Effect of intellectual capital efficiency on financial performance: Evidence from Ethiopian commercial banks

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December, 2018

Addis Ababa, Ethiopia

Effect of intellectual capital efficiency on financial performance: Evidence from Ethiopian commercial banks

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A thesis submitted to Addis Ababa university faculty of business and economics department of management in partial fulfillment of the requirements for the degree of masters of Science in management

December 2018

Addis Ababa, Ethiopia

Declaration

I, Henok Tefera, have carried out independently a research work entitled **"Effect of intellectual capital efficiency on financial performance: evidence from Ethiopian commercial banks"** in partial fulfillment of the requirement of the MSc degree in management from Addis Ababa 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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Certification

Addis Ababa University

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This is to certify that the thesis prepared by Henok Tefera entitles: ***"Effect of intellectual capital efficiency on financial performance: evidence from Ethiopian commercial banks"*** and submitted in partial fulfillment of the requirements for the degree of masters of science in management compiles with the regulations of the university and meets the accepted standards with respect to originality and quality.

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Acknowledgments

I praise the name of Almighty God who gave me power and patience in every endeavor of my life. Next my gratitude and special word of thanks goes to my research advisor Dr. Matiwos Ensermu (PhD).

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List of abbreviations and acronyms

AIB S.C:- Awash International Bank Share Company

ABB S.C:- Abay bank S.C Share Company

ADiB S.C: - Addis International bank Share 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

Abstract

"Effect of intellectual capital on financial performance: evidence from Ethiopian commercial banks"

Henok Tefera

Addis Ababa University, November 2018

This paper adopted Pulic (1998) model known as Value Added Intellectual Coefficient™ (VAIC™) to measure the effect of Intellectual Capital (IC) efficiency on the Ethiopian commercial banks financial performance of as measured on return on asset (ROA). Purposively sampled 15 commercial banks, which enable to answer research questions by focusing on particular characteristics of a population that are of interest, 75 observations for 5 years data from 2013 to 2017 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 firm size (SIZE), constructed from the annual financial statements. The assumptions needed to be fulfilled for OLS were tested; the residual was found homoscedastic, free of multicollinearity, free of autocorrelation and normally 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 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. Based on the findings, recommended that, bank managers to establish separate department for proper record of all IC components and policy makers to take in to account human capital and structural capital while setting up policies and procedures so as not to negatively affect the financial performance.

Keywords*:* Intellectual capital, VAIC, financial performance and Ethiopian commercial banks.

Chapter One

Introduction

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

1.1.1 Intellectual Capital

"The new source of wealth is not material, it is information, knowledge applied to work to create value." Walter Wriston, former Citibank president and CEO.

Intellectual capital (IC) plays an important role in an organization's performance and it represents distinctive characteristics that, ceteris paribus, can determinate the success or failure of an organization relative to its peers (Pulic, 1998). Intellectual capital is relatively new issue which has been brought up theoretically in international commercial environment recently (Pourkiani et al., 2014). Intellectual capital is the sum of all knowledge that is possessed by all individuals in an organization that can generate value for the organization (Cantu et al., 2009).

According to Goh (2005), though physical capital is essential for banks to operate, it is the intellectual capital that determines the quality of services provided to customers. Further (Ahuja and Ahuja, 2012) states that, an efficient utilization of IC is more crucial in banking than other industries, asserting high quality services depends on its investment in items related to IC such as its human resources, brand building, systems and processes. Therefore, as businesses face limited physical resources, IC becomes more important and necessary for banks to manage their intellectual capital as efficiently as possible.

According to Pablos, (2002), with the initiation of knowledge based economy, the traditional bases sources of competitive advantage that depend on tangible assets in

creating firm value and sustaining competitive advantage begun to erode. Furthermore Santoso, (2011) added that, Physical and financial capitals and production facilities are no longer factors that generate sustainable competitive advantage. Intangible assets especially knowledge is gaining prominence than ever before as a matter of survival and of achieving competitive advantage for the firm to compete strategically (Santoso, 2011). Thus, organizations and governments are focusing on intangibles as differentiators for the sustainable competitive advantage of both businesses and nations.

Though organizations and governments have begun to see that intellectual capital is a critical factor in generating a sustainable competitive advantage in recent years, intellectual capital has not been widely explored (Pedrini, 2007). The global economy has brought focus to the regional aspects of economic growth and has changed the perspective of economic growth from production (output) aspects to resource (input) aspects, as production has become more knowledge-based (Rodriguez & Martí, 2006). Stahle & Bounfour, (2008) stated that, in developing economies, IC components can function as pillars that support economic growth and additional efforts to increase intellectual capital levels affect the economy positively.

Study on intellectual capital in Ethiopian business environments was still very limited Mekete, (2015), Meressa (2015) and Demissie, (2016). Thus, this study could contribute to the research literature on intellectual capital applications in Ethiopian banking industry, adding the needed research on intellectual capital in Ethiopian banks for the academic communities. Academic communities also recommended using the results of this study to make comparisons to other industries and conduct further studies on intellectual capital in Ethiopian commercial banking industry.

1.1.2 Overview of Ethiopian Banks

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. The share of public banks, in total branches declined to 39.5 percent from 41.9 percent in the year 2015/16 signifying the growing role of private banks (NBE report, 2017).

The financial sector has been robust and continued to operate under safe and sound environment. With the opening of 494 new branches in a single year their total branch network increased to 3,187 from 2,693 a year earlier which resulted in improved access to finance. As a result, bank branch to population ratio declined from 1:33,448 people to 1:28,932 in previous year of 2015/16. They have also stepped up their deposit mobilization, loan collection and disbursement. Accordingly, deposits depicted a 19.3% annual growth while loan collection rose 28.6% and new loan disbursement went to finance the private sector. Moreover, the financial indicators confirmed that the banking sector well capitalized, return on equity and assets as well as Non-performing loans were within the required level (NBE report, 2017).

1.2 Statement of the problem

The research work carried out by Boekestein, (2009) stated that, with limited physical resources, businesses must improve competencies and innovations along with other non-physical resources such as knowledge to reduce development time, develop superior products and services, and market products and services profitably. Furthermore, Lipunga, (2014) added that, the 21st century is more dominated by knowledge economy and many firms are shifting from using physical capital and embrace intellectual capital, as more and more firms are trying to find better ways to use their resources efficiently. Academicians have been drawn into the web of an unending debate concerning the place of intangible assets in corporate value creation. However, scholars have argued on the extent that intellectual capital can enhance firms' financial performance.

Samilogu, (2006) and Tan, (2007) in their separate studies submit that an increase in IC increases the value of the firm and financial performance. Berzklane and Zelgalve (2014) using the same model avers a statistically significant and positive relationship between IC and company value for companies in Latvia and Lithuania whereas such correlation were not observed for companies in Estonia. Banimahd, et.al., (2012) suggests, 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 a relationship with firm's size. 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, and market to book value ratio.

Mehri (2013) stated that intellectual capital, together with information from financial statement can explain the financial performance and market value of firms (share prices). Further, Rastogi, (2000) claimed that, IC is both invisible and intangible and as such the value of knowledge cannot be captured well by any traditional measure. In view of the forgoing examples, scholars of financial and corporate reporting in their various studies have both theoretically and empirically examined the impact of intellectual capital on firms' financial performance but results have rather than resolve the issues remain inconsistent and produced mixed outcomes.

The above studies affirmed and reaffirmed the ability of intellectual capital to have positively influence corporate valuations, some empirical results still negates the assertion or could not establish any statistical relationship between IC and financial performance. Ferraro and Veltri, (2011); and Mehnralian et.al, (2012); Gottfredson, (1997); Jensen, (1998) found no statistical significant relationship between IC and financial performance. Again, research work by Tarideh (2013), indicate no relationship between IC and financial performance.

In contrary to the study of, (Firer and Williams, 2003), who used the Value Added Intellectual Coefficient (VAIC) to measure IC and commercial banks performance in Africa and submits no significant correlation on profitability, productivity and market

value, Isanzua, (2015) conduct a research on tanzanian commercial banks and found that there is strong relationship betwwen fiancial perforance inicators and components of value added intellectual coefficient (VAIC).

From the foregoing submissions, it is clear that the task of establishing the relationship between IC and financial performance indicators is yet to be rested. This study becomes very imperative as there is a clear gap created by dearth of studies on the impact of IC components on financial performance from the developing countries as most of the studies were done in foreign countries.

In Ethiopia as far as the knowledge of the researcher is concerned, there are very few, Mekete, (2015), Meressa (2015) and Demissie, (2016), researches conducted on the intellectual capital. Mekete, (2015) and Demissie, (2016) focused on separete single variables in intellectual capital, knowledge management and organaizational capital respectively. Moreover, Meressa (2015) investigated the determinants of value added intellectual capital itself through seven proxy variable, while this study investigated the effect of intellectual capital on the financial performance.

Hence, this study follows alternative approach on examining the effect of Intellectual capital on financial performance through value added intellectual coefficient (VAIC) model developed by Pulic, (1998). Accordingly, the study aims to investigate empirically the effect of VAIC on financial performance of Ethiopian commercial banks and to assesses the relationship between the level of intellectual capital efficiency in terms of Human Capital, Capital Employed and Structural Capital (Value Added Intellectual Coefficient components) with banks performance in Ethiopia from the traditional accounting based financial performance measure perspective of Return on Asset (ROA).

1.3 Guiding Research Questions

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

- What is the effect of intellectual capital efficiency on financial performance of Ethiopian commercial banks?

1.4 Objectives of the study

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

1.4.1 General Objective

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

1.4.2 Specific Objectives

This study will have the following specific objectives:

- To examine the effect of the intellectual capital efficiency as measured on value added intellectual capital (VAIC) model on return on assets (ROA) of Ethiopian commercial banks.
- To examine the effect of human capital efficiency (HCE) on return on assets (ROA) Ethiopian commercial banks.
- To examine the effect of structural capital efficiency (SCE) on return on assets (ROA) Ethiopian commercial banks.
- To examine the effect of capital employed efficiency (CEE) on return on assets (ROA) Ethiopian commercial banks.

1.5 Scope of the study

The research focused only on the effect of intellectual capital on the financial performance of selected fifteen commercial banks namely; Abay Bank S.C, Addis International Bank S.C, Awash International Bank S.C, Bank of Abyssinia S.C, Birhan International Bank S.C, Bunna International Bank S.C, Commercial bank of Ethiopia Bank, Cooperative Bank of Oromia S.C, Dashen Bank S.C, Lion International Bank S.C, Nib International Bank S.C, Oromia International Bank S.C, United Bank S.C, Wegagen Bank S.C. and Zemen Bank S.C.

Since the research limited on the commercial banks, publicly owned 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. The remaining two private commercial banks namely; Debub Global Bank S.C, and Enat Bank S.C., are excluded from the study sample due to unavailability of full financial reporting on the study period. Since Debub global bank Share Company and Enat Bank Share Company established in the year 2012 and 2013 respectively, inclusion of these banks leads to decrease in the number of observations. In addition, due to unavailability of published financial report in the year 2013 for both of these two commercial banks respectively, the researcher discarded both banks from sample selection. Hence, main banking activity, and availability of the financial data is the basic criteria of sample selection.

1.6 Significance of the study

The research work is expected to provide importance to commercial banks management team, policy makers and future researchers, thus; the study mainly have the following importance:-

- Since this study aim at investigation of effect of intellectual capital on the financial performance of commercial banks in Ethiopia, would help management team of Ethiopian commercial banks in the new formulation of their bank policies and procedures help to enhance their financial performance and/or to take corrective actions on their existing one/ policy and procedure amendments.

- 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 as well as in making amendments on the existing ones so as not to negatively affect the financial performance.

- The study fill the gap on existing literature and provides evidence whether variables identified by previous studies in other countries researches are the same as the ones found in Ethiopia. Furthermore, the study also opens the issue of intellectual capital for further and detail investigation for researchers.

1.7 Limitation of the study

- Since this study is on only one of the finance industry sub-sectors in Ethiopia, the existence of only 18 banks in the Ethiopia and some of them are established in the recent year, inclusions of all banks leads to decrease in the study sample size, the study covers only for five years (2013-2017 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 Outline of the study

This chapter 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 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 framework

2.1.1 Overview of Intellectual Capital

Since peoples were dealing with various set of issues and from a range of backgrounds, their definitions of intellectual capital directly reflect their unique perspectives and the very specific sets of problems they were working to resolve. Each of the perspectives they developed is true for its specific user need. The term intellectual capital (IC) was first published by John Kenneth Galbraith in 1969 (Feiwal, 1975). He believed that IC meant more than just "intellect as pure intellect" but rather incorporated a degree of "intellectual action" in that sense, intellectual capital is not only a static intangible asset, but an ideological process; a means to an end.

The limitations on financial statements in explaining firm value underline the fact that the source of economic value is no longer the production of material goods, but the creation of intellectual capital (Chen et.al, 2005). Intellectual capital includes human capital and structural capital wrapped up in customers, processes, databases, brands, and systems Edvinsson and Malone, (1997), and has been playing an increasingly important role in creating corporate sustainable competitive advantages (Kaplan and Norton, 2004).

Among the Intangible assets especially Knowledge are gaining prominence than ever before as a matter of survival and of achieving competitive advantage for the firm to compete strategically (Latif et al., 2012). Thus it is no secret that the organization that

continues to invest in new skill and technology will continue to be successful and intellectual capital has become the critical driver for sustainability (Bontis, 2001). Because intellectual capital can improve the financial performance of organizations, create value, and provide sustainable environment for competitive advantage globally, the use of intellectual capital should become one of the priorities of all organizations (Cohen & Kaimenakis, 2007).

Intellectual capital can be described in terms of a tripartite connotation containing human capital, relational capital and structural capital components. Its concept is relatively new in worldwide business environment Al-Hamadeen & Suwaidan, (2014). As per Jay Chatzkel (2002), IC from a managerial perspective can be defined as the knowledge, applied experience, organizational technology, relationships, and professional skills that provide for a competitive edge in the market. A more dynamic version of this definition says that intellectual capital is: knowledge that can be converted into value or profit. It is the value embedded in the ideas embodied in people, processes, and customers.

Despite the increasing recognition of intellectual capital in driving firm value and competitive advantages, an appropriate measure of firms' intellectual capital is still in infancy. The problem is that intellectual capital is not typically used effectively and may cost businesses lost revenue in millions of dollars a year (Sudarsanam, Sorwar, & Marr, 2006). Instead of directly measuring firms' intellectual capital, Pulic (2000) proposed a measure of the efficiency of value added by corporate intellectual ability (Value Added Intellectual Coefficient (VAIC)).

The major components of VAIC can be viewed from a firm's resource base – physical capital, human capital, and structural capital. VAIC is being increasingly used in business (Pulic, 1998, 2000) and academic applications (Firer and Williams, 2003). In comparison with research studies conducted in developed countries, limited consideration is given to examine intellectual capital practices of business within developing countries (Al-Hamadeen & Suwaidan, 2014).

2.1.2 Theoretical base

The theories that are underpinning the study of firm preference are knowledge based theory, human capital theory, resource base theory and intellectual capital theory.

2.1.2.1 Knowledge Base Theory

Originating from the strategic management literature, this perspective builds upon and extends the resource-based view of the firm initially promoted by Penrose (1959). The knowledge-based theory of the firm considers knowledge as the most significant resource of a firm Njuguna, (2014). Its proponents argue that because knowledge-based resources are usually difficult to imitate and socially complex, heterogeneous knowledge bases and capabilities among firms are the major determinants of sustained competitive advantage and superior corporate performance.

This knowledge is embedded and carried through multiple entities including organizational culture and identity, policies, routines, documents, systems, and employees Njuguna, (2014). Although the resource-based view of the firm recognizes the important role of knowledge in firms that achieve a competitive advantage, proponents of the knowledge-based view argue that the resource-based perspective does not go far enough. Information technologies play an important role in the knowledge-based view of the firm in that information systems can be used to synthesize, enhance, and expedite large-scale intra- and inter-firm knowledge management (Alavi and Leidner 2001).

2.1.2.2 Human Capital Theory

The theory of human capital is rooted from the field of macroeconomic development theory. Becker's (2003) argues that there are different kinds of capitals that include schooling, a computer training course, and expenditures on medical care. And in fact, lectures on the virtues of punctuality and honesty are capital too. In the true sense, they improve health, raise earnings, or add to a person's appreciation of literature over a lifetime. Consequently, it is fully in keeping with the capital. Concept as traditionally defined to say that expenditures on education, training and medical care are investments

in capital. These are not simply costs but investments with valuable returns that can be calculated Njuguna, (2014).

2.1.2.3 Resource base theory

According to the resource-based theory point of view, core competencies can be constructed from the organizational point of view, many ideas that intellectual capital is a core competence or power Njuguna, (2014). The Resource-based view (RBV) confirms that an organization's performance relies on a set of internal resources and capabilities. It focuses on the internal resources and capabilities which can reinforce competitive advantage. Moreover, Ahmed, (2014) states that, the RBV considers that a firm is made up of a heterogeneous set of tangible and intangible resources. The aim is to illustrate the role of resources in supporting organizational performance in a dynamic, competitive environment Acur et al. (2010). These resources are employed to support firms in producing better products and services in order to satisfy customers' needs. These resources have four attributes. They are rare, valuable, have few substitutes and are not easily imitable Njuguna, (2014).

2.1.2.4 Intellectual capital theory

The theory of intellectual capital is a new prominent theory which has not only challenged the large attention, but already considerably promises the increase of business results in the future. The base of the theory lies in the fact that tangible assets (land, buildings, equipment and money) of today's leading companies around the world have less value than intangible assets, which has not been quoted in their business balances. Theory is founded on the conviction that the wealth of enterprises is based on the human capital, structural capital and consumer capital. The value creation happens when one kind of capital turns into another. The value has been created whenever the human ability (human capital) creates new business processes (structural capital) which results in better services for consumers and increases their loyalty (consumer capital) (Njuguna, 2014).

In this study, the theory will help in elaborating the intellectual capital and its role in organizational performance

2.1.3 Research area of intellectual capital

The intellectual capital researches mainly concerned with raising awareness about the existence and value of intangible assets within organizations and about developing classification models for intellectual capital (Roos et al., 1997, Stewart, 1997, Brooking, 1996 and others). (Roos et al., 1997) suggested that, there are three approaches to measure intellectual capital. The first approach employ the existing value-based measures suggested that the value of intellectual assets is the difference between the market value of the firm and its book value. The second approach is to measure 'hidden' intellectual assets which are critical success factors of the business. The third approach is to use an intellectual capital index to provide a measure of the efficiency of intellectual assets. This approach starts with identifying key measures of success of an individual firm and weighted (according to importance) to provide a single summary index.

As it evidenced by the works of (Sveiby, 1997; Mouritsen et al., 2001; Bontis et al., 2000; Lev, 2001; Meritum, 2002), literatures shifted to focus on the measurement of intellectual capital with the creation of frameworks, indices and guidelines to support the initial concepts of having different reasons as to why organizations should measure their intellectual capital. Sveiby (1997) was developed a content analysis framework, which categorizes intellectual capital according to organization's internal capital, external capital, or human capital within an organization. Abeysekera and Guthrie (2005) empirically examined the annual reports of the top 30 different firms listed on the Colombo Stock Exchange for the years 1998 and 1999. The researchers classified 45 IC items by external capital, human capital and internal capital categories.

Recent literatures started to link intellectual capital with performances and focus on intellectual capital performances using the efficiency coefficient, called VAIC, developed by Pulic, A. (1998). Pulic (2001) discusses the value creation efficiency analysis of 20 banks in the Croatian economy for a period of five years and comes out with a VAIC ranking. The efficiency of the banks is measured using the performance of the capital employed and the intellectual capital using VAIC as a tool of measurement.

2.1.4 Intellectual capital and Financial Performance

A. The value added intellectual capital

VAIC is an analytical procedure designed to enable management, shareholders and other relevant stakeholders to effectively monitor and evaluate the efficiency of Value Added (VA) by a firm's total resources and each major resource component Kurfi et.al, (2017). Previous research on intellectual capital has used Value Added Intellectual Coefficient (VAIC™) developed by Ante Pulic in 1998 as measurement of Intellectual Capital performance. Pulic (1998) also come out with a result that indicates the Value Added Intellectual Coefficient (VAIC) theory as the approach to measure how much and how efficiently IC and capital employed create value based on the relationship of three major components: (1) capital employed; (2) human capital; and (3) structural capital. This is agreed by Saengchan (2008), as the study aimed to investigate the Pulic's Value Added Intellectual Coefficient (VAIC), which includes human capital (HC), structural capital (SC) and physical capital (CA) as the efficiency measure of capital employed and intellectual capital and their impact on firms' financial performance.

➢ VAIC and financial performance

Though, there has been an ongoing debate over which VAIC components improve the performance of financial institutions, there is a wide range of studies investigating the impact of intellectual capital on the financial performance of firms as measured by VAIC model. While some of these studies (Chen et al., 2005; Gan & Saleh, 2008; Tan et al., 2007) suggest that intellectual capital has positive impacts on the financial performance of firms, others (Chan, 2009, Ghosh & Mondal, 2009) fail to produce adequate evidence showing this positive relationship. Some studies (Goh, 2005; Mondal & Ghosh, 2012) suggest that the most important VAIC component having a positive impact on the financial performance is HCE; while others (Al-Musalli & Ku Ismail, 2014; Joshi et al., 2013; Ting & Lean, 2009) claim that CEE affects the performance positively. Therefore, based on the findings of the previous studies, it is hypothesized that:

H1. There is a significant positive relationship between the value added intellectual capital coefficient (VAIC) of Ethiopian commercial banks and their financial performance measure (ROA).

B. Human Capital Efficiency (HCE)

Human Capital consists of the skills, competencies and abilities of individuals and group (Stewart, 1997). Human Capital is interpreted as employee values creating potentials depicted in the knowledge, competencies, skills, experiences, abilities and talents of firm's employees and managers. Human capital captures knowledge, professional skills, experience and innovativeness of employees within an organization, Boujelbene and Affes (2013); Banimadh, et al. (2012); Uadiale and Uwuigbe, (2011). According to Rastogi (2000) as cited by Stiles and Kulvisaechana (2008) the concept and perspective of human capital stems from the fact that there is no substitute for knowledge and learning, creativity and innovation, competencies and capabilities and that they need to be relentlessly pursued and focused on the firm's environmental context and competitive logic. Nielson, Bukh, Johansen, Gormsen (2006) submit that human resources capital is the core of IC components and they include skilled staff, knowledge and management philosophy the company's performance has been affected.

➢ Human capital and financial performance

Financial performance in relation to HC connotes notable actions or achievements which accrue to an enterprise as a result HC measurement and application (Anuonye, 2015). The traditional monetary bookkeeping is unable to look at the real value of the firm where it only measures physical assets Lina, (2014). Prior studies keep up that HC makes value for the organization Fathi et al., (2013). For instance, the investigation of Gan and Saleh (2008) examined the relationship in the middle of HC and firm execution, and they found that HC significantly affected profitability and productivity of the firm. In the same vein, the study of Al-Musali and Ismail (2014) proved an HC and its consequence on financial performance of Saudi Arabian banks where they revealed that HC was positively connected with banks' financial performance. Additionally, Chen et al. (2005) found that HC had a significant influence on profitability. Therefore, based on the findings of the previous studies, it is hypothesized that:

H2. There is a significant positive relationship between the human capital efficiency coefficient (HCE) of Ethiopian commercial banks and their financial performance measure (ROA).

C. Structural Capital Efficiency (SCE)

Structural capital (SC) is defined as the knowledge that stays within the firm (Bontis, 1998). It comprises organizational routines, procedures, systems, cultures and databases. Nik Maheran (2009) has mentioned that structural capital encompasses the enabling structures that allow the organization to exploit the intellectual capital. The structure ranges from tangible items offered by an organization such as patents, trademarks and databases, to complete intangible success such as culture, transparency and trust among employees. Thus, organizations that possess strong structural capital will have a supportive culture that permits their employees to try new things, to learn and to practice those (Bontis *et al,* 2000). On the other hand, structural capital represent the competitive intelligence, formulas, information systems, patents, policies, processes, that result from the products or systems the firm has created over time. Structural capital also includes all the non-human storehouses of knowledge in organizations, which include the databases, organizational charts, process manuals, strategies, routines and anything whose value to the company is higher than its material value (Bontis *et al,* 2000). Edvinsson and Malone (1997) as cited by Uadiale and Uwuigbe (2011) further classified structural capital into organization, process and innovation capital.

➢ Structural capital and financial performance

Muhammad & Ismail, (2009) opined that structural capital as a competitive intelligence, formulas, information system, patents, policies and others which resulted from products or systems the company has created over a period of time Bontis (2000) conducted a study on IC and business performance, and revealed that IC had a positive association with business execution regardless of industry. Maditinos et al. (2010) carried out another study to confirm findings of Bontis (2000), the findings revealed a positive relationship of structural capital and firm performance. In his study, Appuhami (2007) found a positive relation between structural capital and firm performance. Hence, in the light of the aforementioned findings, the following hypothesis is derived:

H3. There is a significant positive relationship between the structural capital efficiency coefficient (SCE) of Ethiopian commercial banks and their financial performance measure (ROA).

D. Capital Employed Efficiency (CEE)

Capital employed on the other hand can be defined as total capital harnessed in a firm's fixed and current assets. It represents the potential an organization has due to ex-firm intangibles (Bontis, 1999) and defines the value of relationships with suppliers, allies and customers are classified into the forms of brand equity and customer loyalty (Stewart, 1997). He submits that brand equity defines a promise of quality for which a customer agrees to pay a premium price and the value of brands is measurable in financial terms while the customer loyalty accounts for a base of customers that is measurable and depicted in a premium price. It is the knowledge embedded in relationships with customers, suppliers, industry associations or any other stakeholder that influence the organization's life, (Oba, et. al 2013; Banimadh, et.al, 2012; Salman,et.al 2012; Edvinsson and Malone (1997).

➢ Capital employed and financial performance

Capital utilized is regarded as the strongest predictor of execution (Choudhury, 2010). Accordingly, Lina (2014) opined that a strong linkage between capital utilized backings that information tied up in relationship among representatives, customers, suppliers, cooperation accomplices and so forth tends to prompt process and create developments, better critical thinking which tends to increase generation and administration conveyance effectiveness and in addition customer satisfaction. Appuhami and Bhuyan (2015) also established a positive relationship between capital employed and capital gains on shares of listed companies in Thailand stock market. Also, Khalique et al. (2011) conducted a research on the relationship of IC with the organizational performance of commercial banks in Islamabad, Pakistan. The results showed that capital employed has positive relationship with organizational performance. Though many studies found the relationship between capital employed and business performance but the result is mixed and inconclusive. This component of IC still makes up a reasonable linkage with business performance. Thus, the hypothesis related to capital employed is formulated as follows:

H4. There is a significant positive relationship between the capital employed efficiency coefficient (CEE) of the banks operating in Ethiopian commercial banks and their financial performance measure (ROA).

2.1.5 Firm performance as measured on ROA

Firm performance can be measured through different tools based on financial and non-financial aspect. Performance measurement tools can help businesses evaluate their resource allocation processes in order to determine how resources can be better managed and distributed to the appropriate channels Chen *et al*, (2005).

Traditionally, many performance measures have been based around financial aspects, omitting important non-financial aspects including the importance of dynamic capability through accumulating research and development as well as marketing capability over time, to further enhance firm performance (Hsu & Wang, 2010). Besides that, the evaluation of the performance of banks, for example, usually employs financial indices, providing a simple description about the bank‘s financial performance in comparison to previous periods (Chen, 2001). By focusing only on financial aspects, however, is not enough for management to deal with the changing business environment.

Moreover, Kwan (2003) mentioned that the financial statements is a common measure of banks generally in terms of financial health over a given period of time and it can be used to compare similar banks across the same industry or to compare industries or sectors in aggregation. The performance can be measured by using various methods such as accounting based technique, which consist of Return on Asset (ROA) and Return on Equity (ROE). In other study by Pandya and Rao (1998), shows that management researchers would prefer to use various accounting based measures to measure performance. Most common variables are ROA and ROE. This is certainly true as Bram Handkar *et al* (2007) in their initial study, tried out several alternatives by gathering data on Return on Assets (ROA), Return on Equity (ROE), and Return on Investment (ROI).

Return on Assets methods (ROA) 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. ROA is the most universally reported figure, revealing lesser gap in the data set.

ROA = Net income/ Total Assets

2.1.6 Significance of Measuring Intellectual Capital

With the ongoing pressure of globalization and the highly competitive nature of the international market today, importance of performance measurement increases. Performance measurement is a tool designed primarily to improve decision making as it allow user to examine the capabilities, progress and success of an organization or industry over time, either against the same or of different region Stewart, (1997). In traditional accounting measures, assets refer mainly to financial and physical capital Edvinsson and Malone, (1997). IC measurement covers important non-financial contents such as customer satisfaction, innovation and human capital. There is significant difference between the two approaches: IC measurement looks to the future while financial accounting looks backwards (Sveiby, 2000). However, Bontis (2001) more in-depth views, is that IC is a vital resources for strategic marketing and business management and its quantification has great benefit as an internal management tool rather than an external communication to investors.

2.1.7 Value added as an indicator of Intellectual Capital

Ante Pulic (2000, 2003, and 2005) was pioneered IC researchers who focus on constructing IC and economic performance and based his analyses solely on company's financial accounting indicators. Value Added Intellectual Coefficient (VAIC) method enables firms to measure the value-creation efficiency from decisions of investment and management of resources (Pulic, 2001, 2002; Boremann 1999). It has undergone critical conceptual or formal analysis, and most recently the measurement model was further elaborated by corporate IC.

The indirect way of measuring efficiency by calculating the efficiency coefficient of value added (VA), capital employed (CE), human capital (HC) and structural capital (SC). This would produce VAIC index that is unambiguous which informs tangible and intangible asset efficiency that can be utilized to generate a firm's value.

VAIC model intends to measure how best a firm could add value to its company using the element of knowledge. VAIC calculations are based on: human capital which is

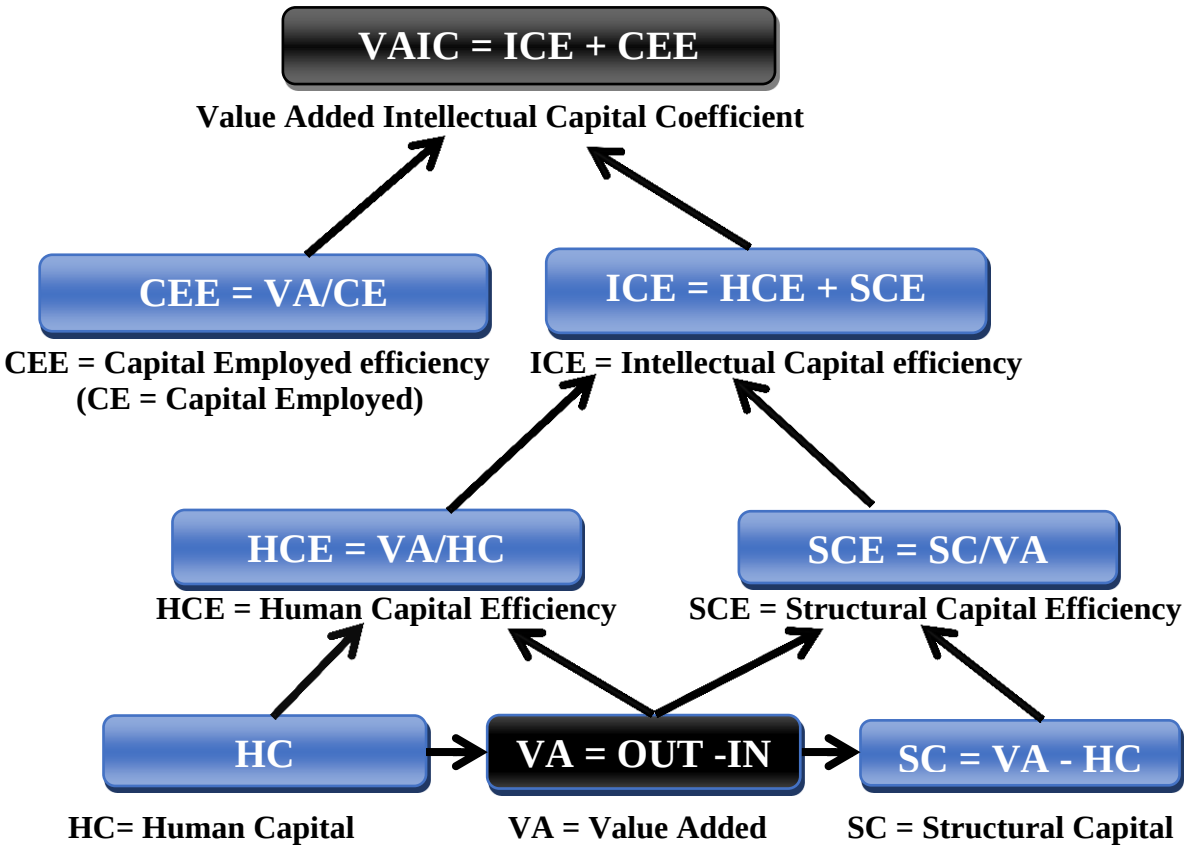
employee expenses; structural capital which is the difference between produced added value and human capital; and lastly, book value of the net asset and the way it is utilized is capital employed efficiency. Based on several assumptions and definitions, VAIC measure could directly analyze IC as it is made up of quantifiable ratios:

(i) Capital employed efficiency CEE = VA/CE;

(ii) Human capital efficiency HCE = VA/HC; and

(iii) Structural capital efficiency SCE = SC/VA.

Figure 2.1: Construction of VAIC



Source: Shamsudin & Yian, (2013)

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.

In Australian, Joshi et al. (2010) explored the relation between IC (and components) and banks' performance over the period 2005-2007 using the VAIC^{TM} 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 (VAIC^{TM}) 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.

2.2.2 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) investigated the 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.

2.2.3 Studies in Ethiopia

Mekete, (2015), examineed 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 reveled 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.

2.3 Research gap and contribution

Studies increasingly indicate that value added may be the smoothest measure of IC utilizing 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.

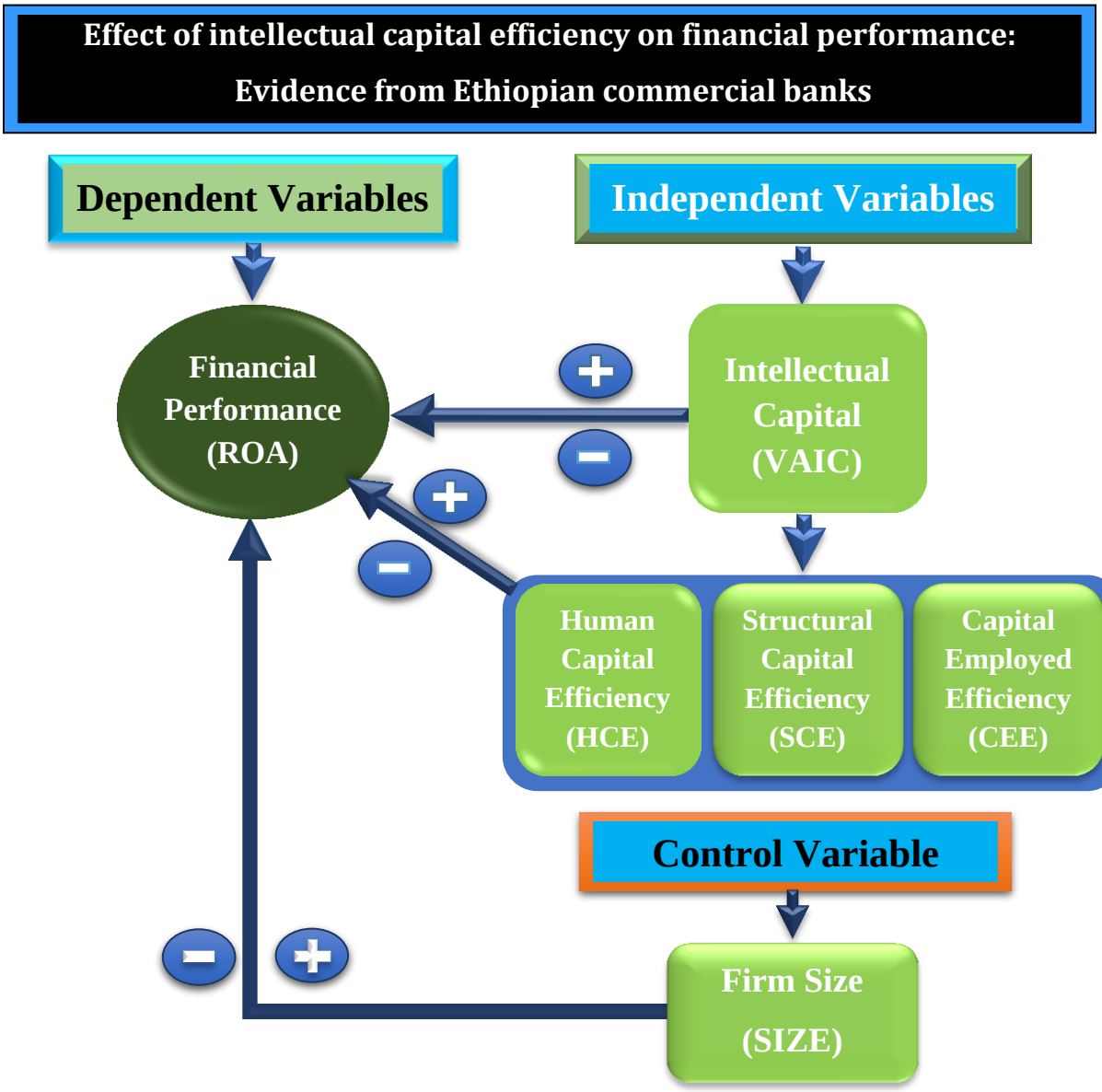
The concept of intellectual capital in Ethiopia is not widely investigated. Though, there are very few, Mekete, (2015), Meressa (2015) and Demissie, (2016), researches conducted on the intellectual capital, none of them are conclusive and fully covered all components of intellectual capital and financial performance. 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. Therefore, the researcher initiated by these gaps and devotes to conduct a research on it so as to fill the gaps.

2.4 Research Model (conceptual framework)

Referring to the literatures reviewed, the overall intellectual capital component will be represented and measured by the VAIC model. 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 will provide a better understanding on the relationship of intellectual capital and Ethiopian commercial banks' performance.

From the theoretical and emperical literature reviews, the following conceptual framework of the study is developed by the researcher.

Figure 2.2 the conceptual framework or model of the study



Source: Adopted from (Isanzu, 2017) and Compiled by the researcher.

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 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 employ 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 firm size (SIZE) was examined. Panel data regression analysis was used to investigate the extent to which intellectual capital affect financial performance of Ethiopian commercial banks within the period 2013 to 2017.

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 and Sample

This study was conducted on Ethiopian commercial banks, in which a total of eighteen (sixteen private and two publicly owned) banks are operating at the moment. For this research purpose out of eighteen banks, the researcher selected 15 commercial banks. Based on their establishment period where all of them are operational under this study cover years, 2013-2017, and hence the availability of required data was assured. Secondly, as the purpose of its establishment differs from the commercial banks, DBE (Development Bank of Ethiopia) is the state owned bank discarded from the sample. DBE specialized bank to finance medium and long-term investment projects that are in the government's priority sectors.

In addition to the inclusion of the new banks leads to a decrease in number of observations, Debub Global Bank Share Company and Enat Bank Share Company

established in the year 2012 and 2013 respectively, due to the unavailability of published financial report for the year ended 2013 for both of these two banks, the researcher discarded from sample selection. Hence, out of the eighteen banks in Ethiopia, the following fifteen 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)
- CBE (Commercial Bank of Ethiopia)
- CBO S.C (Cooperative Bank of Oromia Share Company)
- DAB S.C (Dashen 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)

The sampling method is purposive as the samples included are based on the judgment of the author. As per the annual report of NBE, for the year ended July 07, 2017, sampled fifteen commercial banks are earned 94.6% of the yearly revenue, outlay 96.2% of Employees Salary & Benefits, and represent 97.8% of the total asset of the of Ethiopian banking industry. Based on the forgoing evidence the sampled fifteen banks are dominant in Ethiopian banking industry and conclusions made on those banks will fairly represent the other banks. The main goal of purposive sampling is to focus on particular characteristics of a population that are of interest, which will best enable to answer research questions. Basing purposive sampling, 75 observations are selected taking 5 consecutive year data from each of the fifteen banks.

3.4 Measures of variables

3.4.1 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

3.4.2 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 (VAIC^{TM}) method, developed by Public (1997, 1998, 2001, 2002a, 2002b, 2004), was 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 firm size (SIZE) used to assess the effect of each variable independently on the financial performance of Ethiopian commercial banks.

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.

The equation below formalizes the VAIC relationship algebraically;

$$VAIC = CEE + HCE + SCE$$

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

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

3.5 Control Variables

Applying firm size as the control variable in this study is stimulated by the way that it has been discovered to be connected with organizations with distinguishing attributes. The firms' size has an influence of IC on organization performance (Nimtrakoon, 2015; Chan, 2011). Prior studies that measured size through common logarithm of total assets of the organization include Pouraghajan, (2012), Iavorskyi, (2013) and Meressa, (2016).

3.6 Data analysis and model specification

3.5.1 Data Analysis

In this study the researcher employed, descriptive analysis, diagnostics test and the regression analysis.

Descriptive analysis is used to describe relevant aspects of intellectual capital and financial performance of Ethiopian commercial banks and to provide detailed information about each relevant variable. Diagnostics tests for Muliticollinearity, Hetroskadasticity, Autocorrelation and Normality tests were conducted to ensure that the data suits the basic assumptions of classical linear regression model.

Regression analysis was used to examine the relationship between intellectual capital and financial performance of Ethiopian 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 commercial banks, panel least square method is used.

Finally, the P-value was used to determine the significance of the constant term 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 R^2 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.

3.5.2 Model Specification

Sink and Tuttle (1989) claim that to measure the performance of an organization, seven performance criteria could be analyzed for comparison including: effectiveness, efficiency, quality, productivity, quality of work life, innovation and profitability. In this study, profitability and productivity will be 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 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).

Econometricians 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 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:-

$$\mathbf{Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \ldots + \beta_k X_{ki} + \varepsilon_i \ (i\ 1,2,3\ldots,n)}$$

Where Y_i is the i^{th} observation of the dependent variable, $X_{1i},\ldots,X_{ki}$ are the i^{th} observation of the independent variables, $\beta_0,\ldots,\beta_k$ are the regression coefficients, ε_i is the i^{th} 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 commercial banks. The study used the accounting proxies (ROA) to measure the financial performance of 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 firm size (SIZE) used in the second model.

Financial Performance = f (intellectual capital)

Model: 1 $ROA = \alpha + \beta_1 VAIC + \varepsilon$

Model: 2 $ROA = \alpha + \beta_1 (CEE) + \beta_2 (HCE) + \beta_3 (SCE) + \beta_4 (SIZE) + \varepsilon_{it}$

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

SIZE = Firm Size

ε_{it} = Error component showing unobserved factor

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 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 commercial banks, the topic become worth studying.

The study based on data collected from annual reports of 15 commercial banks in Ethiopia, from year 2013 to 2017. In the previous chapters, indicators which have been selected to present intellectual capital and financial performance of commercial banks ware explained. Hence, basing the review of literature and collected secondary data from the audited financial statements of Ethiopian commercial banks, the researcher developed the following hypotheses:-

- **H1.** There is a significant positive relationship between the value added intellectual capital coefficient (VAIC) of Ethiopian commercial banks and their financial performance measure (ROA).
- **H2.** There is a significant positive relationship between the Human capital efficiency coefficient (HCE) of the banks operating in Ethiopian commercial banks and their financial performance measure (ROA).
- **H3.** There is a significant positive relationship between the structural capital efficiency coefficient (SCE) of the banks operating in Ethiopian commercial banks and their financial performance measure (ROA).
- **H4.** There is a significant positive relationship between the capital employed efficiency coefficient (CEE) of the banks operating in Ethiopian commercial banks and their financial performance measure (ROA).

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.

3.7.1 Summary of the study variables

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
Dependent Variables	Return on Assets	ROA	$\frac{\text{Net income after tax}}{\text{Total Assets}}$	Lina (2014) and Salman et al. (2012)	
Independent Variables	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),	+
Control Variables	Firm Size	SIZE	Natural logarithmic of total asset	Meressa, (2016)	+

Source: - Compiled by researcher

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION

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 fifteen Ethiopian commercial banks from the year 2013 to 2017 with a total of 60 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	3.003087	0.652355	5.126916	1.814493	75
CEE	0.711096	0.084424	0.893472	0.584297	75
HCE	7.615080	1.145273	10.25014	4.420278	75
SCE	4.785975	1.481940	9.949975	2.307150	75
SIZE	3.993465	0.513558	5.564319	2.915661	75
VAIC	13.11215	1.983114	20.44015	7.410136	75

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 0.71 for CEE as measured by the ratio of value addition to capital employed to a maximum of 7.61 for HCE as measured by the ratio of value addition to total salary and wage costs. The minimum and maximum rates of return on assets of Ethiopian commercial banks are 1.81% & 5.12% respectively. Also the table shows that the mean value for the dependent variable ROA is 3.00 and thus indicating, on average Ethiopian commercial banks generated 3% profit on assets employed in the company. The standard deviation on the dependent variable ROA is 0.65 and implied that the volatility of returns from assets varies from the mean by 65% 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 5.3089 was obtained, indicating that the firm created 5.3089 unit out of every 1 unit invested in the firm. However, if the components are examined individually, it is evident that human capital (mean = 7.61) is more efficient in comparison to physical capital (mean = 0.71) and structural capital (mean= 4.78). 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	CEE	HCE	SCE	SIZE	VAIC
ROA	1.0000					
CEE	0.2463	1.0000				
HCE	0.5009	0.2543	1.0000			
SCE	0.6052	0.0565	0.1044	1.0000		
SIZE	-0.1881	-0.0812	0.1542	-0.0079	1.0000	
VAIC	0.6077	0.0912	0.0670	0.79035	-0.0034	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 (0.50 and 0.60) compared to employed capital variables (0.24). 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 0.60 units. However, correlation of ROA with the control variable, bank size (-0.18) indicating that, firm size as measured on the natural logarithmic of total assets, is negatively interrelated the bank financial performance. Thereby, firm's size 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 Regression model 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, 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	1.097116	Prob. F(5,69)	0.3700
Obs*R-squared	5.523464	Prob. Chi-Square(5)	0.3554
Scaled explained SS	3.428290	Prob. Chi-Square(5)	0.6343

Source: EViews output

Table 4.4: Heteroskedasticity test for Model 2 (VAIC Components)

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.458239	Prob. F(4,70)	0.7661
Obs*R-squared	1.913769	Prob. Chi-Square(4)	0.7516
Scaled explained SS	1.101392	Prob. Chi-Square(4)	0.8941

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

$$(cov(u_i, u_j) = 0 \text{ for } i \neq j)$$

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–Godfrey serial 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	1.040275	Prob. F(2,71)	0.3587
Obs*R-squared	2.135195	Prob. Chi-Square(2)	0.3438

Source: - EViews output

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

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.154808	Prob. F(2,68)	0.8569
Obs*R-squared	0.339941	Prob. Chi-Square(2)	0.8437

Source: - EViews output

As can be seen in the above tables (Table 4.5 and Table 4.6), F test result and the P value of F-statistic are 0.3587 & 0.8569 respectively. The values are way 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 ($ut \sim N(0, \sigma 2)$)

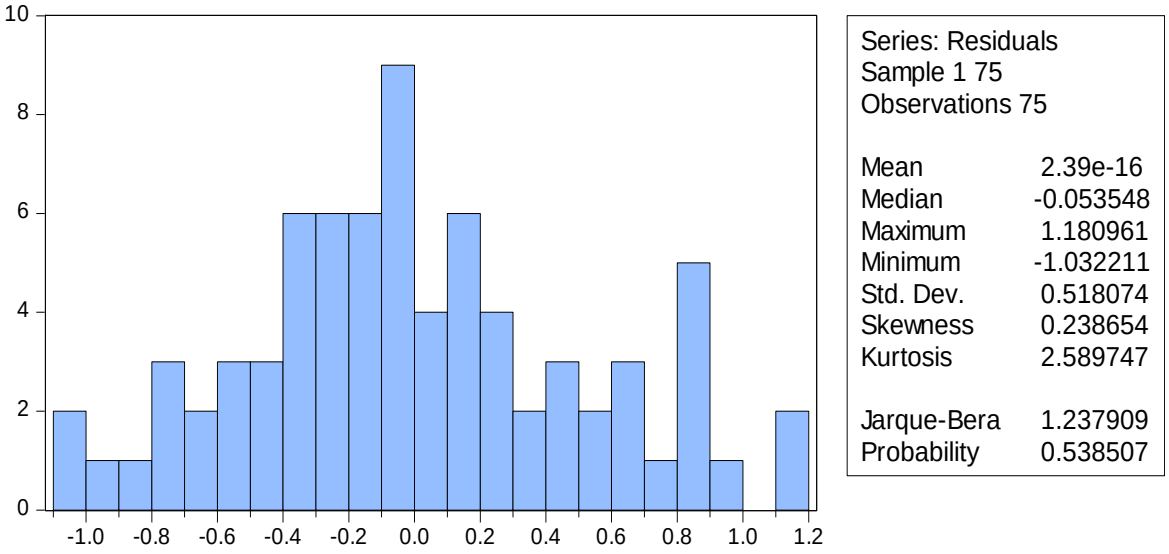
Normality test was applied to determine whether a data is well-modelled by a normal distribution or not, and to compute how likely an underlying random variable is to be normally distributed. If the residuals are normally distributed, the histogram should be bell-shaped and the Jarque-Bera statistic 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 at 10% significant level Brooks (2008).

The hypothesis of normality distribution is:

H0= residuals follows a normal distribution

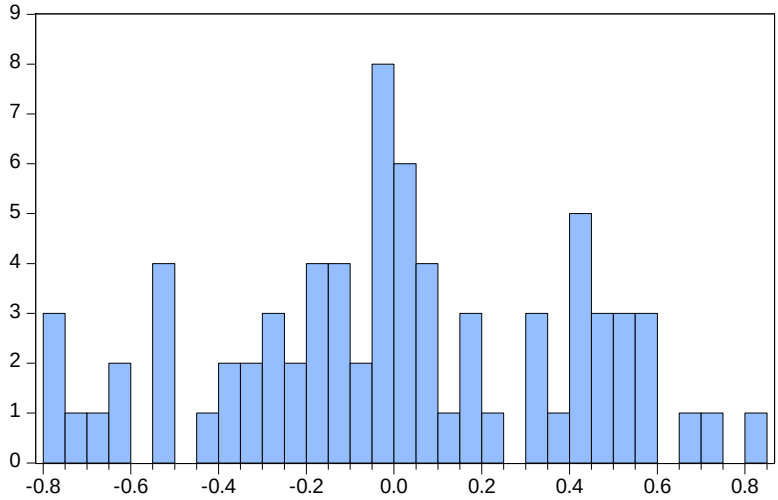
H1 = residuals do not follows a normal distribution

Figure 4.1 Normality test for residuals Model 1 (VAIC)



Source: - EViews output

Figure 4.1 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 are 2.58 and 2.36 respectively. The Skewness measures on both models are 0.23 & -0.07, 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. 0.53 & 0.51). 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 multicollinearity

Multicollinearity 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 collinearity, and it cannot be estimated by OLS Brooks (2008). When independent variables are multicollinear, 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

	CEE	HCE	SCE	SIZE	VAIC
CEE	1.0000	0.2544	0.0565	-0.0812	0.0913
HCE	0.2544	1.0000	0.1044	0.1543	0.0670
SCE	0.0565	0.1044	1.0000	-0.0080	0.6903
SIZE	-0.0812	0.1543	-0.0080	1.0000	-0.0035
VAIC	0.0913	0.0670	0.6903	-0.0035	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 4.5 shows the highest correlation of 0.6904 which is between value added intellectual capital (VAIC) and its component structural capital efficiency (SCE). 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.

4.1.1 Choosing Random effect (RE) Vs. fixed effect (FE) models

The results so far indicate that all CRLM 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-sectionally but not over time, while all of the slope estimates are fixed both cross-

sectionally 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-sectionally 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

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.233459	1	0.6290

Source: - EViews output

Table 4.9 Hausman test of Model 1 (VAIC)

Correlated Random Effects - Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	3.385264	4	0.4955

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 0.6290 and 0.4955 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 Operational models

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: 10/30/18 Time: 13:32

Sample: 2013 2017

Periods included: 5

Cross-sections included: 15

Total panel (balanced) observations: 75

Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.554086	0.234834	6.617822	0.0000***
VAIC	0.272938	0.042630	6.402487	0.0000***

Effects Specification		
	S.D.	Rho
Cross-section random	0.069107	0.0173
Idiosyncratic random	0.520220	0.9827

Weighted Statistics			
R-squared	0.562038	Mean dependent var	2.878769
Adjusted R-squared	0.523299	S.D. dependent var	0.643491
S.E. of regression	0.517481	Sum squared resid	19.54842
F-statistic	41.42685	Durbin-Watson stat	1.715983
Prob(F-statistic)	0.000000		

Unweighted Statistics			
R-squared	0.569307	Mean dependent var	3.003087
Sum squared resid	19.86178	Durbin-Watson stat	1.692066

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

Source: - EViews output

ROA = 1.5540 + 0.27*VAIC

4.4.1.2 Interpretations on regression results Model 1 (VAIC)

The estimation results reported in Table 4.10 above depicted that, the R-squared and Adjusted R-squared values of 0.56 and 0.52 respectively is an indication that the model is a good fit. This means more than 52% of variations in financial performance indicator i.e. return on asset ratio, of Ethiopian Commercial Banks were explained by the value added intellectual capital (VAIC) independent variable included in the model. However, the remaining 48% changes are caused by other factors that are not included in the model. Furthermore, the F-statistic was 41.42 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 1.5540. This means, when the explanatory variable i.e. VAIC took a value of zero, the average value ROA would be take 1.5540 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 0.272938 along with a t statistics of 6.402487. Meaning when intellectual capital, as measured on VAIC^{TM} model, increase by one unit, Ethiopian commercial banks return on asset (ROA) will increase by 0.27 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 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.

4.4.1.3 Relationship between intellectual capital and financial performance

Model 2 (VAIC components)

$$ROA = \alpha + \beta_1 (CEE) + \beta_2 (HCE) + \beta_3 (SCE) + \beta_4 (SIZE) + \varepsilon_{it}$$

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

Dependent Variable: ROA
Method: Panel EGLS (Cross-section random effects)
Periods included: 5
Cross-sections included: 15
Total panel (balanced) observations: 75

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.882508	0.658333	1.340520	0.1844
HCE	0.275585	0.043255	6.371108	0.0000***
SCE	0.240073	0.032235	7.447580	0.0000***
CEE	0.506063	0.550843	0.918706	0.3614
SIZE	-0.372325	0.126937	-2.933161	0.0045***

Effects Specification	S.D.	Rho
Cross-section random	0.201989	0.2299
Idiosyncratic random	0.369647	0.7701

Weighted Statistics			
R-squared	0.623984	Mean dependent var	1.901998
Adjusted R-squared	0.602498	S.D. dependent var	0.583717
S.E. of regression	0.368021	Sum squared resid	9.480750
F-statistic	29.04059	Durbin-Watson stat	1.869575
Prob(F-statistic)	0.000000		

Unweighted Statistics			
R-squared	0.628527	Mean dependent var	3.003087
Sum squared resid	11.69840	Durbin-Watson stat	1.515162

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

ROA = 0.8825 + 0.5060*CEE + 0.2755*HCE + 0.2400*SCE - 0.3723*SIZE

4.4.1.4 Interpretations on regression results Model 2 (VAIC Components)

The estimation results reported in Table 4.11 in the previous page depicted that, the R-squared and adjusted R-squared values are 0.62 and 0.60 respectively is an indication that the model is a good fit. This means more than 60% of variations in financial performance indicator i.e. return on asset ratio, of Ethiopian commercial banks were explained by independent variables included in the model. However, the remaining 40% changes are caused by other factors that are not included in the model. Furthermore, the F-statistic was 29.04 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, 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 commercial banks.

The panel random effect estimation regression result in table 4.11 also shows that, coefficient intercept (α) is 0.8825. This means, when all explanatory variables took a value of zero, the average value ROA would be take 0.8825 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 0.2755 and its corresponding P-value is 0.0000. Meaning that holding other independent variables fixed at their average value, when human capital efficiency (HCE) increase by one unit, Ethiopian commercial banks return on Asset (ROA) will increase by 0.2755 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 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). 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 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 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 0.2400 and its corresponding P-value is 0.0000. Meaning that holding other independent variables fixed at their average value, when structural capital efficiency (SCE) increase by one unit, Ethiopian commercial banks return on Asset (ROA) will increase by 0.24 unit and statistically significant at 1% of significance level. Therefore, the study not rejected the third hypothesis H3 that, there is a significant positive relationship between the structural capital efficiency coefficient (SCE) of Ethiopian 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) and Kurfi et.al, (2017), However; it contradict 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 commercial banks could be

attributed to the fact that Ethiopian commercial banking sector is more competitive sector and hence, Ethiopian commercial banks financial outlay is strictly controlled to be productive. In the other hand it implies the efficiency of Ethiopian 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 0.5060 and its corresponding P-value is 0.3614. 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 increase by 0.50 unit and statistically insignificant at 5% of significance level.

Since there is insignificant positive relationship between CEE and ROA of sampled Ethiopian 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 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) and Ferraro and Veltri, (2011).

Firm Size (SIZE) and return on asset (ROA)

The regression output presented in Table 4.11 shows that, coefficient of the control variable firm size (SIZE) as measured by the natural logarithmic of Ethiopian commercial banks total asset is -0.3723 and its corresponding P-value 0.0045. Meaning that holding other independent variables fixed at their average value, when firm size increase by one

unit, Ethiopian commercial banks return on asset (ROA) will decrease by 0.3723 unit and statistically significant at 1% of significance level. This finding is similar to the finding of Avci E. and S. Nassa, (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 firm size is negatively associated with financial performance of Ethiopian commercial banks. Thus, it appears to suggest that in Ethiopia, banks with a larger size 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 the small banks efficiency in branch opening with the low cost, since the large banks pioneered the new branch opening in unbanked areas. Furthermore, the NBE credit cap also could be the other factor limits the profitability of large banks, as most of the larger banks primarily affected than the small banks with credit cap.

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%	Not rejected
Capital employed efficiency (CEE)	+	+	Insignificant	Rejected
Human capital efficiency (HCE)	+	+	Significant at 1%	Not rejected
Structural capital efficiency (SCE)	+	+	Significant at 1%	Not Rejected

CHAPTER FIVE

Conclusion and recommendation

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.

5.1 Conclusion

Based on the regression analysis findings outlined in the previous sections, the researcher concludes with some recommendations to provide insight the effect of intellectual capital on financial performance of Ethiopian Commercial Banks. 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 limited number of banks in the country limit the scope 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 in banking the key contributor to the operation of any economy, management can now appreciate the impact and support the provision of intellectual elements. As a result, 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 Tanzania. 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 commercial banks. In relations to the components of VAIC and the control variable the study proves that:

All the three components of VAIC are related positively with the financial performance of Ethiopian commercial banks as measured on ROA. In addition, HCE and SCE have positive and significant effect on the financial performance of Ethiopian commercial banks and the relationship is positive and insignificant with CEE. Hence, HCE and SCE seem to contribute more towards the financial performance of Ethiopian commercial banks than CEE. This finding is not surprising since banking sector is a service sector 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 banks in Ethiopia and with the increase in the VAIC the financial performance of 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 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 need for enhancement of human capital and intangible assets and also there is a need to make link with the tangible assets from 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 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.

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, Human capital efficiency coefficient (HCE) and structural capital efficiency coefficient (SCE), more important in enhancing the firm financial performance than tangible and physical assets capital employed efficiency coefficient (CEE), this would alert the directors and managers of Ethiopian 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 Farther research suggestion

This research is an important contribution to the literature on top of its findings of value to 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 Ethiopian commercial banking industry by using more than one measurement of firm's financial performance such as return on equity (ROE), and assets turn over (ATO) to investigate the impact of IC efficiency of firms financial performance.

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Appendices

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

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.097116	Prob. F(5,69)	0.3700
Obs*R-squared	5.523464	Prob. Chi-Square(5)	0.3554
Scaled explained SS	3.428290	Prob. Chi-Square(5)	0.6343

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 10/31/18 Time: 12:29

Sample: 1 75

Included observations: 75

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.158287	0.140377	-1.127588	0.2632
VAIC	0.079698	0.025522	3.122735	0.0026

R-squared	0.117840	Mean dependent var	0.264822
Adjusted R-squared	0.105756	S.D. dependent var	0.336150
S.E. of regression	0.317878	Akaike info criterion	0.572010
Sum squared resid	7.376412	Schwarz criterion	0.633809
Log likelihood	-19.45036	Hannan-Quinn criter.	0.596686
F-statistic	9.751475	Durbin-Watson stat	1.445558
Prob(F-statistic)	0.002569		

Appendix B:

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

Dependent Variable: ROA

Method: Panel Least Squares

Date: 10/30/18 Time: 12:38

Sample: 2013 2017

Periods included: 5

Cross-sections included: 15

Total panel (balanced) observations: 75

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.675070	0.599942	1.125225	0.2643
CEE	0.598391	0.585325	1.022323	0.3101
HCE	0.263224	0.043708	6.022297	0.0000
SCE	0.242376	0.032176	7.532698	0.0000
SIZE	-0.316009	0.094167	-3.355843	0.0013

R-squared	0.630599	Mean dependent var	3.003087
Adjusted R-squared	0.609490	S.D. dependent var	0.652355
S.E. of regression	0.407662	Akaike info criterion	1.107583
Sum squared resid	11.63317	Schwarz criterion	1.262082
Log likelihood	-36.53436	Hannan-Quinn criter.	1.169273
F-statistic	29.87397	Durbin-Watson stat	1.535768
Prob(F-statistic)	0.000000		

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

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.040275	Prob. F(2,71)	0.3587
Obs*R-squared	2.135195	Prob. Chi-Square(2)	0.3438

Test Equation:

Dependent Variable: RESID

Method: Least Squares

Date: 10/31/18 Time: 12:31

Sample: 1 75

Included observations: 75

Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.012397	0.230752	-0.053724	0.9573
VAIC	0.002391	0.041967	0.056971	0.9547
RESID(-1)	0.167669	0.118525	1.414625	0.1615
RESID(-2)	-0.060135	0.119111	-0.504870	0.6152

R-squared	0.028469	Mean dependent var	2.39E-16
Adjusted R-squared	-0.012581	S.D. dependent var	0.518074
S.E. of regression	0.521323	Akaike info criterion	1.586965
Sum squared resid	19.29622	Schwarz criterion	1.710564
Log likelihood	-55.51117	Hannan-Quinn criter.	1.636316
F-statistic	0.693516	Durbin-Watson stat	2.007526
Prob(F-statistic)	0.559032		

Appendix D:

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

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.154808	Prob. F(2,68)	0.8569
Obs*R-squared	0.339941	Prob. Chi-Square(2)	0.8437

Test Equation:

Dependent Variable: RESID

Method: Least Squares

Date: 10/30/18 Time: 13:12

Sample: 1 75

Included observations: 75

Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.004995	0.611676	0.008165	0.9935
CEE	-0.014654	0.604595	-0.024237	0.9807
HCE	0.004438	0.045027	0.098559	0.9218
SCE	-0.001501	0.032781	-0.045793	0.9636
SIZE	-0.005232	0.095912	-0.054549	0.9567
RESID(-1)	0.034908	0.124811	0.279689	0.7806
RESID(-2)	0.058292	0.124255	0.469130	0.6405

R-squared	0.004533	Mean dependent var	1.78E-16
Adjusted R-squared	-0.083303	S.D. dependent var	0.396491
S.E. of regression	0.412675	Akaike info criterion	1.156373
Sum squared resid	11.58044	Schwarz criterion	1.372672
Log likelihood	-36.36400	Hannan-Quinn criter.	1.242739
F-statistic	0.051603	Durbin-Watson stat	1.963523
Prob(F-statistic)	0.999406		

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	0.233459	1	0.6290

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
VAIC	0.253428	0.272938	0.001630	0.6290

Cross-section random effects test equation:
Dependent Variable: ROA
Method: Panel Least Squares
Date: 10/30/18 Time: 13:29
Sample: 2013 2017
Periods included: 5
Cross-sections included: 15
Total panel (balanced) observations: 75

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.657662	0.317460	5.221645	0.0000
VAIC	0.253428	0.058717	4.316065	0.0001

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.492980	Mean dependent var	3.003087
Adjusted R-squared	0.364076	S.D. dependent var	0.652355
S.E. of regression	0.520220	Akaike info criterion	1.717584
Sum squared resid	15.96707	Schwarz criterion	2.211982
Log likelihood	-48.40941	Hannan-Quinn criter.	1.914992
F-statistic	3.824410	Durbin-Watson stat	1.863413
Prob(F-statistic)	0.000104		

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	3.385264	4	0.4955

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
CEE	0.495800	0.506063	0.019311	0.9411
HCE	0.312930	0.275585	0.000539	0.1076
SCE	0.220053	0.240073	0.000316	0.2603
SIZE	-0.861502	-0.372325	0.079995	0.0837

Cross-section random effects test equation:
Dependent Variable: ROA
Method: Panel Least Squares
Date: 10/30/18 Time: 12:44
Sample: 2013 2017
Periods included: 5
Cross-sections included: 15
Total panel (balanced) observations: 75

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.654748	1.227129	2.163381	0.0348
CEE	0.495800	0.568101	0.872731	0.3865
HCE	0.312930	0.049090	6.374660	0.0000
SCE	0.220053	0.036817	5.976997	0.0000
SIZE	-0.861502	0.310012	-2.778930	0.0074

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.757024	Mean dependent var	3.003087
Adjusted R-squared	0.678924	S.D. dependent var	0.652355
S.E. of regression	0.369647	Akaike info criterion	1.061996
Sum squared resid	7.651798	Schwarz criterion	1.649093
Log likelihood	-20.82486	Hannan-Quinn criter.	1.296418
F-statistic	9.693074	Durbin-Watson stat	2.280244
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: 10/30/18 Time: 13:32

Sample: 2013 2017

Periods included: 5

Cross-sections included: 15

Total panel (balanced) observations: 75

Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.554086	0.234834	6.617822	0.0000
VAIC	0.272938	0.042630	6.402487	0.0000

Effects Specification

	S.D.	Rho
Cross-section random	0.069107	0.0173
Idiosyncratic random	0.520220	0.9827

Weighted Statistics

R-squared	0.562038	Mean dependent var	2.878769
Adjusted R-squared	0.523299	S.D. dependent var	0.643491
S.E. of regression	0.517481	Sum squared resid	19.54842
F-statistic	41.42685	Durbin-Watson stat	1.715983
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.569307	Mean dependent var	3.003087
Sum squared resid	19.86178	Durbin-Watson stat	1.692066

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

Dependent Variable: ROA

Method: Panel EGLS (Cross-section random effects)

Date: 10/30/18 Time: 12:47

Sample: 2013 2017

Periods included: 5

Cross-sections included: 15

Total panel (balanced) observations: 75

Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.882508	0.658333	1.340520	0.1844
CEE	0.506063	0.550843	0.918706	0.3614
HCE	0.275585	0.043255	6.371108	0.0000
SCE	0.240073	0.032235	7.447580	0.0000
SIZE	-0.372325	0.126937	-2.933161	0.0045

Effects Specification

	S.D.	Rho
Cross-section random	0.201989	0.2299
Idiosyncratic random	0.369647	0.7701

Weighted Statistics

R-squared	0.623984	Mean dependent var	1.901998
Adjusted R-squared	0.602498	S.D. dependent var	0.583717
S.E. of regression	0.368021	Sum squared resid	9.480750
F-statistic	29.04059	Durbin-Watson stat	1.869575
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.628527	Mean dependent var	3.003087
Sum squared resid	11.69840	Durbin-Watson stat	1.515162