JIMMA UNIVERSITY

IMPACT OF INTELLECTUAL CAPITAL EFFICENCY, ON PERFORMANCE OF ETHIOPIAN PRIVAT BANKS.

BY

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DECLARATION

I, Demesew Tefera, have carried out independently a research work entitled **"Impact of intellectual capital efficiency on performance of Ethiopian Private Banks."** in partial

fulfillment of the requirement of the MBA degree in management from Jimma University with the guidance and support of the research advisor. This study is original work and it hasn't been presented for the award of any other Degree, Diploma, Fellowship or other similar titles of any other university or institution.

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ABSTRACT

This paper adopted Pulic (1998) model, scholars acknowledged as Value Added Intellectual Coefficient™ (VAIC™) to the measurement of Intellectual capital efficiency and performance of Ethiopian Private Banks" as measured on return on asset (ROA). This paper also used Purposively sampled from 16 Private commercial bank in Ethiopias, which enable to answer research questions by focusing on particular characteristics of a population that are of interest, 80 observations for 5 years data from 2015 to 2019 was taken. VAIC and its three components, human capital efficiency (HCE), capital employed efficiency (CEE) and structural capital efficiency (SCE) along with the control variable phisical capital intensity (PCI), data are constructed from the annual financial statements. The assumptions needed to be fulfilled for OLS were tested; the residual was found homoscedastic, free of multicollinearity, autocorrelation and normal distributed. Regression models are used to test the hypotheses of the study where the results show that there was positive significant influence of IC as measured by VAIC on financial performance. Among the component of VAIC, the results showed that human capital efficiency (HCE) and structural capital efficiency (SCE) positively influence the financial performance of Ethiopian private commercial banks while capital employed efficiency (CEE) has existence of negative significant relationship and statistically insignificant relationship with

the financial performance as measured by ROA. The study also provided evidence for existence of negative significant relationship between phisical capital intensity and ROA.

Keywords: Intellectual capital, VAIC componants, financial performance measurement and Ethiopian private commercial bank.

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AIB S.C:- Awash International Bank Share Company
ABB S.C:- Abay bank S.C Share Company
ADiB S.C: - Addis International bankShare Company
BOA S.C:- Bank of Abyssinia Share Company
BrIB S.C:- Birhan International Bank Share Company
BuIB S.C:- Bunna International Bank Share Company
CBE: - (commercial bank of Ethiopia)
CBO S.C:- (Cooperative Bank of Oromia Share Company)
DAB S.C:- Dashen Bank Share Company
CE:- Capital Employed
CEE:- Capital Employed Efficiency (VAIC™)
HC:- Human Capital
HCE:- Human Capital Efficiency (VAIC™)
IC:- Intellectual Capital
ICE:- Intellectual Capital Efficiency (VAIC™)
LIB S.C:- Lion International Bank Share Company
NBE - National Bank of Ethiopia
NIB S.C:- Nib International Bank Share Company
OIB S.C:- Oromia international Bank Share Company
OLS:- Ordinary least square
ROA:- Return on Assets
ROE:-Return on Equity
SC:-Structural Capital
SCE:- Structural Capital Efficiency (VAIC™)
UB S.C:- United Bank Share Company
VA:-Value Added
VAIC™:- Value Added Intellectual Coefficient
WB S.C:- Wegagen Bank Share Company
ZB S.C:- Zemen Bank Share Company

CHAPTER ONE

This chapter provides readers with an introduction to the research areas. It starts with study background and continues with problem statements, which presents, how the researcher select the topic, highlights the previous research and subsequently guides the readers to the research questions. Following this chapter presents the research purpose, contribution & limitations and ended with the disposition of the research.

1.1 Background of the study

There is a general consensus among researchers and accounting practitioners that, with the advent of knowledge-based economy, intellectual capital (IC), rather than physical and financial capital, becomes the main factor in driving firm value and sustaining its a competitive advantage (Ahuja & Ahuja, 2012; Wang, 2011; Zeghal & Maaloul, 2010).

As a result, there is now a growing awareness that the potential for creating competitive advantage and long-term corporate value lies more importantly in efficient management of IC than in tangible assets (Ting & Lean, 2009). This is especially so in knowledge intensive industries such as the banking industry as its key resources are intangible and intellectual in nature (Shih, Chang, and Lin, 2010; Kujansivu).Ahuja and Ahuja (2012) argue that an efficient utilization of IC is more crucial for financial performance.

In recent years there has been a growing realization that a company's stock to intangible assets is a key contributor to its capacity to secure a sustainable competitive advantage. Knowledge based intangibles in particular are recognized to be central to the value creation process. Such assets have increasingly been referred to by a new term that of intellectual capital, in order to distinguish them from the financial capital that has traditionally provided the foundations for wealth creation. Intellectual capital refers to a much wider range of assets than those normally recognized as intangible e.g. goodwill, brands, company reputation, etc. Consequently it is often referred to as intangibles particularly in the European literature. Accounting and intellectual capital are linked to each other because of the necessity to provide an accounting perspective on value creation. At one level there is a need to explain the hidden value attributed to intellectual capital by the capital markets, i.e. the excess of the market value of a company over the book value of its assets, determined in accordance with prevailing accounting principles. At the same time, it is important to set about documenting the growth of the value creation. In addition, there is a necessity to clearly distinguish intellectual capital from intangible assets in order that the repertoire of accounting treatments of the latter is not stretched to accommodate the former.

All of this proceeds against a background of growing interest in the establishment of a model of business reporting as a more comprehensive, customer oriented approach to the tasks traditionally associated with financial accounting and reporting. Given intellectual capital's central role in the value creation activities of companies, there is a pressing need to ensure that the information that accountants make available in any business report includes appropriate details of a company's stock of intellectual capital.

As per NBE report, (2010), modern banking in Ethiopia dates back to the year 1905 when the Bank of Abyssinia was established under a fifty year franchise agreement made with the National Bank of Egypt, which was owned by the British by then. It replaced by Bank of Ethiopia, also known as Banque National Ethiopienne, after its formal liquidation on August 29, 1931. Hence, National Bank was one of the first indigenous banks in Africa.

The Bank of Ethiopia operated until 1935 and ceased to function because of the Italian invasion. During the five years of the Italian occupation (1936-41), many branches of the Italian Banks such as Banco d'italia, Banco de-Roma, Banco Di-Napoli and Banco Nazianali del lavoro were operational in the main towns of Ethiopia.

After evacuation of Italians, the State Bank of Ethiopia was established on November 30, 1943 with a capital of one million Maria Theresa dollars. Pursuant to the Monetary and Banking Law of 1963 the State Bank of Ethiopia that had served as both a central and a commercial bank was dissolved and split into the National Bank of Ethiopia and Commercial Bank of Ethiopia Share Company. Accordingly, the central banking functions/activities and the commercial banking activities were transferred to the National Bank of Ethiopia and the Commercial Bank of Ethiopia Share Company respectively(NBE report, 2010).

Furthermore, due to change of government in 1974, and the command economic system which had prevailed in the country, the Commercial Bank of Ethiopia S.C. and other banks and financial institutions were nationalized on January 1st, 1975. The nationalized banks were re-organized and one commercial bank, the Commercial Bank of Ethiopia; two specialized banks- the Agricultural and Industrial Bank (AIB), renamed as the Development Bank of Ethiopia (DBE) and a Housing and Savings Bank (HSB) lately named as the Construction and Business Bank (CBB); and one insurance company, the Ethiopian Insurance Corporation (EIC) were formed.

During the era of state socialism (1974-1991), Ethiopia's financial institutions were charged with executing the national economic plan; state enterprises received bank finance in accordance with the plan's priorities. This system based on the template of the Soviet Union, saw little need to develop the tools and techniques of financial systems (NBE report, 2008).

Following economic policy directions and the change of government in 1991, financial institutions were re-organized to operate towards a market oriented policy framework. Proclamation No. 83/1994 which had allowed the establishment of private banks has marked the beginning of new era in the Ethiopian banking sector development. Commercial Banks both public and private are currently operational in line with NBE Banking Supervision, Proclamation No. 592/2008, 2008. The enactment of the banking legislations in the country in the 1990s result for the establishment a fairly good number of private banks. In 2015/16 the number of banks declined to 18 from 19 due to the merger of Construction& Business Bank with Commercial Bank of Ethiopia. Out of the 18 banks 16 were private and the rest 2 are publicly owned.

In 2018/19, banks opened 807 new branches thereby raising the total number of branches to 5564 from 4757 a year earlier. As a result, one bank branch serves about 17 thousand people. About 34.6 percent of bank branches were located in Addis Ababa. Major branch expansion was undertaken by Commercial Bank of Ethiopia (203 branches), followed by Cooperative Bank of Oromia (73 branches), Abyssinia Bank (69 branches), Wegagen Bank (63 braches), United Bank (61 branches), Nib International Bank (52 branches), Berhan International Bank (49 branches), Awash Bank (41 branches), Dashen Bank (40 branches), Abay Bank (38 branches) and Lion International Bank (25 branches). The share of private banks in total branch network rose to 69.7 percent from 68.9 percent last year. Total capital of the banking industry increased by 18.4 percent and reached Birr 101.5 billion by the end of June 2019.

Total resources mobilized by the banking system in the form of deposit, borrowing and loan collection increased by 3.4 percent and reached Birr 308.3 billion at the end of 2018/19 . Deposit liabilities of the banking system topped Birr 899.6 billion, reflecting 23.2 percent annual growth aided by remarkable branch expansion. Saving deposits grew by 27.4 percent followed by time deposits (25.6 percent) and demand deposits (16.5 percent). Of the total deposits, saving deposits accounted for 54.2 percent, demand deposits 35.1 percent and time deposit (10.8 percent). The share of private banks in deposit mobilization increased to 29.1 percent due to opening of 604 new branches. CBE alone mobilized 60.3 percent of the total deposits due to its extensive branch network.

Raising funds through borrowing by the banking system remained insignificant source of resource mobilization in Ethiopia as most of the banks were sufficiently liquid due to increased deposit mobilization and collection of loans. Their total outstanding borrowing at the end of the fiscal year was Birr 72.2 billion up from Birr 65 billion a year earlier due to borrowing by Development Bank of Ethiopia. Of the total borrowing, domestic sources accounted for 87 percent and foreign sources 13 percent. On the other hand, banks' loan collection reached Birr 131.8 billion, showing a 18.1 percent annual increment, of which 61.5 percent was collected by private banks (NBE report, 2018/19).

Those all the above information shows that, the banking industry in Ethiopia are publicized tremendous grows for the last 27 years, which boosts the new market to attract the investors, meanwhile, the current banking compositions are very tied, due to that the market requires high efficiency and assessment of the performance of the employee.

1.2 Statement of the problem

During the industrial age, tangible assets, labor and financial capital were considered the organization's resources of wealth (Gan & Saleh, 2008). After the shift of market environment from the industrial period to the information period (Hsu & Wang, 2012), IC which is also known as intangible assets, is considered as the fourth factor of production, in addition to financial capital, labor and land (Lev & Daum,

2004).Emphasizing the performance of knowledge based firms such as Microsoft is indicated in the power of market value rather than the book value of these firms (Sullivan, 1999). There is a big gap among a company's book value and its market value, the reasons of this gap is intangible assets (Sullivan, 1999).

Some of the intangible assets in the firms are recognized and reported in the financial statements of firms such as brand equity and patents. In contrast, latent intangibles, for instance, skills and experience of employees, relationships, databases and information and administration system do not have formal categorization for recognition. However, they strongly contribute to organization's market value. IC has been identified as intangible assets among researchers and regulators, resulting in its recognition in firms' annual reports or disclosed as separate reports (Stewart, 1997).

Balance sheet (now is known as statement of financial position) only discloses physical assets of firms with historical and book value, and it does not indicate IC as a significant part of firms' total value. Thus original value of firms is not illustrated by financial statement. Therefore, disclosing and identifying IC is one of the important issues that firms attempt to depict in their financial statement beyond traditional financial accounting standards (Mouritsen, 2003).

Today, one of the important resources for increasing firm performance is IC (Itami & Roehl, 1991). The strong relationship between the market tendency and performance was discovered by Jaworski and Kohli (1993).Organizations can be successful if they indicate and manage their IC (Nonaka & Takeuchi, 1995).

Various scholars have argued on the extent that intellectual capital can enhance firms' performance. However, the idea of intellectual capital is much stronger than its concrete form in the companies' statements. The academia for the past two decades has been drawn into the web of an unending debate concerning the place of intangible assets in corporate value creation. In their separate study, Lev and Sougiannis(1996), Amir and Lev(1996) claim that financial reporting which mainly assesses the tangibles of corporations is to some extent loosing relevance especially in the industrial sector that are dominated by knowledge-intensive and innovative organizations. Further to this, Swartz (2006) in Sofian, Rasid, and Mehri(2013) argue that Intellectual Capital(IC), together with information from financial statement can explain the market value of firms(share prices). In his submission, Jelsis(2007) avers that the benefits of managing Intellectual Capital are that it increases the market value of organizations, improves better communication, optimizes utilization of potentials, increase value creation ability, better image, enhance customers' satisfaction, motivating employees and indeed enhances most business processes.

Intellectual Capital is been identified by many to have the capacity of feeling the crucial gap that exists between company book value and market value. To this extent, companies unarguably require a reliable, accurate and adequate measure of firms' valuation which would have incorporated all the components of IC and sufficiently demonstrate its true impact on company's' value and which will narrow the gap between book and market

values(Vafei, et al, 2011; Banimad, et. al., 2012; Berzkalne and Zelgalve, 2013; Szlavik, 2012; Stewart, Bullen and Eyler; Lev, 2001; Cezair, 2008).

Highlighting the place of Intellectual Capital in corporate valuation,(Bontis, 2001; Lev, 2001; Lev and Zarowin, 1999) argue that if it did not exist in organizations, then stock prices would not have reacted to actions such as changes in management, an element that is not recognized in financial statements as assets. Rastogi, (2000); Lev and Radhakrishan,(2003) aver that Intellectual Capital is both invisible and intangible and as such the value of knowledge cannot be captured well by any traditional measure. In view of the fore going, scholars of financial and corporate reporting in their various studies have both theoretically and empirically examined the impact of Intellectual Capital on firms' valuation but results have rather than resolve the issues remain inconsistent and produced mixed outcomes.

Berzklane and Zelgalve(2014) using the same model aver a statistically significant and positive relationship between IC and company value for companies in Latvia and Lithunia whereas such correlation were not observed for companies in Estonia. Banimahd, et. al(2012) suggests that IC indicators has significant and positive relations with accounting based performance indicators such as profitability and productivity indicating that profitability and productivity have significant and positive relations with all other independent variables (firm size, leverage ratio and physical capital intensity) while market value has only relationship with firm's size variable. It also reveals no relationship between market valuation and IC. Ekwe, (2012) found out a statistically strong relationship between the components of IC and Return on Assets (ROA), Return on Equity (ROE), Employee Productivity, Market to Book value ratio.

The above studies still have acknowledged and restated that the ability of Intellectual Capital to have positively influence on corporate valuations, some empirical results still negates the assertion or could not establish any statistical relationship between IC and firms' value. Ferraro and Veltri, (2011); and Mehnralian, Reseakh, Akhavan, and Sadeh (2012); Gottfredson, (1997); Jensen, (1998) found no statistical significant relationship between IC and organizational performance. Again, analysis by Tarideh, (2013) indicates no relationship between IC and corporate value.

The motivation factors of the study are more, but among them following the countries GTP2 Plan, currently, structural changes are takes place at country level, especially in banking industry, due to that the turnover of the expertise and capable employee increase, which boosts the cost income ratio of the industry. However, the R&D practices on human capital efficiency not satisfactory, especially in emerging and developing country. So, if the researchers work showing a significant positive impact of IC on Ethiopian private banks performance, all the stockholders would be highly benefited and uses this research as a reference for policy and decision making practices.

1.3 Guiding research questions

Based on the above statement of the problems the researcher develops the following research question.

1. What is the Impact of the intellectual capital efficiency as measured on value added intellectual capital (VAIC) model on return on assets (ROA) of Ethiopian Private commercial banks?
2. What is the Impact of Human Capital Efficiency (HCE) on Return on Assets (ROA).
3. What is the effect of Structural Capital Efficiency (SCE) and Return on Assets (ROA).
4. What is the effect of Capital Employed Efficiency (CEE) and Return on Assets (ROA).

1.4 Objectives of the study

Basing the research problems and research questions, the research intends to achieve the following objectives: -

The general objective of this study is to examine the effect of value added intellectual capital efficiency on financial performance of Ethiopian private commercial banks.

1.5 Significance of the study

Bank management teams and the policy makers from the administrative/governmental organ can benefit from this study result while setting up a new policy, procedures and standards on banks. The study contributes a lot to the researcher knowledge and as a partial fulfillment of Master of Business Administration.

1.6 Scope of the study

The research focused only on the Impact of intellectual capital on Ethiopian private banks performance, and gives opportunity to the policy makers and the banks industry stockholders' as a reference.

Since the research limited on the commercial banks, publicly owned banks like Development Bank of Ethiopia (DBE), specialized bank to finance medium and long-term investment projects that are in the government's priority sectors rather than the commercial banking, DBE is out of the scope the study. Hence, main banking activity, and availability of the financial data is the basic criteria of sample selection.

1.7 Limitation of the study

Since this study is on only the private Banks in Ethiopia, the existence of only 16 private Commercial banks in the Ethiopia and some of them are established in the recent year, increasing of panel data leads to decrease the data quality, the study covers only for five years (2015-2019 G.C.) Hence, the first limitation of the study is scope. Furthermore, alternate measures for financial performance like book to market ratio cannot be applied, due to the absence of secondary stock market in Ethiopia. Hence the study limited to use only traditional measure of financial performance, i.e. return on asset (ROA),

The analysis and its derived conclusions based on the secondary data sources (i.e. mainly on published annual reports), both the dependent and independent variables are computed from this past data sources. Hence, the historical data not always reflect the current and future economic situation.

1.8 Organization of the paper

Chapter one provided a brief background into the study of intellectual capital and the financial performance of banking institutions. The remainder of the paper is outlined as - chapter two reviews related literature on the subject matter, chapter three discusses the methodology, chapter four focuses on data analysis and interpretation of findings and chapter five presents the conclusion and recommendations.

CHAPTER TWO

Literature review

In this chapter, the researcher presents the theoretical foundation for the study by providing relevant literature pertaining to intellectual capital and financial performance of private commercial banks. Theories that led to the development of the hypotheses will also be examined, with the different concepts and discussion points arising then being used to frame the final research model. The literature review is based on authoritative and original sources such as journals, books, thesis and dissertations.

2.1 Theoretical Review

2.1.1 Intellectual capital Definition

The emergence of new economy based on knowledge and information has led to an increase in scholars' interest in research in the field of intellectual capital. Therefore, this field has been used as a means to determine the value of a given company and the changes in the dominant paradigm in industrial society (Khalkhali et al., 2012). In fact, in the present knowledge-based economy, the role and importance of intellectual capital return have been considered in the sustained and continuous profitability of companies more than financial return on equity (Anvari, Rostami and Seraji, 2005). Intellectual capital is a multidisciplinary concept and its understanding varies in business and commerce-related fields (Huang and Luther, 2007).

An appropriate combination of value of intellectual capital such as knowledge, proficiency, financial sources, performance, strategy and good relationship with stakeholders can lead to the increase of corporation performance (Dewi and Saudah,

2012). Therefore, through better use and investing in intellectual capital entrepreneurs and their workers will be able to discover opportunities for new business and enhance their competitive advantage in a market (Rexhepi et al., 2013).

2.1.2 **Conceptualizing intellectual capital**

Intellectual capital has been identified as a set of intangibles (resources, capabilities and competence) that drives the organizational performance and value creation (Roos and Roos, 1997; Bontis, 1998; Bontis et al., 2000). So that, intellectual capital is considered as a strategic performance measure introducing a transition in thinking about a new structure and process is supporting a company's productive assets (Bontis, 2001). The various definitions have been proposed for the concept of intellectual capital, but since this concept is abstract, there are some differences between the definitions.

Intellectual capital as having knowledge, application of experience of firm, organizational technology, relationship between customer and suppliers and as also professional ability which leads to competitive advantage in the market of the corporation in market (Edvinsson and Malone, 1997). Similarly, Lonnqvist (2004) have defined intellectual capital as non-physical resource which is related to the employees' abilities, organizational resources, operational methods and communication with the relevant stakeholders, and specifies the value of each company in the market environment. From the accounting point of view, intellectual capital is the equivalent to the market and book value differential of a company's assets, which, in spite of not being in the balance sheet due to its hidden nature, has the potential to turn into profit and benefit (Andriessen and Tissen, 52 Money and Economy, Vol. 9, No. 4, Fall 2014 2000). In other words,

intellectual capital is an intangible asset with the potential to create value for the company and the society (Mavridis, 2005).

There are so many methods to measure the intellectual capital, but, theoreticians agree on VAIC approach (Bontis, 1998; Bontis, 2000; Dong and Gao, 2012; Edvinsson and Malone, 1997; Farsanietal, 2012; Roose et al., 1997; Stewart, 1999; Saint-Onge, 1996; Sveiby, 2012). VAIC was first introduced by Pulic (1998), and it is one of the direct measurement methods. On one side, this model creates a relationship between customer and product or service, and on the other side, it is the relationship between created value and applied resources in production or service. According to this view, the components of intellectual capital considered are physical capital efficiency, human capital efficiency, and structural capital efficiency.

2.2 Review of empirical studies

2.2.1 Studies in developed and emerging market countries

The first empirical study of intellectual capital has been conducted by Pulic (1998), which examine the effect of IC on firm performance. Pulic (1998) created a new method using accounting tools to measure IC and companies' financial performance. It has opened the way widely for researchers from many countries to measure IC efficiency for banking and other sectors Abdulsalam et al., 2011. Bontis, (1998) shed some light on the development of some terms and measurement models relating to IC and its effect on firm performance. Bontis et. al., (2000) studied the effects accounting IC components (HC, SC and relational capital) on performance of Malaysian service and non-service companies. They revealed that HC and relational capital have positive impact on the service sector.

2.2.2 Intellectual capital and banks performance

Many studies in the intellectual capital field show the important role of this capital and its impact on the performance of companies in the world. So that, in the last 25 years a whole literature developed aiming to clarify the concept of intellectual capital (IC) and to decipher the role it plays in increasing the performance of firms (Sumedrea, 2013). For this reason, this article only refers to studies that have been conducted on banking financial performance. When it comes to managing intellectual capital in banks, the finance function has a key role to play in appreciating the source of a firm's value (Irene and Hooi, 2009). Najibullah (2005) conducted a study on the relationship between intellectual capital and the company's financial performance on banks listed on the Dhaka Stock Exchange in Bangladesh. The study showed that there was a strong relationship between intellectual capital and company performance and market value of the company.

An Indian bank evaluates the idea of VAIC and its operation with the help of annual reports. Study justified the relationship of human capital, physical capital and banks performance (Kamath, 2007).

Ulum et al. (2008) conducted a study on the Indonesian banks during the period 2004-2006. The findings showed that there is positive relationship between the intellectual capital and the company's financial performance. The results of the study conducted by Kuryanto and Syafrudin (2008) showed that intellectual capital was not positively related to firm performance. Intellectual capital was also not related to the company's future performance.

Maditinos et al. (2011) researched impact of IC and its components on financial performance and market value of 96 firms from four different economic sectors which were listed on Athens Stock Exchange (ASE), and reported that only human capital component has significant impact. The empirical evidence failed to show the impact of IC on financial performance for the banks listed in Milan Stock Exchange as reported by Puntillo (2009).

Zou and Huan (2011) showed that there is not a significant relationship between IC and banking financial performance in China.

Kvalitne and Primaratny (2012) conducted an empirical investigation on the basis of the intellectual capital of the banking sector in the United States during fiscal years of 2000 and 2010. They aimed to examine the empirical relationship between intellectual capital and productivity, profitability and investor reactions using multiple regression and combination techniques. They showed that there is a positive significant relationship between intellectual capital and productivity, profitability and investor reaction.

Abdullah and Sofian (2012) studied the relationship between the characteristics of the intellectual capital performance of 147 banks in the member countries of the Gulf Cooperation Council. The results indicated that there is a meaningful relation between the characteristics of the board of directors and the intellectual capital performance.

Haji & Mubaraq (2012) elaborated Nigerian banks which illustrate the significance of effective skill management and its direct relation with progression of an organization.

Although the majority of extant studies have shown a positive relationship between intellectual capital and financial performance in a variety of sectors and geographical contexts, there have been some alternative results. For example, the work by Rehman et al. (2011, 54 Money and Economy, Vol. 9, No. 4, Fall 2014 2012) shows that there is no significant link between human capital and structural capital on the performance of banks in Pakistan.

Clearly, there is no confidence in the universality that intellectual capital has a positive influence on banking performance in all contexts. Indeed, there may be specific instances (e.g. certain countries and certain banking styles) where this is not the case. However, there is one more context that may give rise to an alternative view.

Recently, numerous researches have been carried out regarding the measuring of intellectual capital and its relations with financial performance of stock market value of Tehran Stock Exchange companies in Iran. However, only Shahai and Khalaf Elahi (2010) investigated the effect of intellectual capital on the performance of the branches of Sepah Bank in Tehran. Both descriptive and inferential data were obtained from analyzing the questionnaires in their study. Their results showed that the intellectual capital component have a positive effect on the performance of the branches of Sepah Bank in Tehran, and the highest effect belonged to the client capital, next stand structural and human capitals.

The difference between this paper and the mentioned study is that this article investigated the emphasizing role of intellectual capital in banking financial performance and it dealt with actual data of the banks under study. To provide the information on financial performance and IC of the banks, this study collected data through the financial statements issued by banks. These financial statements are published annually in websites of banks and to process the data, E-views software will be used. As a result, the research question will be: what is the Impact of Intellectual capital efficency (structural, physical and human) on the Performance of Ethiopian private banks.?

In Australian, Joshi et al. (2010) explored the relation between IC (and components) and banks' performance over the period 2005-2007 using the VAICTM model. Significant relation between HC and value creation efficiency has been reported, where human capital efficiency is relatively higher than structural capital efficiency and capital employed efficiency. Moreover, bank size, number of employees, and shareholder equity has no influence on IC performance of Australian banks.

The research works of Shih, et.al. (2011) reported the correlation between knowledge creation and intellectual capital in Taiwan's banking sector is a positive impact on knowledge creation on HC, SC and CC capital. In addition, HC performance showed significant effect on customer capital and SC. Moreover, customer capital positively influences SC and banks with high HC have good operational efficiency.

Mondal & Ghosh (2012) explored the relation between IC and performance in terms of ROA, ROE and asset turnover ratio for 65 Indian banks for 1999-2008. The findings highlighted significant relation between IC and ROA and ROE and asset turnover ratio. The study also found that human capital has a major effect on banks performance. These

findings are parallel with Kamath, (2007) that indicate that foreign banks show perfect use of HC to create value, whereas public banks rely on CE to achieve good performance.

Mention & Bontis (2013) analyzed the relation between IC and its components with banks performance in Luxembourg and Belgium. The findings show that human capital affects banks performance directly and indirectly, whereas structural capital and relational capital both presented insignificant positive effect on banks performance.

Al-Musali and Ismail, (2014) examines intellectual capital performance of listed banks in Saudi Arabia using VAIC methodology, and investigates the impact of IC on financial performance. The results of a survey of a sample of all listed banks during 2008 to 2010, found that IC performance of Saudi banks is low and it is positively associated with bank financial performance indicators. However, when VAIC is split into its components, the relationships between components and bank financial performance indicators vary.

Lina (2014) associated the IC components towards company performance, where the listed companies in Indonesian Stock Exchange were examined between the periods of 2009 to 2011. Result showed that HC and SC had no influence towards company performance while CE had a significant a relationship with company performance.

Fatima and Ousama, (2015), measures the value added intellectual coefficient (VAICTM) for corporate efficiency performance of the Islamic banking sector in Malaysia and examines the relationship between IC efficiency and financial performance. The secondary data collected from annual reports for the years 2008, 2009 and 2010 reveled that human capital efficiency is higher than the structural capital and capital employed efficiencies. Furthermore, the paper found that IC efficiency influences the profitability of Islamic banks. The findings provide empirical evidence that the optimal utilization of IC and resources leads to higher bank profitability.

In US, Meles et al, (2016) examined the impact of intellectual capital on financial performance using a large sample of 5,749 commercial banks, covering over 40,000 observations over the time window 2005-2012. The study found that efficiency in the use of Intellectual Capital (IC) positively affects the financial performance of US banks. In addition, the results show that the human capital (HC) efficiency, a subcomponent of IC efficiency, is found to have a larger impact on financial performance than other IC sub-components. These findings suggest that the development of effective techniques of knowledge management, enabling banks to accumulate the IC necessary to adapt to a constantly changing environment, represents an effective tool of achieving the goals of both bank managers and policymakers.

Avci E. and S. Nassa, 2017 investigated the relationship between intellectual capital and financial performance of financial companies listed in Borsa Istanbul, using data of 44 listed companies over 2004-2015. VAIC method is used as a measure of IC. An OLS regression is utilized to examine the impact of IC; HCE, SCE, and CEE on market performance, financial performance, and productivity performance. The findings show that HCE has a positive significant relation with ROA. SCE show a positive significant relation ROE and a negative significant association with market to book ratio. Regarding

to CEE, the results show that it has only a positive significant impact on market to book ratio and a negative significant influence on asset turnover ratio.

Poh et al., (2018) measure the intellectual capital towards the financial performances of the local banks in Malaysia through VAIC method. The study determine how the intellectual capital influences the financial performances of banks in terms of two periods which are latest six years from 2011 to 2016 and the past ten years from 2007 to 2016. The regression analysis results to indicate that the components of intellectual capital have their influences towards the bank's financial performances indicators. Over the six years and ten years periods, intellectual capital has the significant relationship on Return on Assets. These results determine that the banks need to focus on the three components of intellectual capital whereby all the three efficiencies have the influences to enhance the best financial performances in Malaysia's banking sector.

2.2.3 **Studies in African countries**

Chokri Zehri et. al., (2012), examined the relationship between IC and business performance from the standpoint of financial performance, the marketplace and economics. The researchers used a sample of 25 companies listed on the stock market in Tunisia by using a panel's data. The result confirmed that components of intellectual capital have positive and significant impact on firm performance.

In Nigeria,Ekwe, (2013) investigatedthe relationship between the IC indices (HSE, SCE and CEE) and growth in revenue of selected banks using VAIC. The study adopted the ex-post facto research design and systematically conducted using longitudinal time series data generated and computed from the annual reports and accounts of the selected banks in Nigeria spanning from year 2000 to 2011. The multiple regression analysis results showed that there was positive and significant relationship between components of VAIC and the growth in revenue of the banks in Nigeria.

Njuguna, (2014) aimed to determine how intellectual capital affects the financial performance of Kenyan state corporations. The study adopted a descriptive research design used primary data which was collected through self-administered questionnaires and employed a multiple regression analysis technique. The findings of the study indicate that the company culture which contains valuable practices of conducting business is the major benefit resulting from organizational intellectual capital. The findings also indicated that employees being very highly skilled in their jobs as the major way of human capital to improve the firm's performance.

Isanzua, (2015), sets out to extend the evidence by investigating the intellectual capital of banks operating in Tanzania, for the period of four years from 2010 to 2013. Annual reports, have been used to obtain the data on VAIC in determining intellectual capital and its three major components like HCE, SCE and CEE. The results revealed that Intellectual capital has a positive relationship with financial performance of Tanzanian banks and also when the VAIC was divided into its three components it was discovered that the financial performance is positively related to Human capital efficiency and Capital employed efficiency but is negatively related to structural capital efficiency.

Kurfi et. al, (2017), examined the impact of IC on financial performance of listed Nigerian food products companies from 2010 to 2014 by adopting VAIC model. The Regression results show that there was positive significant influence of IC on financial performance. Specifically, the results showed that structural capital and capital employed influence the financial performance of Nigerian food products companies. Based on the resource-based theory, the results prove that companies can enhance financial performance by emphasizing on IC.

Ogbodo Okenwa et. al., (2017)examined the effect of IC on the financial performance of 15 quoted commercial banks in Nigeria using VAIC model through a panel data analysis for six years from 2010 to 2015. The results revealed that there is a positive and statistically significant relationship between Intellectual Capital and financial performance of deposit money banks in Nigeria at 5% level of significance.

2.2.4 **Studies in Ethiopia**

Mekete, (2015), examined the Effects of intellectual capital on innovations in the Ethiopian commercial banks specifically the mediating role of knowledge management via primary data (questionnaire). Empirical findings of the study showed that human, social and customer capital have a positive and direct effect on knowledge management. Knowledge management has a positive effect on product, process and organizational innovations. Social capital has a positive and direct effect on organizational innovation but doesn't have effect on product and process innovations. Customer capital has direct effect on product and process innovations but not on organizational innovation. Human capital has a negative and direct effect on product innovation.

Demissie, (2016), assesses the direct and indirect effect of intellectual capital on innovations considering organizational capital as a mediator in the Ethiopian commercial banking sector through a primary data using a 5 item likert Scaled questionnaire. The results revealed that intellectual capital does not have a significant direct effect on product innovation with the exception of organizational capital. Organizational capital mediates the relationship between intellectual capital and innovations. Human, organizational and customer capital have a positive direct effect on process innovation while social capital has a negative direct effect. Human, customer and social capital do not have a significant direct effect on Ethiopian banking sector's product innovation.

Meressa, (2016), empirically examine the determinants of intellectual capital of Ethiopia banks by considering bank age, bank size, investment in information and technology, bank risk, profitability, ratio of staff cost to total income and bank concentration as an explanatory variables. With arrangement of secondary data, short panel, quantitative approach and deductive method of inquiry, the fixed effect linear regression analysis revealed that bank profitability, ratio of staff cost, investment in information and technology and bank concentration have statistically significant positive effect on intellectual capital performance. In addition, bank risk and age have significant negative effect on intellectual capital performance. Furthermore, the study found that, bank size has statistically insignificant negative relationship with intellectual capital performance.

Henok, (2017), empirically examine the "Effect of intellectual capital efficiency on financial performance: evidence from Ethiopian commercial banks" the results show that there was positive significant influence of IC as measured by VAIC on financial performance. Among the component of VAIC, the results showed that human capital efficiency (HCE) and structural capital efficiency (SCE) positively influence the financial performance of Ethiopian commercial banks while capital employed efficiency (CEE) has statistically insignificant relationship with the financial performance as measured by ROA. The study also provided evidence for existence of negative significant relationship between firm size and ROA. .

As per the annual and quarterly reports of NBE, for the year ended June 30, 2019, total capital of the banks reached birr 101.4 billion, of which all private banks comprise 57%. Total deposit of banks reached birr 899.6 billion as of june 2019, out of which all private banks comprised 40% , regarding branches over all branches reached 5,564 as of june, 2019, out of which private owned banks share stood at 70%.

2.3 Research gap and contribution

The scholares studies increasingly indicate that value added may be the smoothest measure of IC by adapting the VAIC model. However, overall studies using VAIC have resulted in mixed reviews across different countries, industries, and years. For instance, while Appuhami (2007) concluded IC's importance in Thai sectors, Shiu (2006) noted only weak relationships between performance and VAIC. In addition,Chen et al. (2005) concludes that IC drives firm value and financial performance, however, Firer and Williams (2003) and Chan (2009) found that firms and investors place less importance on IC compared to physical assets. The inconsistency of the evidence does not lead to a compelling conclusion about the relationship between firm performance and IC.

Furthermore, regarding the components of VAIC, Lina (2014) in her study associated the IC components towards the company performance, where the listed companies in Indonesian Stock Exchange were examined between the periods of 2009 to 2011. Result showed that HC and SC had no influence towards company performance while CE had a significant a relationship with company performance. Thus, the study found mixed result. However, the study of Mehri et al. (2013) on the relationship between IC and financial performance industries in Malaysia, reported a positive significant relationship. In the same vein, the study of Dadashinasab and Sofian (2014) investigated the effect of IC on high IC firm financial performance with moderating role of dynamic capability for the periods of 2000 to 2011.

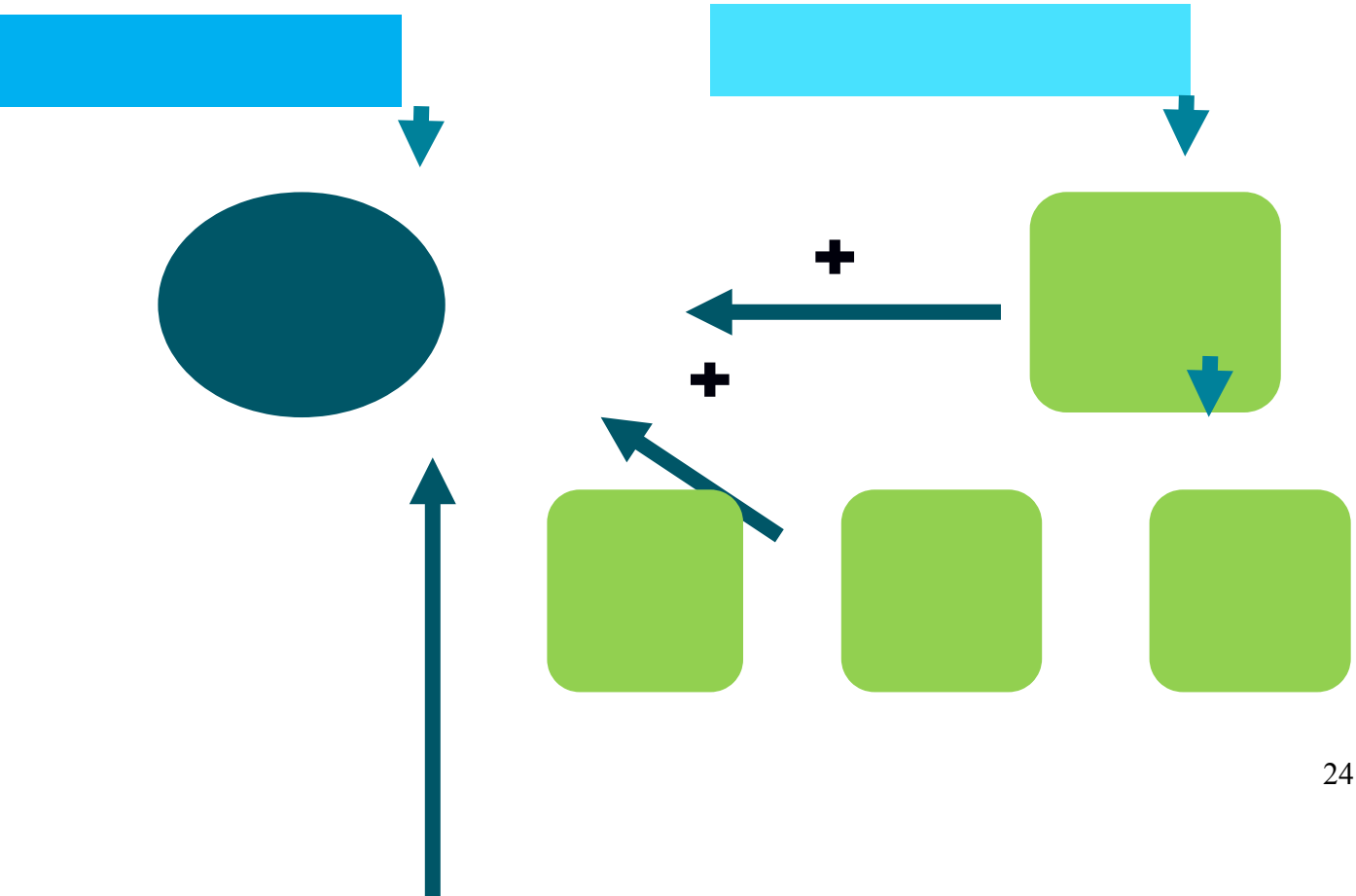
Similarly, the study of Maditinos et al. (2011) and Laing et al. (2010) in Athens and Australia on empirical relation of IC efficiency based on HC efficiency showed a significant and positive relation with financial performance. A study by Al-Shubiri (2013) on the impact of value added intellectual coefficient components on financial health in Jordanian industrial sector from 2005 to 2011 indicated a significant impact of human, employed element and IC as a whole on financial health as productivity and profitability. Unlike the study of Najibullah (2005) that investigated the value creation efficiency of IC with market valuation and financial performance of 22 Bangladesh Banks listed on Dhaka Stock Exchange. Hence, the result proved mixed.

The concept of intellectual capital in Ethiopia is not widely investigated. Though, there are very few, Mekete, (2015), Meressa (2015), Demissie (2016), and Henok (2017) researches conducted on the intellectual capital, none of them are conclusive and fully covered all computative banks in Ethiopia. Mekete, (2015), focused on examining effect on innovation through mediating role of knowledge management on commercial banks financial perfomance, while Demissie, (2016) investigated the relationship between intellectual capital and organaizational capital. Moreover, Meressa (2015) investigated the determinants of value added intellectual capital itself through seven proxy variable. Henok (2017) investigate "Effect of intellectual capital efficiency on financial performance: evidence from Ethiopian commercial banks" including CBE and excluding Debub global and Enat Bank. Therefore, to updating the existing research works and to confirm and fill the researcher's gap, the researcher initiated by these two reasons and devotes to conduct a research on it.

2.4 Conceptual framework

The correlation of intellectual capital against bank performance on a whole would be determined between efficient utilization of assets that is via the return on assets (ROA) ratio. Subsequently, each element of intellectual capital was analyzed on how it corresponds towards performance to determine which has the most significant contribution using regression. Using VAIC models, the study were provide a better understanding on the relationship of intellectual capital and performances of Private commercial banks' in Ethiopia. Referring to the literatures reviewed, the overall intellectual capital component will be represented and measured by the VAIC model and the following conceptual framework of the study is developed by the researcher.

Figure 2.1 the conceptual framework or model of the study



Source: Adopted from (Isanzu, 2017) and esearcher.

The equation below formalizes the VAIC relationship algebraically;

VAIC = CEE + HCE + SCE ……. Source Isanzua, (2015)

Where VAIC = VA intellectual coefficient of the banks
CEE = capital employed efficiency coefficient of the banks
HCE = human capital efficiency coefficient of the banks.
SCE = structural capital efficiency of the banks
VA = value added by each year for the banks

Pulic (1998) states the higher the VAIC coefficient, the better the efficiency of VA by a firms total resources. The first step in calculating CEE, HCE and SCE is to determine a firm's total VA. This calculation is defined by the following equation.

VA = I + DP + D + T + M + R + WS …….. Source Isanzua, (2015)

Where; VA (value added) for the banks are computed as the sums of interest expense (I), depreciation expenses (DP); dividends (D), corporate tax (T), equity of minority shareholders in net income of subsidiaries (M), and profits retained for the year (R) wages and salaries (WS).

Public (1998) further states that CEE is the ratio of total VA divided by the total amount of Capital Employed (CE) where capital employed is defined as the book value of a firm's net asset. CEE is represented algebraically as;
CEE = VA/CE
Where CEE = capital employed efficiency coefficient of the banks.
VA = VA of the bank and
CE = Book value of the net assets of the banks
HCE = is calculated as the ratio of total VA divided by the total salary and wages spent by the firm on its employees. The equation is shown below
HCE = VA/HC Where:
HCE = human capital efficiency coefficient of the banks,
VA = Value added of the banks and
HC = Total salary and wage cost of the banks
In order to calculate SCE, it is first necessary to determine the value of a firm's Structural Capital (SC). Pulic (1998) proposes a firm‟s total VA less its human capital is an appropriate proxy of a firm‟s SC. That is:

SC = VA – HC

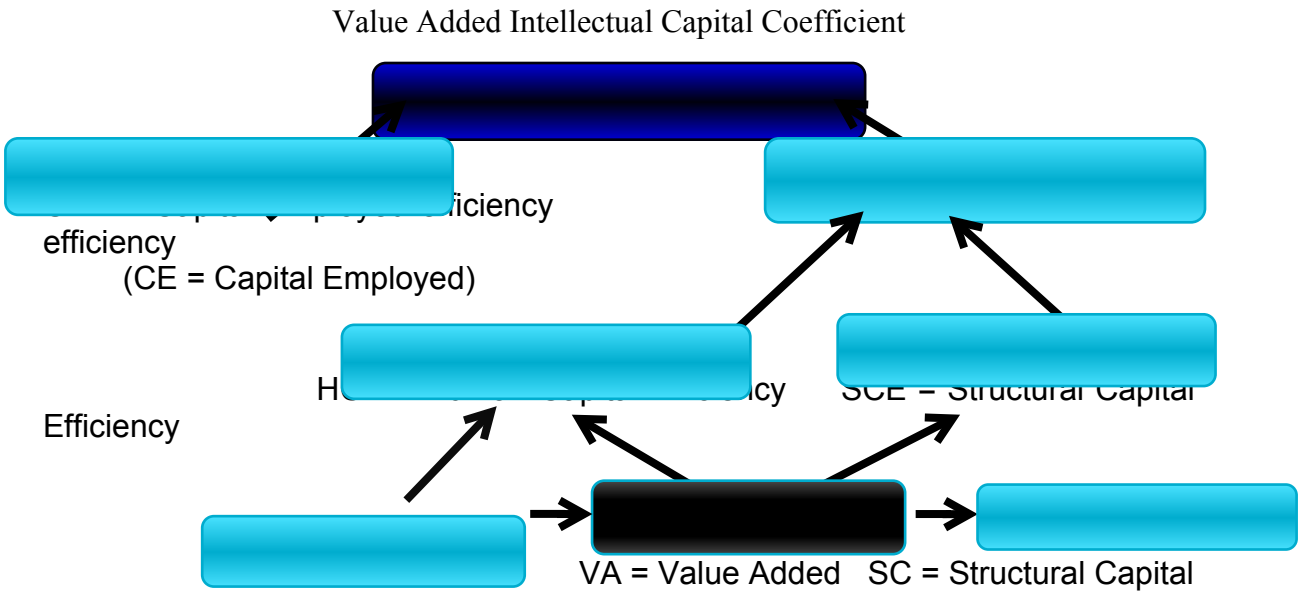
Where; SC = structural capital of the banks
VA = VA of the banks and
HC = total salary and wage expenditure of the banks.

Based on prior empirical research findings, Pulic (1998) argues that there is a proportionate inverse relationship between HC and SC in the value creation process attributable to the entire intellectual capital bases, the less human capital participates in value creation, them more structural capital is involved. Consequently, Pulic (1998) argues the formula for calculating SCE differed to that for CEE and HCE respectively. Specifically, Pulic (1998) states SCE is the ratio of a firm's SC divided by the total VA. The relationship is shown in the equation below.

SCE = SC/VA

Where = SCE = structural capital efficiency coefficient VA of the banks,
SC= structural capital of the banks and
VA = VA of the banks

Figure 2.2: Construction of VAIC



Source: Shamsudin & Yian, (2013)

The study adopts VAIC technique developed by Pulic (1998). This is because, the VAIC model enables the firm to measure its value creation efficiency, it is less criticized model, as well as the most recent model for measuring financial performance through intellectual capital (Sekaran and Roger, 2013). Additionally, VAIC has been adopted in several studies (Ting and Lean, (2009), Al-Musali, (2010), Kamal et. al., (2011), Jasour et. al, (2013), Sofian, (2014), Isanzua, (2015), Razak et. al., (2016), Kurfi et. al, (2017) and Poh et al., (2018)) to examine the relationship between IC and firm's performance.

VAIC uses of three components (Coefficients as follows; Capital Employed Efficiency, Human Capital Efficiency and Structural Capital Efficiency). Pulic (1998, 2000) opines

that VAIC is an analytical procedures designed to enable management, shareholders and other relevant stakeholders to effectively monitor and evaluate the efficiency of value added by a firm's total resources and each major resource component. VAIC is a composite sum of two major indicators; these are:

(1) Capital Employed Efficiency (CEE) - indicator of value added efficiency of capital employed which is defined as the book value of a firm's net assets.

(2) Intellectual Capital Efficiency (ICE) - indicator of value added efficiency of company's intellectual capital base. Intellectual capital efficiency is composed of two other variables as follows:-

(2.1) Human Capital Efficiency (HCE) - indicator of value added efficiency of human capital. Total salary and wage costs are indicators of a firm's human capital (HC).

(2.2) Structural Capital Efficiency (SCE) - indicator of value added efficiency of structural capital.

CHAPTER THREE

Research design and methodology

The preceding chapter presented reviews of literatures on intellectual capital with respect to the theoretical perspectives and prior empirical studies. The results from a review of the literature are used to establish expectations for the relationship of intellectual capital and firms' financial performance. In addition, it confirms that there was a knowledge gap on intellectual capital and financial performance of Ethiopian Private commercial banks. This chapter outlines and explains the methodology employed to achieve the research objective. It starts by explaining source of data and continues with population of the study and sample, data type, data presentation and analysis techniques in the subsequent sections.

3.1 Introduction

There are two main research paradigms quantitative research method and qualitative research method. The quantitative research is more objective in nature that involves analysis of numerical data by applying statistical tests. However, the qualitative research is much more subjective in nature, concerned with understanding of applicable knowledge and can be generalized in understanding of the phenomenon (Collis and Hussey, 2003). The methodology part of the research explains the design of the research,

instruments to be utilized in order to answer the research questions, the sources of data, sample specification and finally the model adopted explaining the dependent as well as independent variables.

3.2 Research design

A research design is a master plan that specifies the methods and procedures for collecting and analyzing the needed information. It provides a framework or plan of action for the research (Zikmund, 2003). The design of this research was quantitative as the author focus on numeric data obtained from financial statements of the selected banks and then employs a regression analysis. The purpose of this research paper was explanatory as the emphasis in explanatory research is on studying a situation or a problem in order to explain the relationships between variables. It also attempt to build and elaborate on theories and add to predictions and principles where possible.

Accordingly, the cause and effect relationship between dependent variables (financial performance measured by ROA) and Independent variables, value added intellectual capital (VAIC) and its components ;capital employed efficiency (CEE), human capital efficiency (HCE) and structural capital efficiency (SCE), along with the control variable physical capital intensity (PC) were examined. Panel data regression analyses were used to investigate the extent to which intellectual capital affect financial performance of Ethiopian private commercial banks within the period 2015 to 2019.

Panel data is a dataset in which the behavior of entities like states, companies, individuals and countries are observed across time. The estimation technique will be adopted because it takes care of heterogeneity associated with individual banks by allowing for individual specific variables, it gives more informative data, more variability, less collinearity among variables, more degree of freedom and more efficiency (Charless & Kenneth, 2013). It also in reaches empirical analysis in such a way that may not be possible if either only time series data or cross sectional data is used.

3.3 Population of the study

This study was conducted on Ethiopian private commercial banks, in which a total of sixteen private banks are operating at the moment. For this research purpose out of eighteen total commercial banks including the government owned banks, the researcher selected 16 private commercial banks. Based on their establishment period were all of them are operational under this study cover years, 2015-2019, and hence the availability of required data were assured. Secondly, as the purpose of its establishment differs from the commercial banks business line, DBE (Development Bank of Ethiopia) is the state owned bank. DBE specialized bank to finance medium and long-term investment projects that are in the government's priority sectors and based on their branch size, huginess of capital, period of establishments and asset merging policy from the government with existing construction business bank, commercial bank of Ethiopia also discarded from the sample.

Hence, out of the eighteen banks in Ethiopia, the following Sixteen commercial banks selected for this research purpose:-

- ABB S.C (Abay Bank Share Company)
- AdIB S.C (Addis International Bank Share Company)
- AIB S.C (Awash International Bank Share Company)
- BOA S.C (Bank of Abyssinia Share Company)
- BrIB S.C (Birihan International Bank Share Company).
- BuIB S.C (Bunna International Bank Share Company)
- CBO S.C (Cooperative Bank of Oromia Share Company)
- DAB S.C (Dashen Bank Share Company)
- DGB S.C (Debub Global Bank Share Company)
- EB S.C (ENAT Bank Share Company)
- LIB S.C (Lion International Bank Share Company)
- NIB S.C (Nib International Bank Share Company)
- OIB S.C (Oromia international Bank Share Company)
- UB S.C (United Bank Share Company)
- WB S.C (Wegagen Bank Share Company) and
- ZB S.C (Zemen Bank Share Company)

3.4 **Data type and sources**

The reaserch sampling method is purposive as the samples included are based on the judgment of the author, based on the forgoing evidence the sampled are all sixteen banks are dominant in Ethiopian banking industry and conclusions made on those banks will fairly represent the banks industry average business transaction.

The main goal of purposive sampling is to focus on particular characteristics of a population that are on performance of the banks, which will best enable to answer research questions. Basing purposive sampling, 80 observations are selected taking 5 consecutive year data from each of the sixteen private commercial banks anual report mainained at NBE records. The biggest advantage of using secondary data is that it can be more economical. Someone else has already collected the data, so the researcher does not have to devote money, time, energy and resources to this phase of research.

However, secondary data may not answer the researcher's specific research questions or contain specific information that the researcher would like to have. It also may not have been collected in the geographic region or during the years desired, or with the specific population that the researcher is interested in studying. In order to overcome the drawback of the secondary data, the researcher focused on specific industry and shorter periods besides to conducting census on the population.

3.5 **Measures of variables**

3.5.1 **Dependent variable**

Measurement of a variable is essentially the process of assigning numbers to that variable of the study (Lee Abbott and McKinney, 2012). In scientific research, variables must be measured (Graziano and Micheal, 1993). Thus, measurement of the variables in the theoretical framework is a part and parcel of scientific research and a crucial aspect of research design (Sekaran and Roger, 2013). Leedy and Ormrod (2010) opined that unless

the variables are measured in some means the researcher will not be able to test the hypotheses and eventually to find answers to research questions.

In this study, financial performance which is measured by ROA is the dependent variable that reflects the efficiency of firm in utilizing total assets, and holding constant firm's financial policy. It also provides information about the value added to the company that leads to better performance of that company. Prior studies like Lina (2014), Salman et al. (2012) and Dadashinasab and Sofian (2014) used ROA as a measure of financial performance while other studies like, Fathi et al. (2013), Djamil et al. (2013) and Bharathi (2015) used ROA in addition to return on equity (ROE) for determining financial performance. The formulation of ROA measures a company's earning in relation to all of the resources it had at its disposal, which is the shareholders‟ capital plus short and long term borrowed funds. ROA formula is:

ROA = Net income/ Total Assets

3.5.2 **Independent Variables**

Although the measurement of intellectual capital is still a debatable issue, numerous methods have been developed to measure it. In this study, the Value Added Intellectual Capital (VAICTM) method, developed by Public (1997, 1998, 2001, 2002a, 2002b, 2004), were used. The researcher used VAIC as an independent variable independently on the first regression analysis. In addition, each of VAIC components i.e. capital employed efficiency (CEE), human capital efficiency (HCE) and structural capital efficiency (SCE) along with the control variable physical capital intencity (PCI) used to assess the effect of each variable independently on the financial performance of Ethiopian Private commercial banks.

3.5.3 **Control Variables**

Physical capital intensity (PCI): Physical capital intensity as measured by a ratio of a company's fixed assets to its total assets (Firer and Stain bank, 2003; Firer and Williams, 2003) is used to control for the impact of fixed assets on corporate performance. The assumption is that company's fixed assets have significant impact on company's financial performance.

3.6 **Methoud of Data analysis**

The researcher employed both descriptive analysis and the regression analysis.

3.6.1 **Descriptive stastics analysis and development**

Descriptive analysis was used to describe relevant aspects of intellectual capital and financial performance of Ethiopian private commercial banks and to provide detailed information about each relevant variable. Diagnostics tests for Muliticollinearity,

Hetroskadasticity, Autocorrelation and test for data normal distribution tests were conducted to ensure that the data suits the basic assumptions of classical linear regression model.

3.6.2 **Regression analysis**

Regression analysis was used to examine the relationship between intellectual capital and financial performance of Ethiopian private commercial banks and to know the effect and magnitude of intellectual capital on their financial performance. Furthermore, in order to examine this relationship between intellectual capital and financial performance of Ethiopian private commercial banks, panel least square method is used.

Finally, the P-value was used to determine the significance of the variables and the coefficients terms for each of the regressions. The importance of each of the regressions was determined by carrying out the F-test at 95% confidence level. The coefficient of determination R2 was used to measure the strength to which independent variables explain the variations in the dependent variables. The analysis carried out with E-views version 8 statistical software.

3.6.2.1 Econometric Model

Sink and Tuttle (1989) claim that to measure the performance of an organization, seven performance criteria could be analyzed for comparison including: effectiveness, efficiency, and quality, and productivity, quality of work life, innovation and profitability. In this study, profitability and productivity was utilized to measure performance. Productivity is basically balancing the output a production unit generates and the provided inputs by a decision making unit. It quantifies an efficient use of resources by increasing the production of goods and services with the same resources or utilizing fewer resources to produce the same goods and services. Greater financial performance is more likely to be visible when a firm exhibits its productivity growth (Roslender and Fincham, 2001).

Productivity has always been important to the development process in the banking sector as it allows banks to intensify their competitiveness in relation to enhancing operational efficiency and to develop more contemporary priced financial products. The banking sector is a dominant supplier of intermediate services such as financing facilities indicating how important productivity in the banking sector is to the economy. Furthermore, the efficiency of the banking sector administering intermediate services affects the value chain of manufacturing and service industries et al. that depend on such services being provided to them (Abd-Kadir H., Selamat Z. & Idros M., 2010). However, the general procedures of financial reporting and accounting regulations are insufficient to report IC value in spite of the amount of methods developed and utilized to measure IC (Andriessen, 2004; Pike and Ross, 2004; Chan, 2009), (Lev and Zorowin, 1999; Lev, 2004; Kujansivu, 2005; Lajili and Zeghal, 2005).

Although many methods have been proposed and utilized, a widely accepted process of IC quantification does not exist. “True competitive advantage” is created by identifying and measuring IC as intangibles create value and is therefore important to organizations (Ratnatunga et al., 2004, p. 78).

The typical measurements of IC are limited (Abernethy et al., 2005) and even popular frameworks like balancing the scorecard face issues when linking the method to outcomes (Norreklit, 2000). Thus innovative solutions when measuring IC are required especially to pinpoint the links between IC elements and rational capital and value creation (Edvinsson and Malone, 1997; Stewart, 1997; Sveiby, 1997).

After surveying contemporary studies Andriessen (2004) listed 30 methods and more recently Chan (2009) listed 34 methods of calculating IC. Pike and Ross (2004) were assured in the reliability of these methods having measured the succor of a few of these methods with associated theories. Andriessen (2004) felt that they failed to establish a connection between financial performance and IC.

The methods identified and commonly established by Pike and Ross (2004) and Chan (2009) were categorized into four generic approaches:

i. Market Capitalization Methods (MCM): Calculate the difference between a company's market capitalization and its book value as the value of its IC or intangible assets. Markets to Book Value, Tobin‟s Q are examples of this method.

ii. Direct Intellectual Capital methods (DIC): Estimate the Ringgit-value of intangible assets by identifying its various components. Once these components are identified, they can be directly evaluated, either individually or as an aggregated. This method includes The Value Explorer, Intellectual Asset Valuation, Total Value Creation (TVC), Accounting for the future (AFTF) etc.

iii. Scorecard Methods (SC): The various components of intangible assets or intellectual capital are identified and indicators and indices are generated and reported in scorecards or as graphs. Examples of this method are National Intellectual Capital Index, IC Rating TM, ICdVALTM, and Value Chain Scoreboard

iv. Return on Assets methods (ROA): It is the capitalization of industry above-average earnings by the company’s average cost of capital. Industry above average earnings is the multiplication of company’s excess ROA over industry ROA with its average tangible assets. This method includes Knowledge Capital Earnings, Economic Value Added (EVATM), Calculated Intangible Value (CIV), Value Added Intellectual Coefficient (VAICTM) etc.

These approaches were explained in detail by Chan (2009). The final approach, i.e. VAICe, or the “Austrian approach”, has been utilized in numerous of studies (VAICe) (Pulic, 2000, 2001, 2004; Chan, 2009). The VAIC approach is a comparative analysis that is both standard and consistent that can be utilized at local and international levels over a long period of time.

In order to identify the effect of intellectual capital on Ethiopian private commercial banks financial performance, multiple regression analyses were applied. Multiple regressions are not only a technique, but a whole family of techniques which can be used to explore the relationship between one dependent variable and a number of independent variables (Brooks, 2008).

Most Economic analysis use regression analysis to make quantitative estimates of economic relationships that previously have been completely theoretical in nature. Therefore, the literature reviewed in the previous chapter identified the proxy variables for both the explained variables (financial performance) and the explanatory variables (Intellectual capital). This chapter presents a framework of analysis on the basis of these studies, and involves adopting a model that would help to demonstrate the responsiveness of the dependent variables (ROA) to the change in the explanatory variable (intellectual capital) in Ethiopian private commercial banks.

Panel techniques take into account the heterogeneity present among individual commercial banks, and allow the study of the impact of all factors with less collinearity, more degree of freedom and greater efficiency Christopher and Rim, (2014). According to Brooks, (2008), the general multivariate regression model with K independent variables can be written as follows:-

$$\mathbf{Yi = \beta 0 + \beta 1X1i + \beta 2X2i + \ldots + \beta kXki + \varepsilon i \ (i\ 1,2,3\ldots,n)}$$

Where Yi is the ith observation of the dependent variable, X1i,…,Xki are the ith observation of the independent variables, β0,…,βk are the regression coefficients, εi is the ith observation of the stochastic error term, and n is the number of observations.

The following models were used to identify the effect of intellectual capital on financial performance of Ethiopian Private commercial banks. The study used the accounting proxies (ROA) to measure the financial performance of Ethiopian Private commercial banks. The author also used Value Added Intellectual Capital (VAIC) as explanatory variable in the first regression analysis. In order to assesses the effect of each of the VAIC components i.e. capital employed efficiency (CEE), human capital efficiency (HCE), structural capital efficiency (SCE) along with the control variable for Physical capital intensity(PCI) used in the second model.

Financial Performance = f (intellectual capital)

Model: 1 ROA= α + β1 VAIC+ ε

Model: 2 ROA = α + β1 (CEE) + β2 (HCE) + β3 (SCE) + β4 (PCI) + εit

Where: ROA = Return on Asset (dependent variable), α = Constant coefficient
β = Regression coefficients for measuring independent variables
VAIC = value added intellectual coefficient, CEE = capital employed efficiency
HCE = human capital efficiency , SCE = structural capital efficiency and
PCI = Physical capital intensity and εit = Error component showing unobserved factor

Table 3.1 VAIC variables & computation

Output (Interest Income + Service Charge & Commission Income + Other Income)

Input (Provision For Doubtful Loans + General Expenses)
VA (OUTPUTit - INPUTit)
Capital Employed (Total Assets – Total Liability)
VACAit = VAit / CAit
HCit = Investment in Human Capital (Employees Salary & Benefits)
VAHCit = VAit / HCit
SCit = Structural capital (VAit – HCit)
STVAit = SCit / VAit
VAICit = VAHCit + VACAit + STVAit

Source: - Isanzua, (2015), Razak et. al., (2016), Thakur, (2017) and Poh et al., (2018)

Table 3.2 Definition, notation and expected sign of the study variables

Variables	Notation	Measure	Used By (Source)	Expected Sign
Return on Assets	ROA	Net income after tax / Total Assets	Lina (2014) and Salman et al. (2012)	
Value Added Intellectual Capital	VIAC	Human Capital Efficiency + Capital Employed Efficiency + Structural Capital Efficiency	Isanzua, (2015),	+
Human Capital Efficiency	HCE	Capital Employed Efficiency	Razak et. al., (2016) ,	+
Capital Employed Efficiency	CEE	Structural Capital Efficiency	Thakur, (2017)	+
Structural Capital Efficiency	SCE	Value Added – HCE	Poh et al., (2018),	+
Physical capital intensity	PCI	Capital Intensity		+

Source: - Compiled by researcher

3.6.2.2 Diagnostics Test

Sink and Tuttle (1989) claim that to measure the performance of an organization, seven performance criteria could be analyzed for comparison including: effectiveness, efficiency, and quality, and productivity, quality of work life, innovation and profitability. In this study, profitability and productivity was utilized to measure performance. Productivity is basically balancing the output a production unit generates and the provided inputs by a decision making unit. It quantifies an efficient use of resources by increasing the production of goods and services with the same resources or utilizing fewer resources to produce the same goods and services. Greater financial performance is more likely to be visible when a firm exhibits its productivity growth (Roslender and Fincham, 2001).

Productivity has always been important to the development process in the banking sector as it allows banks to intensify their competitiveness in relation to enhancing operational efficiency and to develop more contemporary priced financial products. The banking

sector is a dominant supplier of intermediate services such as financing facilities indicating how important productivity in the banking sector is to the economy. Furthermore, the efficiency of the banking sector administering intermediate services affects the value chain of manufacturing and service industries et al. that depend on such services being provided to them (Abd-Kadir H., Selamat Z. & Idros M., 2010). However, the general procedures of financial reporting and accounting regulations are insufficient to report IC value in spite of the amount of methods developed and utilized to measure IC (Andriessen, 2004; Pike and Ross, 2004; Chan, 2009), (Lev and Zorowin, 1999; Lev, 2004; Kujansivu, 2005; Lajili and Zeghal, 2005).

Although many methods have been proposed and utilized, a widely accepted process of IC quantification does not exist. “True competitive advantage” is created by identifying and measuring IC as intangibles create value and is therefore important to organizations (Ratnatunga et al., 2004, p. 78).

The typical measurements of IC are limited (Abernethy et al., 2005) and even popular frameworks like balancing the scorecard face issues when linking the method to outcomes (Norreklit, 2000). Thus innovative solutions when measuring IC are required especially to pinpoint the links between IC elements and rational capital and value creation (Edvinsson and Malone, 1997; Stewart, 1997; Sveiby, 1997).

After surveying contemporary studies Andriessen (2004) listed 30 methods and more recently Chan (2009) listed 34 methods of calculating IC. Pike and Ross (2004) were assured in the reliability of these methods having measured the succor of a few of these methods with associated theories. Andriessen (2004) felt that they failed to establish a connection between financial performance and IC.

The methods identified and commonly established by Pike and Ross (2004) and Chan (2009) were categorized into four generic approaches:

i. Market Capitalization Methods (MCM): Calculate the difference between a company's market capitalization and its book value as the value of its IC or intangible assets. Markets to Book Value, Tobin‟s Q are examples of this method.

ii. Direct Intellectual Capital methods (DIC): Estimate the Ringgit-value of intangible assets by identifying its various components. Once these components are identified, they can be directly evaluated, either individually or as an aggregated. This method includes The Value Explorer, Intellectual Asset Valuation, Total Value Creation (TVC), Accounting for the future (AFTF) etc.

iii. Scorecard Methods (SC): The various components of intangible assets or intellectual capital are identified and indicators and indices are generated and reported in scorecards or as graphs. Examples of this method are National Intellectual Capital Index, IC Rating TM, ICdVALTM, and Value Chain Scoreboard

iv. Return on Assets methods (ROA): It is the capitalization of industry above-average earnings by the company’s average cost of capital. Industry above average earnings is the multiplication of company’s excess ROA over industry ROA with its average tangible assets. This method includes Knowledge Capital Earnings, Economic Value

Added (EVATM), Calculated Intangible Value (CIV), Value Added Intellectual Coefficient (VAICTM) etc.

These approaches were explained in detail by Chan (2009). The final approach, i.e. VAICe, or the "Austrian approach", has been utilized in numerous of studies (VAICe) (Pulic, 2000, 2001, 2004; Chan, 2009). The VAIC approach is a comparative analysis that is both standard and consistent that can be utilized at local and international levels over a long period of time.

3.7 Hypotheses

On the basis of prior researches on the topic, (Ting and Lean, (2009), Al-Musali, (2010), Kamal et. al., (2011), Jasour et. al, (2013), Sofian, (2014), Isanzua, (2015), Razak et. al., (2016), Kurfi et. al, (2017) and Poh et al., (2018)) used Value Added Intellectual Coefficient (VAIC) model to investigate the effect of intellectual capital on Ethiopian private commercial banks financial performance. However, since the result on the available researches are not inclusive in the relationship between intellectual capital and financial performance of private commercial banks, the topic become worth studying.

The study based on data collected from annual reports of 16 private commercial banks in Ethiopia, from year 2015 to 2019. In the previous chapters, indicators which have been selected to present intellectual capital and financial performance of private commercial banks were explained. Hence, basing the review of literature and collected secondary data from the audited financial statements of Ethiopian private commercial banks, the researcher were developed the following hypotheses:-

Hypothesis 1: Human capital positively influences Ethiopian private banks performance.

This hypothesis is further explained by the following equation:

Performance of Private Banks $= \beta 0 + \beta 1(HC)$ (1)

Where: HC - Human capital

$\beta 0$, $\beta 1$ - are expected to be positive parameters

Hypothesis 2: Structural capital positively influences on Ethiopian private banks performance.

This hypothesis is further explained by the following equation:

Performance of Private Banks $= \beta 0 + \beta 1(SC)$ (2)

Where: SC - Structural capital

$\beta 0$, $\beta 1$ - are expected to be positive parameters

Hypothesis 3: capital employed efficiency positively influences Ethiopian private banks performance.

This hypothesis is further explained by the following equation:

Performance Ethiopian private banks = β0 + β1(CEE) (3)

Where: CEE – Capital Employed efficiency

β0 , β1 - are expected to be positive parameters

Hypothesis 4: Intellectual capital (human capital, structural capital and relational capital) positively influences Ethiopian private banks performance.

This hypothesis is further explained by the following equation:

Performance Ethiopian private banks = β0 + β1(IC) (4)

Where: IC - Intellectual capital, β0 , β1 - are expected to be positive parameters

As it stated before, Value Added intellectual capital (VAIC) and Components of VAIC i.e. human capital efficiency (HCE), structural capital efficiency (SCE) and capital employed efficiency (CEE) are indicators of intellectual capital and ROA as indicators of financial performance.Panel data model specification presented as follows:-

VA = (OUTPUTit - INPUTit)

Output =(Interest Income + Service Charge & Commission Income + Other Income)
Input= Provision For Doubtful Loans + General Expenses
Capital Employed= Total Assets – Total Liability
Investment in Human Capital=Employees Salary & Benefits
Structural capital= (CEE – HCE).

Defining the hypotheses of this research is closely linked to the objectives mentioned above. The set of hypotheses are actually the answers which were supposed to be obtained from this research. The hypotheses were done taking into account the results of previous research. The following hypotheses were formulated for the conceptualization model:

CHAPTER FOUR

Results and Discussions

This chapter deals with the results and analysis of the findings. The chapter contains three sections. The first section presents descriptive analysis on variables of the study; the second section; presents the results on fulfillment of the classical linear regression model (CLRM) assumptions; the third section lays down the results of regression analysis that constitute the main findings of this study.

4.1 **Descriptive statistics**

Table 4.1 provides a summary of the descriptive statistics of the dependent and independent variables for the sixteen Ethiopian commercial banks from the year 2015 to 2019 with a total of 80 observations. The table shows the mean, minimum, maximum, standard deviation and number of observations of the dependent and independent variables.

Table 4.1 Descriptive statistics

Variables	Mean	Std. Dev.	Maximum	Minimum	Observations
ROA	3.2862	0.2730	3.9217	2.7735	80
VAHC	383.49	79.080	583.50	188.00	80
VASC	73.478	4.5900	82.862	57.658	80
VACE	8.0349	1.3568	10.4055	4.3659	80
PCI	2.9874	1.3480	8.0000	1.1025	80

VAIC	465.00	84.070	674.58	250.08	80

Source: - E-Views output

Table 4.1:- Shows the average indicators of variables computed from the financial statements and the standard deviation that shows how much dispersion exists from the average value. According to Brooks, (2008), a low standard deviation indicates that the data point tend to be very close to the mean, whereas high standard deviation indicates that the data point are spread out over a large range of values.

As can be presented in the table 4.1 in previous page that, the mean values of all the variables ranges from minimum of 2.98 for PCI, as measured by a ratio of a company's fixed assets to its total assets, to a maximum of 4.65 for VAIC as measured by the sume of CEE = Capital Employed efficiency and ICE = Intellectual Capital efficiency. The minimum and maximum rates of return on assets of Ethiopian private commercial banks are 2.77% & 3.92% respectively. Also the table shows that the mean value for the dependent variable ROA is 3.28 and thus indicating, on average Ethiopian private commercial banks generated 3.28% profit on assets employed in the company. The standard deviation on the dependent variable ROA is 0.27 and implied that the volatility of returns from assets varies from the mean by 27% only.

With regards to the independent variable, the mean value of HCE indicates that banks human capital is more effective in creating value than SCE and CEE during the study periods. A VAIC of 4.65 was obtained, indicating that the firm created additional value of 4.65 units out of every 1 unit value invested in the firm. However, if the components are examined individually, it is evident that human capital (mean = 3.83) is more efficient in comparison to physical capital (mean = 0.08) and structural capital (mean= 0.73). This is consistent with the findings of Gan & Saleh (2008), Firer & Williams (2003), Ho & Williams (2002) and Shamsudin & Yian (2013).

4.2 **Correlation analysis**

To analyze the association between the dependent and independent variables, a correlation analysis is undertaken and the results are presented below.

Table 4.2 Correlation Analysis

Correlation	ROA	VAHC	VASC	VACE	PCI	VAIC
ROA	1.0000					
VAHC	0.6552	1.0000				
VASC	0.6404	0.7134	1.0000			
VACE	0.4297	0.5685	0.4763	1.0000		
PCI	-0.4171	-0.2955	-0.2630	-0.3028	1.0000	
VAIC	0.6573	0.7997	0.7215	0.5769	-0.2972	1.0000

Source: - E-Views output

The most widely-used type of correlation coefficient is Pearson r, also called linear or product-moment correlation. The values of the correlation coefficient are always between -1 and +1. A correlation coefficient of +1 indicates that the two variables are perfectly related positively; while a correlation coefficient of -1 indicates that two variables are

perfectly related in a negative linear sense. A correlation coefficient of 0, on the other hand indicates that there is no linear relationship between two variables (Gujarati, 2004).

The output given in Table 4.2 depicts that there is a significant positive relationship between ROA with regards to VAIC and the elements of intellectual capital. All VAIC, SCE, HCE and CEE are positively correlated and which means that it does yield profitability to enhance on these resources. As performance is positively associated with profitability, banks should attempt to enhance its human capital efficiency, structural capital efficiency and capital employed efficiency. As such when intellectual resources are increasing in efficiency, the VAIC increases, which is expected to boost the financial performance of the financial institutions.

The diagnostic statistic among the explanatory variables, human capital and structural capital is significantly interrelated (0.65 and 0.64) compared to employed capital variables (0.42). This suggests that although the relationship between VAIC and performance is positively, employed capital efficiency is not the prime focus as it does not yield as much profit as Human capital efficiency and structural capital efficiency. From the results in table 4.2, when structural capital increases by 1 unit, the company's ROA increased by 0.64 units. However, correlation of ROA with the control variable, physical capital intensity (PCI) (-0.41) indicating that, physical capital intensity as measured on a ratio of a company's fixed assets to its total assets, is negatively interrelated the bank financial performance. Thereby, physical capital intensity is on opposite direction with regards to accounting financial performance measure (ROA).

In general, even though the correlation analysis shows the direction and degree of associations between variables, it does not allow the researcher to make cause and inferences regarding the relationship between the identified variables. Thus, in examining the effects of selected independent variables on dependent variables, the econometric regression analysis which is discussed in the forthcoming section of the paper gives assurance to overcome the shortcomings of correlation analysis.

4.3 Model Diagnostics tests

For valid hypothesis testing and to make data available for reliable results, the test of assumption of regression model is required. Accordingly, the study has gone through the most critical regression diagnostic tests consisting of Normality, Multicollinearity, heteroskedasticity, and autocorrelation and model specification accordingly.

4.3.1 CLRM assumptions

To maintain the data validity and robustness of the regressed result of the research, the basic classical linear regression model (CRLM) assumptions must be tested for identifying any misspecification and correcting them so as to augment the research quality Brooks, (2008). There are different CLRM assumptions that need to be satisfied and that are tested in this study, which are: errors equal zero mean test, normality, homoscedasticity, autocorrelation, and multicollinearity.

4.3.1.1 Test for heteroskedasticity assumption ($\underline{\text{var}(ut) = \sigma 2 < \infty}$)

The condition of classic linear regression model implies that there should be homoskedasticity between variables. This means that the variance should be constant and same. Variance of residuals should be constant otherwise, the condition for existence of regression, homoskedasticity, would be violated and the data would be heteroskedastic Brooks, (2008). To check for this, Breusch-Pagan-Godfrey tests were applied.

The Breusch-pagan tests of the null hypothesis that the error variances are all equal versus the alternative that the error variance are a multiplicative function of one or more variables. Hence, following the general null hypothesis of Breusch-pagan tests, the researcher develops the following hypothesis to check the presence of heteroskedasticity:

- *H0: homoskedastic error term*
- *H1: heteroskedasticity error term*

Table 4.3: Heteroskedasticity test for Model 1 (VAIC)
Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	2.486191	Prob. F(1,78)	0.1189
Obs*R-squared	2.471172	Prob. Chi-Square(1)	0.1160
Scaled explained SS	2.223767	Prob. Chi-Square(1)	0.1359

Source: EViews output

Table 4.4: Heteroskedasticity test for Model 2 (VAIC Components)
Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.884113	Prob. F(4,75)	0.4777
Obs*R-squared	3.602354	Prob. Chi-Square(4)	0.4625
Scaled explained SS	2.907428	Prob. Chi-Square(4)	0.5734

Source: EViews output

Both F-statistic and chi-square (χ^2) tests statistic were used. As can be presented in the above tables (Table 4.3 & Table 4.4), Heteroskedasticity test both the F- and χ^2 -test statistics give the same conclusion that there is no significant evidence for the presence of Heteroskedasticity. Since the p-values in all of the cases were above 0.05, the null hypothesis of homoskedasticity is failed to reject at 5 percent of significant level. This implying that there is no significant evidence for the presence of heteroskedasticity in this research models. The third version of the test statistic, "scaled explained SS", which as the name suggests is based on a normalized version of the explained sum of squares from the auxiliary regression, also give the same conclusion. (See Appendices for detail).

4.3.1.2 Test for absence of autocorrelation assumption ($cov(u_i, u_j) = 0$ for $i \neq j$)

Another basic assumption of regression model says that the covariance between error terms should be zero. This means that error term should be random and it should not exhibit any kind of pattern. If there exists covariance between the residuals and it is non-zero, this phenomenon is called autocorrelation Brooks, (2008). Therefore, to check the presence of autocorrelation in this study, the researcher used Breusch–Godfrey test.

Breusch–Godfrey Serial Correlation LM test

Breusch–Godfrey tests area joint test for autocorrelation that will allow examination of the relationship between uˆ t and several of its lagged values at the same time. According to Brooks (2008), The Breusch-Godfrey test is a more general test for autocorrelation up to the r^{th} order.

Hypothesis of this test are:-

Following the general null hypothesis of Breusch–Godfreyserial correlation LM test, the researcher develops the following hypothesis to check the absence of autocorrelation:

H0 = No autocorrelations errors

H1 = Autocorrelations errors

Table 4.5: Breusch-Godfrey Serial Correlation LM Test: Model 1 (VAIC)

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.883052	Prob. F(2,73)	0.4179
Obs*R-squared	1.889737	Prob. Chi-Square(2)	0.3887

Source: - EViews output

Table 4.6: BG Serial Correlation LM Test: Model 2 (VAIC Components)

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.883052	Prob. F(2,73)	0.4179
Obs*R-squared	1.889737	Prob. Chi-Square(2)	0.3887

Source: - EViews output

As can be seen in the above table (Table 4.5 and Table 4.6), F test result and the P value of F-statistic are 0.4129 &0.8830 respectively. The values are away beyond the significance level of 5%. Hence, the null hypothesis of no autocorrelation is failed to reject at 5 percent of significant level. This implying that there is no significant evidence for the presence of autocorrelation in both models. The Chi-Square P-value of the models are also supports the absence of autocorrelation. (See Appendices for detail). Therefore, can be concluded that, the covariance between residuals is zero, data is normal and absence of autocorrelation problem was found conclusively from the LM test.

4.3.1.3 Test of normality ($ut \sim N(0, \sigma 2)$)

Normality test was applied to determine whether a data is well-modelled by a normal distribution or not, and to compute how likely an underlying random variable is to be normally distributed. If the residuals are normally distributed, the histogram should be bell-shaped and the Jarque-Bera statistic would not be significant. This means that the p-value given at the bottom of the normality test screen should be greater than 0.05 to support the null hypothesis of presence of normal distribution at the 5% level.Theoretically, if the test is not significant, then the data are normal, so any value

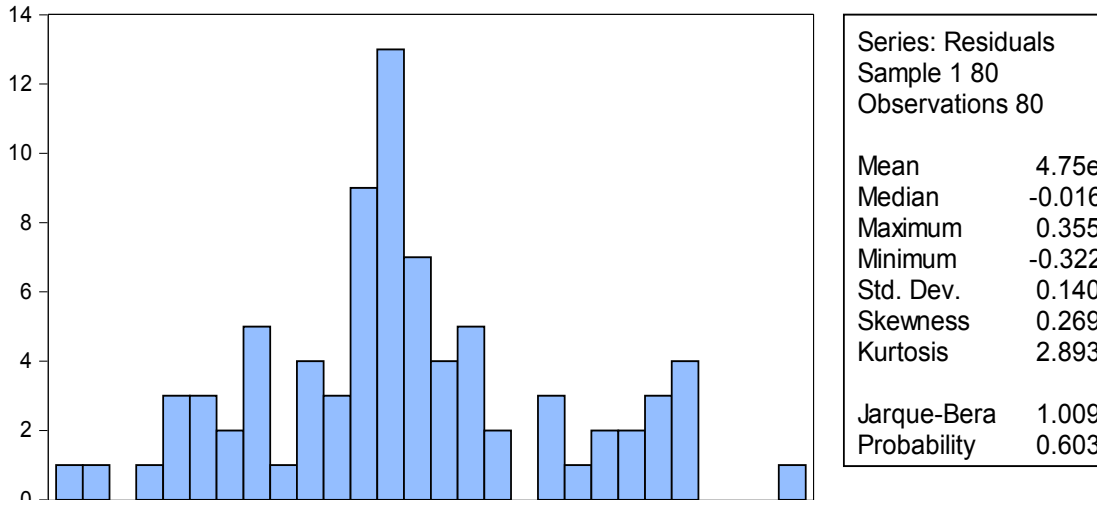
above 0.05 indicates normality.Skewness measures the extent to which a distribution is not symmetric about its mean value. Kurtosis refers to the ‘‘peakedness’’ of the distribution. For a normal distribution the kurtosis value is 3. Kurtosis measures how fat the tails of the distribution are, the Jarque–Bera test for normality is based on two measures, Skewness and kurtosis. The Jarque-Bera probability statistics/P-value is also expected not to be significant even a t 10% significant level Brooks (2008).

The hypothesis of normality distribution is:

H0= residuals follows a normal distribution

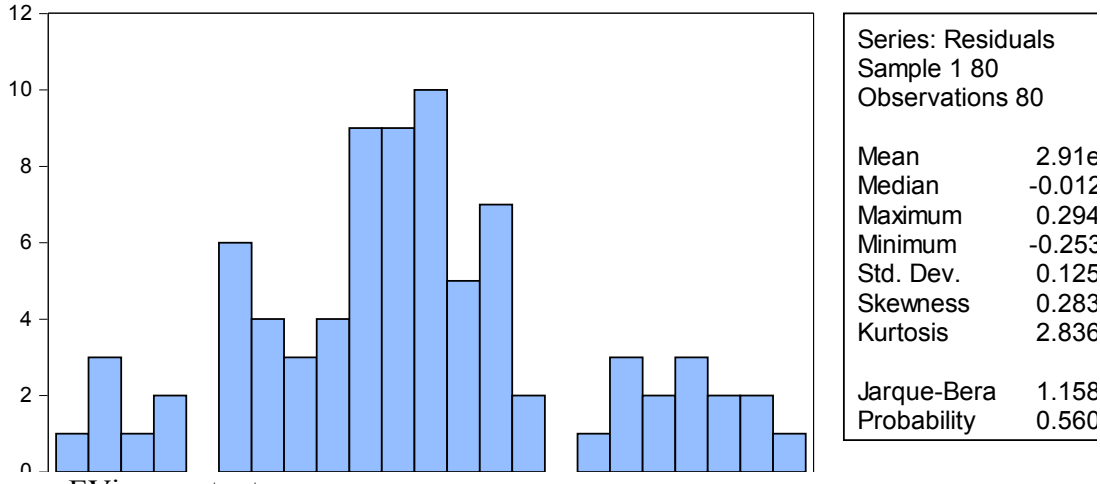
H1 = residuals do not follows a normal distribution

Figure 4.1 Normality test for residualsModel 1 (VAIC)



Source: - EViews output

Figure 4.2 Normality test for residuals Model 2 (VAIC Components)



Source: -EViews output

As shown in the above histograms (Figure 4.1& Figure 4.2), Kurtosis values are2.89 and 2.83 respectively. The Skewness measures on both models are 0.26 & 0.28, both are

close to zero and implied the normality of the data. More importantly, the Jarque-Bera statistics was not significant even at 10% level of significance for both models, as per the P-values shown in the histograms are way beyond that (i.e. 0.60 &0.56). This is therefore the null hypothesis of the residuals follows a normal distribution is failed to reject at 5 percent of significant level. Hence, it seems that the error term in all of the cases follows the normal distribution and it implies that the inferences made about the population parameters from the samples tend to be valid.

4.3.1.4 Test for multi co linearity

Multi co linearity indicates a linear relationship between explanatory variables which may cause the regression model biased (Gujarati, 2004). If an independent variable is an exact linear combination of the other independent variables, then we say the model suffers from perfect co linearity, and it cannot be estimated by OLS Brooks (2008). When independent variables are multi co linear, there is overlap or sharing of predictive power. This may lead to the paradoxical effect, whereby the regression model fits the data well, but none of the explanatory variables (individually) has a significant impact in predicting the dependent variable Gujarati, (2004).

According to Lewis-Beck, (1993) suggestion in order to find out the multicollinearity problem, the bivariate correlations among the independent variables should be examined and the existence of correlation of about 0.8 or larger indicates a problem of multicollinearity. Also, Cooper and Schendlar, (2003) suggested that a correlation above 0.8 should be corrected.

Table 4.7: Correlations matrix of explanatory variables

	VAHC	VASC	VACE	PCI	VAIC
VAHC	1.0000	0.7134	0.5685	-0.2955	0.7997
VASC	0.7134	1.0000	0.4763	-0.2630	0.7215
VACE	0.5685	0.4763	1.0000	-0.3028	0.5769
PCI	-0.2955	-0.2630	-0.3028	1.0000	-0.2972
VAIC	0.7997	0.7215	0.5769	-0.2972	1.0000

Source: EViews output

The Pearson correlation, which varies between -1 and 1, if the p-value is 0, there is no linear correlation, and if the p-value is -1 or 1 we have a perfectly negative or positive relationship between the variables. According to Pallant (2005), the results in the above correlation matrix table 4.7 shows the highest correlation of 0.7997 which is between value added intellectual capital (VAIC) and its component human capital efficiency (VAHC). Since there is no correlation above 0.8 in this study according to Cooper and Schendlar (2003) and Lewis-Beck (1993), it can be concluded there is no problem of multicollinearity, thus enhanced the reliability for regression analysis.

4.3.2 Hausman Specification Tests

Choosing Random effect (RE) vs. fixed effect (FE) models

The results so far indicate that all CLRM assumptions are not violated, so the ordinary least square regression can be safely applied. However, since this study uses a panel data, there are two types of panel estimator approaches that can be employed, namely: fixed effects models (FEM) and random effects models (REM) Brooks, (2008).The simplest types of fixed effects models allow the intercept in the regression model to differ cross-sectionaly but not over time, while all of the slope estimates are fixed both cross-sectional and over time. The random effects approach proposes different intercept terms for each entity and again these intercepts are constant over time, with the relationships between the explanatory and explained variables assumed to be the same both cross-sectional and temporally Brooks, (2008).

To examine whether individual effects are fixed or random, a Hausman specification test was conducted providing evidence in favor of the REM model Baltagi (2005). The null hypothesis for this test is that unobservable heterogeneity term is not correlated or random effect model is appropriate, with the independent variables. If the null hypothesis is rejected then we employ Fixed Effects method Brooks, (2008).

The Hausman test hypothesis is

H_0= *Random effect model is appropriate*
H_1= *Fixed effect model is appropriate*

Table 4.8 Hausman test of Model 1 (VAIC Components)

Correlated Random Effects - Hausman Test

Equation: Untitled

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.002528	1	0.9599

Source: - EViews output

Table 4.9 Hausman test of Model 1 (VAIC)

Correlated Random Effects - Hausman Test

Equation: Untitled

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	1.548374	4	0.8180

Source: - EViews output

The above two tables (Table 4.8 and Table 4.9) shows that, Hausman specification test, the P-values of both models are 0.96 and 0.82 respectively. Both values are way beyond

the 5% level of significance. Hence, the null hypothesis of the random effect model is appropriate is failed to reject at 5 percent of significant level. This implies that, the random effect model is more appropriate than the fixed effect model and gives more comfort for both models. (See Appendices for detail).

4.4 Regression results analysis

Eviews regression output is divided into three panels. The top panel summarizes the input to the regression, the middle panel gives information about each regression coefficient, and the bottom panel provides summary statistics about the whole regression equation. The two most important numbers, "R-squared" (the one who answered how much percent of the variance in the dependent variable in the regression accounted for) and "S.E. of regression." and the one that shows how far is the estimated standard deviation of the error term.

Five other elements, "Sum squared residuals," "Log likelihood," "Akaike info criterion," "Schwarz criterion," and "Hannan-Quinn criter." are used for making statistical comparisons between two different regressions. The next two numbers, "Mean dependent var" and "S.D. dependent var," report the sample mean and standard deviation of the left hand side variable Brooks, (2008).

"Adjusted R-squared" makes an adjustment to the plain-old to take account of the number of right hand side variables in the regression. Measures what fraction of the variation in the left hand side variable is explained by the regression. The adjusted, sometimes written, subtracts a small penalty for each additional variable added.

"F-statistic" and "Prob (F-statistic)" come as a pair and are used to test the hypothesis that none of the explanatory variables actually explain anything. Put more formally, the "*F*-statistic" computes the standard *F*-test of the joint hypothesis that all the coefficients, except the intercept, equal zero. "Prob (F-statistic)" displays the *p*-value corresponding to the reported *F*-statistic.

The final summary statistic is the "Durbin-Watson," the classic test statistic for serial correlation. A Durbin-Watson close to 2.0 is consistent with no serial correlation, while a number closer to 0 means there probably is serial correlation Brooks, (2008). Hence, as concluded in the Hausman tests (Table 4.8 and Table 4.9) above the random effects model is appropriate regression analysis to this study.

4.4.1 Model results and interpretations.

4.4.1.1 Intellectual capital and financial performance: Model 1 (VAIC & ROA)

$$\text{Model 1 ROA} = \alpha + \beta_1 (\text{VAIC}) + \varepsilon_{it}$$

Table 4.10 Random effects regression results model 1 (VAIC)

Dependent Variable: ROA
Method: Panel EGLS (Cross-section random effects)
Date: 04/23/20 Time: 21:39
Sample: 2015 2019
Periods included: 5

Cross-sections included: 16
Total panel (balanced) observations: 80
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.992076	0.090529	22.00496	0.0000
VAIC	0.002783	0.000191	14.54466	0.0000

Effects Specification		
	S.D.	Rho
Cross-section random	0.022436	0.0248
Idiosyncratic random	0.140744	0.9752

Weighted Statistics			
R-squared	0.733139	Mean dependent var	3.095395
Adjusted R-squared	0.729718	S.D. dependent var	0.268984
S.E. of regression	0.139841	Sum squared resid	1.525332
F-statistic	214.2874	Durbin-Watson stat	1.838305
Prob(F-statistic)	0.000000		

Unweighted Statistics			
R-squared	0.734908	Mean dependent var	3.286170
Sum squared resid	1.560574	Durbin-Watson stat	1.804749

*** Correlation coefficient significant at 1%, **correlation coefficient significant at 5% and *correlation coefficient significant at 10% significance level respectively.

Source: - EViews output

ROA = 1.992076 +0.002783*VAIC

The estimation results reported in Table 4.10above depicted that, the R-squared and an Adjusted R-squared value of 0.73 and 0.72 respectively is an indication that the model is a good fit. This means more than 73% of variations in financial performance indicator i.e. return on asset ratio, of Ethiopian private Commercial Banks were explained by the value added intellectual capital (VAIC) independent variable included in the model. However, the remaining 27% changes are caused by other factors that are not included in the model. Furthermore, the F-statistic was 214.28 and the probability of not rejecting the null hypothesis, that there is no statistically significant relationship existing between the dependent variable (ROA) and the independent variable (VAIC), is 0.000000 indicates that the overall model is significant at 1% and hence the independent variable VAIC significant in causing variation in Return on asset of Ethiopian commercial banks.

The panel random effect estimation regression result in the above table 4.10 shows that, coefficient intercept (α) is 1.992076. This means, when the explanatory variable i.e. VAIC took a value of zero, the average value ROA would be take 1.992076 unit and statistically significant at 1% level of significance.

In addition, the above table 4.10 in the previous page reviled that, the regression coefficient of the regression model 1 by assumes ROA dependent variable and VAIC as independent variable, the beta coefficient of VAIC is found to be 0.002783along with a t statistics of 14.54466.Meaning when intellectual capital, as measured on VAIC™ model, increase by one unit, Ethiopian private commercial banks return on asset (ROA) will increase by0.003 unit and statistically significant at 1% of significance level.

The result also confirms that VAIC has a positive impact on return on assets of banks. In turn not reject the first hypothesis H1, There is a significant positive relationship between the value added intellectual capital coefficient (VAIC) of Ethiopian private commercial banks and their financial performance measure (ROA).

The results of the study is in line with the other studies by Chen et al. (2005), Tan et al. (2007) and Ting & Lean (2009) in which it is revealed that there was a significant positive relationship between VAIC and ROA. However, the result in of this study is in contrary to the research findings of Tarideh (2013), Gottfredson, (1997) and Jensen, (1998).The models provide support to expectation and it implies that organization's financial performance increases with the increase in the IC performance of the bank.

$$ROA = \alpha + \beta_1 (VAHC) + \beta_2 (VASC) + \beta_3 (VACA) + \beta_4 (PCI) + \varepsilon_{it}$$

Table 4.11 Random effects regression results model 2 (VAIC Components)

Dependent Variable: ROA
Method: Panel EGLS (Cross-section random effects)
Date: 04/23/20 Time: 21:36 Sample: 2015 2019
Periods included: 5 Cross-sections included: 16
Total panel (balanced) observations: 80
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.365163	0.456791	2.988596	0.0038
VAHC	0.001878	0.000507	3.702241	0.0004
VASC	0.020196	0.008160	2.474942	0.0156
VACE	-0.020376	0.013864	-1.469751	0.1458
PCI	-0.040035	0.011920	-3.358718	0.0012

Effects Specification		
	S.D.	Rho
Cross-section random	0.000000	0.0000
Idiosyncratic random	0.134409	1.0000

Weighted Statistics

R-squared	0.789713	Mean dependent var	3.286170
Adjusted R-squared	0.778497	S.D. dependent var	0.272980
S.E. of regression	0.128475	Sum squared resid	1.237945
F-statistic	70.41368	Durbin-Watson stat	1.949480
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.789713	Mean dependent var	3.286170
Sum squared resid	1.237945	Durbin-Watson stat	1.949480

*** Correlation coefficient significant at 1%, **correlation coefficient significant at 5% and *correlation coefficient significant at 10% significance level respectively.
Source: - EViews output

ROA = 1.365163 - 0.001878*CEE + 0.001878*HCE + 0.020196*SCE - 0.040035*PCI

4.4.1.2 Interpretations on regression results Model 2 (VAIC Components)

The estimation results reported in Table 4.11in the previous page depicted that, the R-squared and adjusted R-squared values are 0.78 and 0.77 respectively is an indication that the model is a good fit. This means more than 78% of variations in financial performance indicator i.e. return on asset ratio, of Ethiopian private commercial banks were explained by independent variables included in the model. However, the remaining 22% changes are caused by other factors that are not included in the model. Furthermore, the F-statistic was 70.41 and the probability of not rejecting the null hypothesis that there is no statistically significant relationship existing between the dependent variable (ROA) and the independent variables, prob. F stastics is 0.000000 indicates that the overall model is significant at 1% and hence all the independent variables jointly are significant in causing variation in return on asset of Ethiopian private commercial banks.

The panel random effect estimation regression result in table 4.11also shows that, coefficient intercept (α) is 1.36. This means, when all explanatory variables took a value of zero, the average value ROA would be take 1.36 unit and statistically significant at 1 % level of significance.

A. Human capital employed efficiency (HCE) and return on asset (ROA)

As shown in the regression output presented in Table 4.11, the coefficient of human capital efficiency (HCE) as measured by value addition to total Employees salary and benefits to total asset ratio is 0.002 and its corresponding P-value is 0.000. Meaning that holding other independent variables fixed at their average value, when human capital efficiency (HCE) increase by one unit, Ethiopian private commercial banks return on Asset (ROA) will increase by 0.002 unit and significant at 1% of significance level. Therefore, the study not rejected the second hypothesis H2 that, there is a significant positive relationship between the human capital efficiency coefficient (HCE) of Ethiopian private commercial banks and their financial performance measure (ROA). This means, there is no sufficient evidence to support the negative relationship between ROA and HCE. This finding is similar to the finding of Ekwe, (2013), Sofian, (2014), Isanzua, (2015) and Meles et al, (2016); Henok (2017). However; it contradict with the finding of Ferraro and Veltri, (2011); Gottfredson, (1997); Jensen, (1998).

The relationship is positive as expected and this positive relationship between human capital efficiency and financial performance of Ethiopian private commercial banks could be attributed to the fact that efficiency of employees in service rendering firms has in value creation for the firms and financial performance too. The possible reason for the significant positive relationship could be the recently evident innovative new banking products in the Ethiopian banking industry and also signifies the efficiency of employees when compared with the outlays for salary & benefit. Furthermore, the result suggests that, Ethiopian private commercial banks employees' salary and benefit skim alignment with their financial performance.

B. Structural capital efficiency (SCE) and return on asset (ROA)

As shown in the regression output presented in Table 4.11, the coefficient of structural capital efficiency (SCE) as measured by the firm value addition without the human capital to the value addition ratio is 0.020 and its corresponding P-value is 0.016. Meaning that holding other independent variables fixed at their average value, when structural capital efficiency (SCE) increase by one unit, Ethiopian private commercial banks return on Asset (ROA) will increase by 0.020 unit and statistically significant at 1% of significance level. Therefore, the study not rejected the third hypothesis H3that,there is a significant positive relationship between the structural capital efficiency coefficient (SCE) of Ethiopian private commercial banks and their financial performance measure (ROA). This finding is similar to the finding of Al-Musali, (2010), Jasour et.al, (2013),Vishnu, (2015) ; Henok(2017), and Kurfi et.al, (2017), however; it contradicts with the finding of Jensen, (1998) and Isanzua, (2015).

Pulic, (1998) states that, SCE_i is dollar of SC_i within the firm, for every dollar of value added, and as HCE_i increases, SCE_i increases. If the efficiency measures for both HCE_i and SCE_i were calculated with VA as the numerator, the logical inconsistency would remain. Hence, the relationship is positive as expected, and this positive relationship between structural capital efficiency and financial performance of Ethiopian private commercial banks could be attributed to the fact that Ethiopian private commercial banking sector is more competitive sector and hence, Ethiopian private commercial banks financial outlay is strictly controlled to be productive. In the other hand it implies the efficiency of Ethiopian private commercial banking industry in maintain good customer relationship, low cost processes, and dependable databases, brands, and systems.

C. Capital employed efficiency (CEE) and return on asset (ROA)

The regression output showed in Table 4.11 presented that, the coefficient of capital employed efficiency (CEE) measured by the ratio of value added to employed capital is negetive 0.002 and its corresponding P-value is 0.146. Meaning that holding other independent variables constant at their average value, when capital employed efficiency (CEE) increase by one unit, Ethiopian commercial banks return on asset (ROA) will decrease by 0.002 unit and statistically insignificant at 1% of significance level.

Since there is insignificant negetive relationship between CEE and ROA of sampled Ethiopian private commercial banks, the study rejected the forth hypothesis H4 that, there is a significant positive relationship between the capital employed efficiency coefficient

(CEE) of Ethiopian private commercial banks and their financial performance measure (ROA). The insignificance relationship could be attributable to the fact that, the very low cost of capital compared to the inflation rate.

However, as far as the knowledge of the researcher for this variable, the researcher could not get sufficient empirical literature on the relationship between capitals employed efficiency and financial performance. Hence, further research will be required. The result is consistent with the prior research work of Isanzua, (2015) an Ekwe, (2013). However, contradict with the finding of Shamsudin & Yian (2013), Ferraro and Veltri, (2011) and Henok (2017).

D. Physical capital intensity (PCI) and return on asset (ROA)

The regression output presented in Table 4.11 shows that, coefficient of the control variable Physical capital intensity (PCI) as measured by the natural logarithmic of Ethiopian private commercial banks total asset is -0.040 and its corresponding P-value 0.0012. Meaning that holding other independent variables fixed at their average value, when Physical capital intensity (PCI) increase by one unit, Ethiopian private commercial banks return on asset (ROA) will decrease by 0.040 unit and statistically significant at 1% of significance level. This finding is similar to the finding of Avci E. and S. Nassa, (2017), Henock (2017). However, the result contradicts with the finding of Ferraro and Kurfi et.al, (2017) and Al-Musali and Ismail, (2014).

The results also indicate that Physical capital intensity (PCI) is negatively associated with financial performance of Ethiopian private commercial banks. Thus, it appears to suggest that in Ethiopia, banks with a larger physical capital may tend to be less profitable in terms of the revenue generated per unit of asset invested. The possible reason for the significant but negative relationship could most probably be a result of banks are mostely utilize the liablity rather than the capital for instanse customer deposit efficently using the short, medium and long term lending programs.Fourthermore, the increase current asset, improperly utilse same and the increase the banks age lead to the incease to deperciation expence has impact on the decline of the book value of the fixed asset.

Table 4.12 Comparison of test result with expectation

Independent Variables	Expected Relationships with ROA	Actual result	Statistical Significance test	Hypothesis Status
Value added intellectual efficiency (VAIC)	+	+	Significant at 1%	Accepted
Capital employed efficiency (CEE)	+	-	Insignificant	Rejected
Human capital efficiency (HCE)	+	+	Significant at 1%	Accepted
Structural capital efficiency (SCE)	+	+	Significant at 1%	Accepted

CHAPTER FIVE

Conclusion and recommendation

5.1 Conclusion

The basic intent of this chapter is to present the overall overviews of the research by summing the main findings of the analysis part and give future research directions. Accordingly, the chapter starts with its discussion by briefly sum up the overviews of the study and its main findings. In section two based on the study finding the researcher highlight some recommendations for the target populations that the study pivoting on and at last highlight further research directions.

Based on the regression analysis findings outlined in the previous sections, the researcher concludes with some recommendations to provide insight the impact of intellectual capital on Ethiopian private Banks performance. However, it should be emphasized again that the absence of vast empirical evidence on the topic of intellectual capital in addition to the availability of variance in business starting date of the banks in the country limit the data collection period of the study. Therefore, as the concept of intellectual capital is a relatively broad area and the research findings are quite dissimilar, this research finding also somehow different from other developed and emerging market countries case.

As this research aims to signify the importance of the intellectual capital, especially banking service is the key contributor to the operation of any economy, so, management can now appreciate the impact and support the provision of intellectual elements. As a result, private commercial banks may create awareness to invest on developing the intellectual capital without compromise on these vital resources.

The research model was created based on the analysis and evaluation from literature on intellectual capital. The study attempted to investigate the relationship between intellectual capital (IC), and financial performance of the banks operating in Ethiopia. The methodology adopted is the one of "Value Added Intellectual Coefficient" (VAICTM) and its components described into HCE SCE and CEE that has been previously utilized by similar studies (Chen et al., 2005; Firer and Williams, 2003; Williams, 2001). In harmony to the stated objectives to assert the relationship of intellectual capital with financial performance and which intellectual capital element most significantly influences the financial performance was found after conducting the econometric analysis for collected data. The study reveals that IC has a positive and significant influence on the financial performance of Ethiopian private commercial

banks. In relations to the components of VAIC and the control variable the study proves that:

All the two components of VAIC are related positively with the financial performance of Ethiopian private commercial banks as measured on ROA. In addition, HCE and SCE have positive and significant effect on the financial performance of Ethiopian private commercial banks and the relationship is negative and insignificant with CEE. Hence, HCE and SCE seem to contribute more towards the financial performance of Ethiopian private commercial banks rather than CEE. This finding is not surprising since banking sector is a service sector which main functions are mobilize the resource from the depositor and lend the money to the inventor, for such activity where human capital is being utilized more than the physical assets.

The result of regression analysis in Model 1 indicates that VAIC can explain the financial performance of Ethiopia private commercial banks and with the increase in the VAIC the financial performance of Ethiopian private commercial banks also increases. The results of Model 2 and indicate that the managers of Indian banks are not able to well utilize the very important component of VAIC i.e. is the physical and financial. However, most of the efficiency is improved by the use of the other two components HCE & SCE by private Commercial banks in Ethiopia. So there is a need to make some policies and strategies to improve the overall efficiency in utilizing the physical assets in an efficient way.

The results show that there is a strong positive impact of human capital and capital employee (intangible asset) on return of asset (tangible assets) in the form of value creation. It can also be concluded that one of the main challenges for the managers is to maintain the conditions for successful creation of intangible value (service, image and relationship) and to transform this intangible value into tangible value (shares, income and etc.). The central bank should focus on making strategies to strengthen the value creation activities related to intellectual capital so as to efficiently utilize the intellectual resources. Furthermore, the absence of sufficient prior literature on the study area definitely warrants further research in the intellectual capital.

As a result of applied research performed for testing and validating the proposed model of evaluation, the impact of intellectual capital on Ethiopian private banks performance in 16 Banks confirmed the efficiency and effectiveness of the proposed approach. The present study is the first to investigate the impact of human, structural, and capital employed efficiency and intellectual capital in Ethiopian private banks. This study aims to discover, step by step, the interdependencies between the three elements of intellectual capital efficiency and how they affect Ethiopian private banks performance. The above results revealed that the companies in the field of banking industries possess many elements of intellectual capital and these elements can be, in fact, measured. Thus, it can be said that the proposed model for evaluation intellectual capital has a positive impact on private banks performance, being oriented on intense development. The most important directions of further research would be:

- Expanding the research to all banking industry level.

- The implementation of the model can be made in organizations of other areas (IT, manufacturing, healthcare, education etc.) and if the model variables are not applicable in the field, they can be eliminated and others can be suggested;
- The correlation analysis between IC and various other variables such as organizational competitiveness, subsidiaries competitiveness, competitiveness of groups etc.

5.2 Recommendation

Based on the research findings above, the following are recommended for stakeholders;

- Since the result of this study provide that, among the intellectual capital components the intangibles asset, Human capital efficiency coefficient (HCE) and structural capital efficiency coefficient (SCE), show more important in enhancing the firm financial performance than the tangible and physical assets capital employed efficiency coefficient (CEE), this would alert the directors and managers of Ethiopian private commercial banks emphasize on IC variables through establishment of separate department. So that clear and proper records and protection of significant components of IC could be kept by banks. This will help them to make their decision would be efficient.
- Since the result of this study provides that, human capital is significant factor for financial performance, while human capital accounting is not in place in Ethiopian, major financial regulatory bodies such as, National Bank of Ethiopian (NBE), Accounting and Auditing Board of Ethiopia (AABE) should encourage the inclusion of human capital accounting in the financial reporting of Ethiopian commercial banks. Thus, standards should be created for human resources identification and measurement. This will enhance valuation of human capital, ensure a higher degree of utility to stakeholders, uniformity in disclosures and will show a reliable comparison of human capital values.

5.3 Further research suggestion

The current global business relationship requires high computation practice; to challenge the challenges I urge the reader and users of this research to investigate this research topics in the entire industries in the countries, which is an important contribution to the literature on top of its findings of value to all stakeholders', managers and policy makers. However, the study isn't beyond limitations. Hence, Future research could use data from different industries, in order to provide further evidence on the impact of IC efficiency on firm's financial performance. Moreover, further studies can also be carried out on the

others performance measurement's such as return on equity (ROE), return on investment (ROI), and assets turn over (ATO) to investigate the impact of IC efficiency.

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Appendices

Appendix A: - Heteroskedasticity Test: Breusch-Pagan-Godfrey Model 1 (VAIC)

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	2.486191	Prob. F(1,78)	0.1189
Obs*R-squared	2.471172	Prob. Chi-Square(1)	0.1160
Scaled explained SS	2.223767	Prob. Chi-Square(1)	0.1359

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 04/23/20 Time: 21:52
Sample: 1 80
Included observations: 80

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.045762	0.016918	2.704913	0.0084
VAIC	-5.65E-05	3.58E-05	-1.576766	0.1189

R-squared	0.030890	Mean dependent var	0.019506
Adjusted R-squared	0.018465	S.D. dependent var	0.027009
S.E. of regression	0.026759	Akaike info criterion	-4.379223
Sum squared resid	0.055851	Schwarz criterion	-4.319672
Log likelihood	177.1689	Hannan-Quinn criter.	-4.355347
F-statistic	2.486191	Durbin-Watson stat	1.843191
Prob(F-statistic)	0.118897		

Appendix B:

Heteroskedasticity Test: Breusch-Pagan-Godfrey Model 2 (VAIC Components)

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.884113	Prob. F(4,75)	0.4777
Obs*R-squared	3.602354	Prob. Chi-Square(4)	0.4625
Scaled explained SS	2.907428	Prob. Chi-Square(4)	0.5734

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 04/23/20 Time: 21:53
Sample: 1 80
Included observations: 80

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.084271	0.071928	1.171605	0.2451
VAHC	-8.73E-06	7.99E-05	-0.109236	0.9133
VASC	-0.000843	0.001285	-0.656374	0.5136
VACE	-0.000190	0.002183	-0.087259	0.9307
PCI	-0.000652	0.001877	-0.347497	0.7292

R-squared	0.045029	Mean dependent var	0.015474
Adjusted R-squared	-0.005902	S.D. dependent var	0.021102
S.E. of regression	0.021165	Akaike info criterion	-4.812518
Sum squared resid	0.033595	Schwarz criterion	-4.663641
Log likelihood	197.5007	Hannan-Quinn criter.	-4.752829
F-statistic	0.884113	Durbin-Watson stat	1.762039
Prob(F-statistic)	0.477696		

Appendix C: - Breusch-Godfrey Serial Correlation LM Test Model 1 (VAIC)

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.326854	Prob. F(2,76)	0.7222
Obs*R-squared	0.682245	Prob. Chi-Square(2)	0.7110

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 04/23/20 Time: 21:51
Sample: 1 80
Included observations: 80
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.006799	0.090908	0.074792	0.9406
VAIC	-1.36E-05	0.000192	-0.070843	0.9437
RESID(-1)	0.075889	0.117092	0.648113	0.5189
RESID(-2)	0.052160	0.118093	0.441684	0.6600

R-squared	0.008528	Mean dependent var	4.75E-16
Adjusted R-squared	-0.030609	S.D. dependent var	0.140547
S.E. of regression	0.142682	Akaike info criterion	-1.007695
Sum squared resid	1.547211	Schwarz criterion	-0.888594
Log likelihood	44.30782	Hannan-Quinn criter.	-0.959944
F-statistic	0.217902	Durbin-Watson stat	1.955646
Prob(F-statistic)	0.883695		

Appendix D:

Breusch-Godfrey Serial Correlation LM Test Model 2 (VAIC components)

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.883052	Prob. F(2,73)	0.4179
Obs*R-squared	1.889737	Prob. Chi-Square(2)	0.3887

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 04/23/20 Time: 21:55
Sample: 1 80
Included observations: 80
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.018245	0.438049	-0.041650	0.9669
VAHC	6.32E-05	0.000488	0.129376	0.8974
VASC	0.000352	0.007819	0.044981	0.9642
VACE	-0.004155	0.013637	-0.304663	0.7615
PCI	0.000297	0.011440	0.025958	0.9794
RESID(-1)	-0.024995	0.119688	-0.208836	0.8352
RESID(-2)	-0.163291	0.123519	-1.321990	0.1903

R-squared	0.023622	Mean dependent var	2.91E-17
Adjusted R-squared	-0.056629	S.D. dependent var	0.125178
S.E. of regression	0.128674	Akaike info criterion	-1.179641
Sum squared resid	1.208655	Schwarz criterion	-0.971214
Log likelihood	54.18564	Hannan-Quinn criter.	-1.096077
F-statistic	0.294351	Durbin-Watson stat	1.944349
Prob(F-statistic)	0.937770		

Appendix E: - Correlated Random Effects - Hausman Test Model 1 (VAIC)

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.002528	1	0.9599

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
VAIC	0.002777	0.002783	0.000000	0.9599

Cross-section random effects test equation:
Dependent Variable: ROA
Method: Panel Least Squares
Date: 04/23/20 Time: 21:28
Sample: 2015 2019
Periods included: 5
Cross-sections included: 16
Total panel (balanced) observations: 80

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.994674	0.104079	19.16491	0.0000
VAIC	0.002777	0.000221	12.55305	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.788012	Mean dependent var	3.286170
Adjusted R-squared	0.734173	S.D. dependent var	0.272980
S.E. of regression	0.140744	Akaike info criterion	-0.897641
Sum squared resid	1.247958	Schwarz criterion	-0.391460
Log likelihood	52.90564	Hannan-Quinn criter.	-0.694699
F-statistic	14.63663	Durbin-Watson stat	2.136542
Prob(F-statistic)	0.000000		

Appendix F:

Correlated Random Effects - Hausman Test Model 1 (VAIC Components)

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	1.548374	4	0.8180

** WARNING: estimated cross-section random effects variance is zero.

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
VAHC	0.001869	0.001878	0.000000	0.9766
VASC	0.018060	0.020196	0.000023	0.6587
VACE	-0.005679	-0.020376	0.000203	0.3018
PCI	-0.041228	-0.040035	0.000106	0.9076

Cross-section random effects test equation:
Dependent Variable: ROA
Method: Panel Least Squares
Date: 04/23/20 Time: 21:33
Sample: 2015 2019
Periods included: 5
Cross-sections included: 16
Total panel (balanced) observations: 80

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.411270	0.499857	2.823350	0.0064
VAHC	0.001869	0.000603	3.098830	0.0030
VASC	0.018060	0.009485	1.903975	0.0617
VACE	-0.005679	0.019868	-0.285856	0.7760
PCI	-0.041228	0.015741	-2.619098	0.0111

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.815872	Mean dependent var	3.286170
Adjusted R-squared	0.757564	S.D. dependent var	0.272980
S.E. of regression	0.134409	Akaike info criterion	-0.963540
Sum squared resid	1.083948	Schwarz criterion	-0.368033
Log likelihood	58.54160	Hannan-Quinn criter.	-0.724784
F-statistic	13.99262	Durbin-Watson stat	2.064086
Prob(F-statistic)	0.000000		

Appendix G: - Random Effects test result Model 1 (VAIC)

Dependent Variable: ROA

Method: Panel EGLS (Cross-section random effects)

Date: 04/23/20 Time: 21:39

Sample: 2015 2019

Periods included: 5

Cross-sections included: 16

Total panel (balanced) observations: 80

Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.992076	0.090529	22.00496	0.0000
VAIC	0.002783	0.000191	14.54466	0.0000

Effects Specification		
	S.D.	Rho
Cross-section random	0.022436	0.0248
Idiosyncratic random	0.140744	0.9752

Weighted Statistics

R-squared	0.733139	Mean dependent var	3.095395
Adjusted R-squared	0.729718	S.D. dependent var	0.268984
S.E. of regression	0.139841	Sum squared resid	1.525332
F-statistic	214.2874	Durbin-Watson stat	1.838305
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.734908	Mean dependent var	3.286170
Sum squared resid	1.560574	Durbin-Watson stat	1.804749

Appendix H: - Random Effects test result Model 1 (VAIC Components)

Dependent Variable: ROA

Method: Panel EGLS (Cross-section random effects)

Date: 04/23/20 Time: 21:47

Sample: 2015 2019

Periods included: 5

Cross-sections included: 16

Total panel (balanced) observations: 80

Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.365163	0.456791	2.988596	0.0038
VAHC	0.001878	0.000507	3.702241	0.0004
VASC	0.020196	0.008160	2.474942	0.0156
VACE	-0.020376	0.013864	-1.469751	0.1458
PCI	-0.040035	0.011920	-3.358718	0.0012

Effects Specification		
	S.D.	Rho
Cross-section random	0.000000	0.0000
Idiosyncratic random	0.134409	1.0000

Weighted Statistics			
R-squared	0.789713	Mean dependent var	3.286170
Adjusted R-squared	0.778497	S.D. dependent var	0.272980
S.E. of regression	0.128475	Sum squared resid	1.237945
F-statistic	70.41368	Durbin-Watson stat	1.949480
Prob(F-statistic)	0.000000		

Unweighted Statistics			
R-squared	0.789713	Mean dependent var	3.286170
Sum squared resid	1.237945	Durbin-Watson stat	1.949480