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# Determinants of Intellectual Capital Performance: Empirical Evidence from Ethiopian Banks

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**Abstract**
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, mostly; within the field of accounting and finance (Al-Hamadeen & Suwaidan, 2014). For that reason, these concepts are applied in business activities of developed countries mostly (Iswati & Anshori, 2007). Studies have been carried out in diverse areas to identify factors that determine intellectual capital performance of banks. However, most of these studies were made in developed countries and gave mixed results though evidences on the case of developing economies, like Ethiopia's, are limited. Hence, the purpose of this study was to empirically examine the determinants of intellectual capital performance of Ethiopia banks. Specifically, the study empirically investigated impact of bank age, bank size, investment in information and technology, bank risk, profitability, ratio of staff cost to total income, and bank concentration on intellectual capital performance. This study adopted correlational explanatory research design with arrangement of secondary data, short panel, quantitative approach and deductive method of inquiry. Econometric model estimation procedures and specification tests of panel data linear regression models were tried. Accordingly, fixed effect regression model was validated. Empirical evidences of 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. On the other hand, bank risk and age have statistically significant negative effect on intellectual capital performance. However, bank size has statistically insignificant negative relationship with intellectual capital performance.
**Keywords***:* Intellectual capital, Value added intellectual capital coefficient, Fixed effect, and Ethiopian banks

## 1. INTRODUCTION

Intellectual capital is relatively new issue which has been brought up theoretically in international commercial environment recently (Pourkiani *et al*., 2014).That's why, its explanation is not same in different studies. However, it can be defined in terms of its components comprising human capital, relational capital and structural capital (Al-Hamadeen & Suwaidan, 2014). It has become significant resource for growth of economy and social prosperity. As a result, the wealth of individuals, organizations, regions and countries is associated directly to their intellectual capital (Chao *et al*., 2015). Hence, it is one of the issues that have been attempted by many researchers for its significance and due to its relative newness (Sharabati *et al*., 2013). Businesses mainly in service sector require intellectual capital for their competitive advantage as long as it is too worthy to improve delivery of quality service to customers (Mondal & Ghosh, 2014). Among these service sectors, financial institutions especially banks are skill based industries that require this asset mostly. Hence, the competitiveness of banking institutions is mostly influenced by quality of intellectual capital. This competitive advantage promotes economic development and improves social welfare (Shahabadi & Samari, 2013). For that reason, empirical studies have been conducted on intellectual capital performance and its determinants by shifting the paradigms from tangible to intangible assets especially intellectual capital. Based on empirical literature of banking, studies have been carried out in various countries to identify factors that determine intellectual capital performance (El-Bannany, 2008; Soheili & Pakdel, 2012; Sefidgar *et al*., 2015). However, these studies found mixed results with regard to the effect of determinant factors. 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). In Ethiopia, a study was carried out by Girma (2015) titled intellectual capital performance's impact on profitability of banks. Besides, empirical evidences of the study revealed existence of variability in intellectual capital performance. Accordingly, this study was carried out to identify, and consequently examine determinant factors of the variability in intellectual capital performance of Ethiopian banks based on previous literature review, which are perceived to influence intellectual capital performance.

## 2. REVIEW OF RELATED LITERATURE

### 2.1. The Concept of Intellectual Capital

Simply, intellectual capital can be defined as a portfolio of intangible assets which are not usually reflected in balance sheet of companies (Maleki & Serkani, 2014). Regarding to the content and composition of intellectual capital, researchers have diverse points of view. Although experts and scholars have different interpretations on

 

the classification, it still uses composition of human capital, structural capital, and relational capital (Al-Hamadeen & Suwaidan, 2014). Structural capital consists of corporate culture, management processes, patents, information and communication systems, management of knowledge, financial relations, licenses, strategies, trademarks, core competencies, networking system, intellectual property, flexibility, research and development, innovation, and management values and beliefs (Al-Hamadeen & Suwaidan, 2014). On the other hand, intangibles like: customer satisfaction, brand, customer loyalty, education and training of employees, dependence on key customer, customer relation, business partnership, annual sales per segment or product, distribution channels, business partnership, market share, and favorable contracts can be incorporated in relational capital (Maleki & Serkani, 2014). In addition, employees create intellectual capital through their competence, attitude and mental agility which we call it human capital. It contains human resources, employee talents, employee loyalty, employee know-how, team work, employee knowledge, employee productivity, human value, employee skills and abilities , training, employee expertise (Sefidgar et *al*., 2015).

**2.2. Previous Empirical Studies on Determinants of Intellectual Capital Performance**

Independent variables of this study that are perceived to determine intellectual capital performance are bank riskiness, investment in information and technology, bank age, profitability, bank size, ratio of staff cost to total income, and banking industry concentration. Hence, previous empirical evidences related to these variables impact on value added intellectual capital coefficient of banks are discussed here.

Financial results of companies can be either positive (income) or negative (loss). If there is loss, bank managers may basically need time to study the causes of these negative results. And if managers spend their time to find what the cause of loss was, they will not have sufficient time to encourage their staffs to innovate and perform better. On the other hand, managers might quite do useful activities if there is income such as motivating, training, conducting research and development activities to add value to the organization and so on. Hence, profitable companies are expected to have higher intellectual capital performance than those companies with negative financial result even with lower profit (Sefidgar *et al*., 2015). As of Mondal & Ghosh (2014), Profitability of banks and intellectual capital are linked items and are positively associated. Positive financial performance of banks makes it easier for managers to convince stockholders about their superior managerial abilities to obtain higher degrees of confidence from different stakeholders. Thus, profitability can increase relational capital which in turn has appreciated contribution to aggregate intellectual capital performance (Bidaki & Hejazi, 2014). The more time managers spend to identify causes of negative financial results(losses), the less time they can spend to undertake value adding intellectual capital activities and vice versa(Soheili & pakdel, 2012). So, good financial performance can motivate managers and officers of banks to encourage their staff to perform better (El-Bannany, 2008).Numerous studies which have been carried out on intellectual capital performance revealed statistically significant and positive effect of profitability on value added intellectual capital coefficient (El-Bannany, 2008; Eftekhare *el al*.,2014; Sefidgar *et al*.,2015).

Information and communication technology systems can be used mainly to benefit management of the company while looking internally and can be considered as organizational capital. Electronic banking activities can increase relational capital. So, higher investment in information and technology products could bring better intellectual capital performance of banks (El-Bannany, 2008). As a consequence, new technological focused electronic banking services could be effectively used to create value and to better manage customer relationship and improve the value added relational capital coefficient directly and intellectual capital performance.

The greater the total assets owned by business enterprises implies that the greater the size. In most cases, it's certain that large businesses have higher intellectual capital (Dewi *et al*., 2014). These companies also tend to have better internal management information systems as far as they have variety of activities. This also increases internal intellectual capital performance (Ferreira *et al*., 2012). In addition, these firms are considered to be more progressive and innovative for the reason that they have strong financial resources enabling them to bring progress and innovation (Mondal & Ghosh, 2014). Empirical evidences of a study carried out by Joshi *et al.* (2010) to inspect intellectual capital performance of Australian banks indicated that size of banks has no impact on intellectual capital performance.

It is assumed that old aged companies have more experience in running business. A company that is able to exist for a long time is the one that makes knowledge as its capital intellectually. Thus, companies' abilities acquired through experiences are sustained by high intellectual capital (Dewi *et al*., 2014). A study was carried out by El‐Bannany (2012) concerning global financial crisis's effect on intellectual capital performance of United Arab Emirates banks using panel data of banks over the period 2004 to 2010. Regression result of this study discovered that bank age has statistically significant impact on intellectual capital performance of those selected banks. Additionally, another study was conducted by El‐Bannany (2011) on the earning quality and other factors affecting intellectual capital performance of banks in the United Arab Emirates using panel data of four years (2006-2009). In the same fashion, results of multiple regression analysis indicated that age of banks affects intellectual capital performance.

 

Making required investments and incentives on employees of companies as means of encouragement to carry out their duties and create innovation for banks is better mechanism to improve intellectual capital performance (Eftekhare *et al*., 2014). Any investment made to benefit employees is supposed to have better contribution in creating value. Motivation of bank employees can be increased if staff cost grows .This motivation in turn increases innovation such as offering new services to customers in order to develop intellectual capital performance (Soheili & pakdel, 2012). It is understandable that risk level and rate of return on investment have positive association. Perhaps human capital may be influenced by any increase of intangible assets, which are critical in contributing to company's success and in motivating its employees to keep up with innovation (Soheili & pakdel, 2012). As Musalli & Ismail (2012), based on market discipline perspective, unsafe and highly risk exposed banks can create doubts in the minds of their customers that switch potential businesses somewhere else. Here, it is reasonable to expect that relationships with customers will damage, customer loyalty will erode, and bank reputation will destroy that in turn lead to negative effects on bank intellectual capital performance as a result of losing depositors` confidence that could reduce value added relational capital coefficient.

Companies with large market shares are capable of exercising market power. Market structure can be described by concentration in which highly concentrated banks are more likely to focus on enhancing efficiency of value creation activities such as intellectual capital performance. High market concentration can be achieved by engaging in activities that enhance firm reputation and satisfy stakeholders`` expectations (Hammond & Slocum, 1996 cited by Al-Musalli & Ismail, 2012). It is also argued in terms of human resources that monopolists have more resources that could help them to hire the most skilled and qualified employees who are capable of taking competitive advantage and make their business better off. It enhances contribution of those skilled employees to intellectual capital performance (Gayle, 2001 cited by Al-Musalli & Ismail, 2012). High market concentration points lack of proper competition as to setting the price of banking services the degree of competition in the market. So, studying market concentration can benefit to provide useful guidelines for competition policy. Here, the higher the concentration ratio implies the more monopoly power there is in the banking system, and the greater intellectual capital performance of highly concentrated bank (Abduh & Idrees, 2013).

## 3. RESEARCH METHODOLOGY

### 3.1. Research Design and Approach

This study was based on positivist paradigm. Because, problems studied by positivists are commonly deterministic in which causes determine effects (Creswell, 2009). The research design was correlational explanatory research design. The dimension of this design was an arrangement of secondary data collection via document analysis, ex post, longitudinal time dimension, quantitative approach and deductive method of inquiry. Because a quantitative approach is appropriate as far as it employs statistics, which is a comparative methodological discipline that uses mathematical ideas for point inference and hypothesis testing (Creswell, 2012).

### 3.2. Population, Sampling and Sampling Technique

Population of this study comprised all banks in Ethiopia which are 19 in number. Banks that have not annual financial statement for six years from 2010 to 2015 were excluded from the study. Development Bank of Ethiopia was also excluded even though it had six year financial statement. The exclusion was due to the reason that the bank's establishment for the purpose of development motive than commercial purpose. Based on these exclusions, 13 banks were selected to investigate the determinant factors of intellectual capital performance in the banking sector purposely.

### 3.3. Data Type and Source

The type of data for this study was secondary data obtained from two sources. Audited annual financial statements were collected from National Bank of Ethiopia. In addition, data on investment in information and technology was obtained from each bank's audited annual financial report. Document review was used to collect required data.

### 3.4. Variable Measurement, Hypotheses and Model Specification

#### 3.4.1. Measurement of Dependent Variable: Intellectual Capital Performance

Value added intellectual capital coefficient developed by Pulic (1998) was used to measure intellectual capital performance. Accordingly, it can be determined using the following procedures.

1. Calculation of Value Added for all stakeholders

As AL-Shubiri (2011), the calculation of value added for stakeholders can be expressed as:

**Changes in retained earnings = Sales revenues - Costs of goods sold - Depreciation - Employee**

 

**salaries and benefits - Total interest expenses - Dividends – Taxes**

This equation can also be rearranged as:

Sales revenues - Costs of goods sold = Depreciation + Employee salaries and benefits +Total interest expenses + Dividends + Taxes + Changes in retained earnings----------1

Sales revenues - Costs of goods sold- Depreciation = Employee salaries and benefits +Total interest expenses + Dividends + Taxes + Changes in retained earnings----------2

The first equation is gross value added approach, whereas the second is the net value added. The left-hand side of the equations implies value added, and the right-hand side represents the distribution of value created. The sum of dividends and retained earnings is equal to net income based on clean surplus assumption. Hence, value added can be calculated as:

Value Added = Sales revenues - Costs of goods sold- Depreciation = Employee salaries and benefits + Total interest expenses + Taxes +Net income

2. Calculation of Value Added Relational Capital Coefficient (VARC)

VARC = VA / RC, where VA refers value added; RC refers to relational capital, which equals to net asset of banks at the end of t period (Lipunga, 2015), and VARC signifies the value created by one unit of relational capital during t period.

3. Calculation of Value Added Human Capital Coefficient (VAHC)

VAHC = VA / HC, where HC refers to Total salaries, wages and all incentives for the bank during the period of t, and VAHC denotes the value created by one unit of human capital invested during period of t

4. Calculation of Value Added Structural Capital Coefficient (STVA)

STVA = SC / VA, where SC equals to Structural Capital = VA – HC, and STVA represents the proportion of total VA accounted by structural capital

5. Value Added Intellectual Capital Coefficient calculation(VAIC)

In a nutshell, value added intellectual coefficient is the sum of value added human capital, structural capital and relational capital coefficients. The mathematical expression can therefore be:

VAIC = VARC + VAHC + STVA, where VAIC indicates corporate value creation

### 3.4.2. Explanatory Variables and their Measurement

| No. | Variable | Symbol | Measurement |
|---|---|---|---|
| 1. | Bank Size | SIZE | Logarithm of total assets |
| 2. | Bank Age | AGE | Time since the date of establishment |
| 3. | Bank Profitability | PROF | Ratio of net income to total asset |
| 4. | Bank riskiness | RISK | Z-score = (ROA + capital asset ratio) / Standard deviation of ROA |
| 5. | Ratio of Staff cost | STAFFCOS | Ratio of staff costs to total income |
| 6. | Bank Investment in IT | IIT | Natural logarithm of total cost of hardware and software |
| 7. | Banking industry concentration | CONC | Herfindahl-Hirschman Index (HHI) )= Sum of the squared market shares of all Banks |

### 3.4.3. Research Hypotheses

Stated objectives of the study were addressed by testing the following hypotheses, taking commercial banks of Ethiopia as a study unit. These hypotheses were developed based on related previous empirical studies conducted in different countries concerning the issue under investigation.

$H_1$: Profitability and intellectual capital performance are positively associated

$H_2$: The impact of investment in information and technology on intellectual capital performance is positive

$H_3$: There is a positive effect of bank size on intellectual capital performance

$H_4$: Bank risk and intellectual capital performance have negative relationship

$H_5$: Bank age affects intellectual capital performance positively

$H_6$: There is positive relationship between ratio of staff cost to total income and intellectual capital performance

$H_7$: Banking industry concentration affects intellectual capital performance positively

### 3.4.4. Econometric Model Estimation Procedures and Specification Tests

Studies carried out by using panel data linear regression models begin by making comparison among three models, viz., pooled regression model, fixed effect model, and random effect model while estimating econometric models. The choice among these models is important as it largely influences conclusions on the individual coefficients (Gujarati, 2003). Specification tests and determination of appropriate panel data model were carried out by using Chow test, Breusch and Pagan Lagrange Multiplier test, and the Hausman test to select the appropriate fitted model among three panel models. As Park (2011), Chow-test (F-test) is applied to make a choice between pooled regression model and fixed effect model. If individual effect does not exist, ordinary least squares will be chosen, otherwise fixed effect model. Accordingly, the F-Test validates fixed effect model over the pooled regression since the test statistic in the F-test is statistically significant **(Insert Table 3.1 here).** On

 

the other hand, the Breusch and Pagan Lagrange Multiplier test was carried out to make a choice between pooled regression model and random effect. This test was based on the null hypothesis that variance of random disturbance term is zero. The result of this test rejected the null hypothesis suggesting that there are random effects (**Insert Table 3.2 here).** Hausman test was also applied to make a choice between fixed effect and random effect for the reason that both fixed and random effects were selected over the pooled regression model following the chow test and the Breusch and Pagan Lagrange Multiplier test respectively. Thus, result of Hausman test rejected the null hypothesis, suggesting that fixed effect model is better suitable compared to the random effect **(Insert Table 3.3 here).**As a result, from the outputs of Chow-test, Breusch and Pagan Lagrange Multiplier test and Hausman-test, the best fitted model used in this study was fixed effect linear regression model. Consequently, regression results of fixed effect model were used for statistical inference and further analysis of the individual coefficients. Accordingly, the following baseline regression model was specified with some modification depending on prior studies on the issue under investigation such as (El-Bannany, 2008; soheili & pakdel, 2012; Eftekhare *et al*., 2014; & Sefidgar *et al*., 2015).

$$\mathbf{VAIC_{it} = \beta_0 + \beta_1 RISK_{it} + \beta_2 PROF_{it} + \beta_3 STAFFCOS_{it} + \beta_4 SIZE_{it} + \beta_5 IIT_{it} + \beta_6 AGE_{it} + \beta_7 CONC_{it} + \mu_i + v_{it}}$$

Where:

$VAIC_{it}$ = value added intellectual capital coefficient in bank i during year t
$RISK_{it}$= Riskiness of bank i during year t
$PRO_{it}$ = profitability of bank i during year t
$STAFFCOS_{it}$=Ratio of staff cost for bank i during year t
$SIZE_{it}$= size of bank i during year t
$IIT_{it}$= investment in information technology of bank i during year t
$AGE_{it}$= Age of bank i during year t
$CONC_{it}$= bank concentration during year t
$\beta_0$ = constant; $\beta_{1-7}$ = parameters estimated
$\mu_i$= bank-specific fixed effects; $v_{it}$ = idiosyncratic disturbance term ; and it = bank i during year t

Diagnostic tests for multiple linear regression assumptions were also carried out. In view of this, Shapiro wilk test was used to test normality distribution of error term with null hypothesis that residuals are normally distributed. Result of this test shows Prob>z = 0.20039 which is statistically insignificant indicating that residuals are normally distributed supporting the null hypothesis **(Insert Table 3.4 here).** A test for multicollinearity was also carried out by variance inflation factor. The result of VIF for each explanatory variable included in the fixed effect linear regression model is less than 3, suggesting that there is no severe multicollinearity problem in the estimated model as of (Gujarati, 2003). So, multicollinearity between the explanatory variables is not considered to be a problem in this study **(Insert Table 3.5 here).** In addition, Ramsey RESET test was performed for model specification with null hypothesis that the model has no omitted variables and its result was statistically insignificant supporting the null hypothesis **(Insert Table 3.6 here).** Moreover, Heteroscedasticity and autocorrelation were controlled using clustered robust standard error.

## 4. EMPIRICAL RESULTS AND DISCUSSIONS

The result of fixed effect regression model on intellectual capital performance and its determinants is presented in table 4.2 below. The estimated model is statistically significant with high explanatory power reasonably. The regression output revealed that the dependent variable is well explained by the explanatory variables in the model with $R^2$ and adjusted $R^2$ of 94.41% and 91.94% respectively and the rest of the variation in intellectual capital performance were not explained by the predictors. F- Statistic of 17.33 with P- value of zero is also significant, suggesting that variations in the dependent variable are well enough explained by the regressors.

 

**Table 4.2: Fixed Effect Model Regression Results**

| VAIC | Coef. | Robust Std. Err. | t | P>\|t\| |
|---|---|---|---|---|
| CONS | 13.41108 | 5.75343 | 2.33 | 0.038 |
| RISK | -.0771705 | .0307059 | -2.51 | 0.027** |
| PROF | 85.30987 | 18.75768 | 4.55 | 0.001* |
| STAFFCOS | .8823765 | .4192924 | 2.10 | 0.057*** |
| SIZE | -.4114678 | .576071 | -0.71 | 0.489 |
| IIT | .0601945 | .0298878 | 2.01 | 0.067*** |
| AGE | -.5943554 | .1164585 | -5.10 | 0.000 * |
| CONC | 10.40924 | 4.826285 | 2.16 | 0.052*** |
| Number of obs = 63<br>F( 7, 43) = 17.33<br>Prob > F = 0.0000<br>R-squared = 0.9441<br>Adj R-squared = 0.9194 | | | | |

Source: stata 13 output

*, **, and *** = significant at 1%, 5%, and 10% significance level respectively

Empirical evidences of this study revealed statistically significant inverse relationship between bank risk and intellectual capital performance reflected by value added intellectual capital coefficient. The implication here is that highly risk exposed banks can create doubts in the minds of depositors and other customers. Hence, the higher the banks are exposed to risk, the lower confidence of depositors, and the greater damage and eroding loyalty of stakeholders that destroys bank reputation, leading to lower intellectual capital performance. Conversely, banks with lower risk are highly solvent. This solvency in turn increases customer loyalty and finally relational capital coefficient which is component of value added intellectual capital coefficient. Therefore, as expected, this study found negative and statistically significant effect of bank risk on intellectual capital performance of commercial banks in Ethiopia. The result of this study is consistent with the findings of **(**Al-Musalli& Ismail, 2012**)**. In the same fashion, the variable age is negatively related to intellectual capital performance and it is statistically significant. This indicates that value creation of newly introduced banks is better than old aged banks**.** The implication here is that recently established banks have higher intellectual capital performance than old aged banks. This may be due to the argument that older banks might have lack of flexibility in adapting their strategies even while market conditions are changed. But, newly introduced banks could perform various activities that can bring higher growth persistence. This growth persistence increases motivation of staffs to work better and create additional value (Haltiwanger *et al*., 2013). Empirical result of this study contradicts with the result of previous studies (El-Bannany, 2014). Thus, Contrary to the formulated hypothesis, this study found statistically significant and negative association between bank age and intellectual capital performance in the case of Ethiopian commercial banks.

The result of fixed effect panel data linear regression model also indicated that profitability is statistically significant and affects intellectual capital performance positively. This shows commercial banks in Ethiopia with high profit earning capacity have better intellectual capital performance than banks with low profitability. This is most probably due to growth of sales revenue serving as ladder to create motivation for employees to work hard; suggesting that bank directors should encourage their staff to perform better. The more profitable a bank is, the greater time will be devoted for doing intellectual activities such encouraging staffs to deliver service with best quality that may in turn bring loyalty of customers and reputation of banks, conducting research and development projects and so on. Afterwards, these activities will improve contributions to value added intellectual capital coefficient of commercial banks. This result is consistent with findings of study made by **(**El-Bannany, 2008; soheili& pakdel, 2012; Eftekhare *et al*., 2014; Sefidgar *et al*., 2015). Hence, result of this study supports the hypothesis formulated earlier which states positive and significant impact of profitability on intellectual capital performance commercial banks in Ethiopia.

Results of this study also revealed that ratio of staff cost to total income is statistically significant and positively related to value added intellectual capital coefficient, suggesting that the greater the ratio of staff cost to total income, the better the intellectual capital performance of the banks will be **(** El-Bannany,2008**).** Higher ratio of staff cost implies making valuable investment in human capital. Bank employees cost is supposed to have contributions in creating value. Greater staff cost as investment in human capital may motivate bank employees to bring performance. Thus, empirical evidences of this study indicated existence of positive and statistically significant relationship between ratio of staff cost to total income and intellectual capital performance in commercial banks of Ethiopia as it was expected. Regression results also revealed statistically significant positive effect of investment in information and technology system on intellectual capital performance of Ethiopian banks. This indicates that banks which made higher investment in information and

 

technology products have better intellectual performance than banks with lower investment in information and technology. To manage customer relationship and enhance relational capital, it's better to use newly introduced technological driven electronic banking product and deliver high quality services to stakeholders with less effort. As result, the contribution of relational capital coefficient to value added intellectual capital coefficient will be higher. So, as it was expected, empirical evidence of this study revealed positive and statistically significant impact of investment in information and technology systems on intellectual capital performance of commercial banks in Ethiopia.

The coefficient of bank concentration in the fixed effect regression result point out statistically significant and positive impact on intellectual capital performance, indicating that banks with large market share have greater value added intellectual capital coefficient and vice versa. This may be due to the ability of highly concentrated banks to exercise market power. Besides, banks having largest market share are capable of monopolizing the market. In consequence, value added intellectual capital coefficient of more concentrated banks will be higher as far as monopolists have strong financial resources that support them to hire the most skilled and qualified competitive employees who are capable of taking competitive advantage (Gayle, 2001 cited by Al-Musalli & Ismail, 2012). Concerning to this variable, the result of this study is congruent with (El‐Bannany, 2012; Al-Musalli & Ismail, 2012). Hence, as expected, empirical evidences of this study found positive and statistically significant relationship between banking industry concentration and intellectual capital performance of commercial banks. Moreover, result of this study revealed statistically insignificant negative effect of bank size on intellectual capital performance. It indicates that variations in value added intellectual capital coefficient don't differ significantly across banks depending on their size. Finding of this study is consistent with (Joshi *et al*., 2010; Al-Musalli& Ismail, 2012). Therefore, based on finding of this study; bank size is not considered as influential explanatory variable to determine value added intellectual capital coefficient as a proxy of intellectual capital performance, disproving the formulated hypothesis**.**

## 5. CONCLUSION AND DIRECTIONS FOR FUTURE RESEARCH

The purpose of this study was to empirically investigate determinants of intellectual capital performance of commercial Banks in Ethiopia. The results of empirical evidence from the econometric linear regression analysis of fixed effect model revealed that independent variables including: risk, profitability, ratio of staff cost to total income, investment in information and technology, bank age and banking industry concentration were statistically significant to explain intellectual capital performance of Ethiopian banks. Specifically, the result of the study indicates that profitability, ratio of staff cost, investment in information and technology, and bank concentration were positively associated to intellectual capital performance, whereas bank age and risk were negatively correlated with intellectual capital performance. Hence, those banks with higher profit, larger ratio of staff cost, higher investment in information and technology, higher concentration, lower risk, and established recently have better intellectual capital performance than those with lesser profit, lower ratio of staff cost, lower investment in information and technology, concentrated weakly, higher risk, and early established banks in Ethiopia. However, size of banks has negative but statistically insignificant relationship with intellectual capital performance of banks in Ethiopia. Therefore, in the case of Ethiopian banks, bank size is not considered as a factor that determines intellectual capital performance.

Along with theoretical contribution, this study contributes to the ongoing debate in intellectual capital literature through its inspection on determinants of intellectual capital performance taking Ethiopian banks. It can also serve as a reference for future researches mainly related to the financial sector. First, this study was confined to the banking sector. Results of the present study can't therefore be used to make generalization to others. Hence, future studies can be carried out by incorporating other sectors to have a comprehensive view of intellectual capital performance in Ethiopia. Additionally, the present study treated intellectual capital performance in an aggregate form. So, future studies can examine the dimensions of intellectual capital coefficients individually (human capital, relational, and organizational capital) and their determinants in separation for providing better understanding of each element if sufficient literature is accessed. Comparative study of this issue can also be carried out between developed and developing countries. Here, cultural differences among developing and developed countries that affect intellectual capital, especially the concept of organizational culture should be considered to make either generalization or modification on the ideas. Moreover, this study applied pulic's value added intellectual capital coefficient as a proxy to measure performance of intellectual capital. Perhaps, a universal model for evaluation of intellectual capital will never be developed (Pazdzior, 2012). However, it can be valued in diverse ways by different indicators (Jurczak, 2008). Hence, Future research may apply different measurement methods. For the reason that there are some other measurement tools like Baruch Lev method, Tobin's q, Balanced Scorecard (Ekwe, 2013; Svanadze & Kowalewska, 2015).

 

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**APENDICES**

**Table 3.1: F-test of simple Pooled OLS against fixed-effects specification**

F test that all ui=0: F (12, 43) = 40.16 Prob > F = 0.0000

**Table 3.2: Breusch and Pagan Lagrangian multiplier test for random effects**

Vaic [bank, t] = Xb + u [bank] + e [bank, t]

Estimated results:

| | Var | sd = sqrt (Var) |
|---|---|---|
| Vaic | 4.109546 | 2.027201 |
| e | .3311422 | .5754496 |
| u | 3.587202 | 1.893991 |

Test: Var (u) = 0

chibar2 (01) = 60.29

Prob > chibar2 = 0.0000

**Table3.3: Hausman Specification Test of Random-Effects against Fixed-Effects**

| | —— Coefficients —— | | | |
|---|---|---|---|---|
| | (b) Fixed | (B) random | (b-B) Difference | sqrt (diag (V_b-V_B)) S.E. |
| Risk | -.0771705 | -.0455999 | -.0315705 | . |
| Prof | 85.30987 | 81.8631 | 3.446772 | . |
| Staffcos | .8823765 | . 6818356 | .2005409 | . |
| Size | -.4114678 | -1.134907 | .7234395 | . |
| iit | .0601945 | -.0645134 | .1247079 | . |
| age | -.5943554 | -.052897 | -.5414584 | .0549335 |
| conc | 10.40924 | -7.248088 | 17.65733 | . |

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient

chi2 (7) = (b-B)'[(V_b-V_B) ^ (-1)](b-B)

= 93.15

Prob>chi2 = 0.0000

(V_b-V_B is not positive definite)

**Table 3.4: Normality Test**

Shapiro-Wilk W test for normal data

| Variable | Obs | W | V | z | Prob>z |
|---|---|---|---|---|---|
| Residuals | 63 | 0.97391 | 1.475 | 0.840 | 0.20039 |

 

**Table 3.5: Multicollinearity Test**

| Variable | VIF | 1/VIF |
|---|---|---|
| SIZE | 2.23 | 0.447654 |
| AGE | 2.22 | 0.449965 |
| IIT | 1.19 | 0.839139 |
| STAFFCOS | 1.09 | 0.919745 |
| PROF | 1.07 | 0.937478 |
| CONC | 1.05 | 0.953886 |
| RISK | 1.05 | 0.955105 |
| Mean VIF | 1.41 | |

**Table 3.6: Model Specification Test for Omission of Variables**

Ramsey RESET test using powers of the fitted values of VAIC

Ho: model has no omitted variables
F (3, 52) = 1.16
Prob > F = 0.3347