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DETERMINANTS OF INTELLECTUAL CAPITAL EFFICIENCY: EMPIRICAL EVIDENCE FROM INSURANCE COMPANIES IN ETHIOPIA

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Abstract

For organizations to thrive in a digital and knowledge-driven economy, intellectual capital is essential. However, there has been a lack of attention given to the factors that affect intellectual capital efficiency (IC efficiency) in Ethiopian insurance companies, which have not been thoroughly examined. *Therefore, this study aims to investigate the factors that affect the IC efficiency of insurance companies in Ethiopia. The study used an explanatory research design with econometric panel data from sixteen insurance companies from 2013-14 to 2022-23. The random effect estimation technique was employed to identify the variable with the highest significance level. The study used a modified value-added intellectual coefficient (MVAIC) approach to measure the IC efficiency of insurance companies as a dependent variable and profitability, risk, barriers to entry, leverage, human resource intensity, company size, and company age as explanatory variables. The study revealed that profitability, risk, human resource intensity, and age have a positive and significant effect on the IC efficiency of insurance companies. In contrast, barriers to entry, leverage, and size negatively and significantly impact insurance companies' IC efficiency. The evidence might help managers and insurance regulatory bodies address the issues that influence IC efficiency to enhance its performance and ultimately optimize its value creation.*
Keywords: Intellectual Capital, Insurance Companies, Ethiopia, MVAIC, Panel Data

INTRODUCTION

Over the previous two decades, economies have shifted from a traditional-driven approach to a more knowledge-intensive one (Ali et al., 2022; Tiwari & Vidyarthi, 2018). Knowledge has become increasingly important for economies and enterprises to gain a sustainable competitive advantage (Ali et al., 2022; Olohunlana & Odeleye, 2023). In the current period, the structure of knowledge assets within a corporation has progressed beyond recruiting highly proficient personnel (Sardo & Serrasqueiro, 2018; Isola et al., 2020). It now encompasses a wide range of additional components, such as enhancing the ability to build and manage structures, safeguarding confidential business information, securing patents and trademarks, fostering customer loyalty, meeting societal obligations, and managing diverse intangible resources. The intangible aspect of the organization is commonly known as intellectual capital (IC).

The concept of IC was initially suggested by Galbraith (1969) and then popularized by Stewart (1997). Subsequently, scholars have extensively studied the concept in the company performance literature, acknowledging its substantial influence on organizations' competitiveness, growth, and sustainability (Duho & Onumahb, 2019; Isola et al., 2020). Due to increasing competitiveness and the need for sustainability, corporate leaders recognize the need to develop their IC (Buallay, 2019). IC preserves and strengthens unique and difficult-to-replicate competitive advantages (Sardo & Serrasqueiro, 2018; Xu & Liu, 2020). Furthermore, it improves the organization's capacities and increases its worth. Typically, IC enhances enterprises' efficiency, growth, and long-term viability.

Although firms that engage heavily in IC development benefit greatly, monitoring its efficiency is critical to their existence and sustainability (Olohunlana & Odeleye, 2023). Measuring the efficiency of IC helps company leaders in making decisions on the optimal use of resources for performance development. Quantifying the efficiency of IC can be problematic due to its inherent complexity despite its vital role in determining a firm's performance (Kweh et al., 2015; Isola et al., 2020). Ratio analysis is a comprehensive method used in the literature to assess the efficiency of IC. It has been accepted by several researchers (Olohunlana & Odeleye, 2023; Isola et al.,2020; Kweh et al., 2015). The ratio analysis of IC utilizes the proportion of human, structural, and relational intellectual capital in relation to the value added by the firms (Mondal & Ghosh, 2012).

The primary objective of this study is to elucidate the factors that affect IC efficiency and, hence, directly relevant to comprehending how knowledge-based economies function. Service-based organizations rely on IC, which encompasses the knowledge and innovation of employees rather than tangible assets, to increase the value of a business and optimize its overall value (El-Bannany, 2012). The significance of IC in knowledge-based industries, like banking and insurance companies, for generating value is more significant compared to other sectors in the economy (El-Bannany, 2008; Meressa, 2016). This validates the selection of insurance companies as a sample for the current study. Scholars observed that the insurance industry is an ideal setting for studying IC due to the abundance of dependable data and the intellectual character of its operations. Previous empirical studies have examined various factors influencing IC performance in different sectors. For instance, Holden & El-Bannany (2004), El-Bannany (2008), Hidayah & Adityawarman (2017), Meressa (2016), Duho & Onumahb (2019), Olohunlana & Odeleye (2023) all studied banks. Kweh et al. (2015) did research on software companies. Harirangga & Panggabean (2020) examined the manufacturing sector, while Babajee (2021) investigated the hotel industry. However, as far as the author knows, no prior study has examined the insurance markets in relation to the factors that influence IC efficiency.

Based on the above gaps, the current research examines factors affecting IC efficiency in Ethiopian insurance markets from 2013-14 to 2022-23. This study makes a significant contribution to the literature because it is the first to measure the factors that affect IC efficiency in insurance companies in Ethiopia. The subsequent sections of this study cover the following sections. Section 2 provides an overview of the existing literature and formulates a hypothesis. Section 3 indicates

the methodology. Section 4 presents the findings of the empirical analysis. Ultimately, section 5 presents the conclusions.

1. REVIEW OF RELATED LITERATURE

1.1 Concept and Measurement of IC

Various researchers have presented and explored definitions and explanations of IC in the literature review. This study critically analyses pertinent literature on IC and provides a precise definition, enhancing the understanding of its concept and significance. In the early years, IC was defined as non-physical assets or intangibles that added value and competitiveness to organizations (Itami,1987). IC also includes knowledge, information, intellectual property, and experience that can be used to generate income (Stewart,1997). Bontis (1998) defined IC as the knowledge that can be converted into profits. IC amalgamates market, human-centered, intellectual property, and infrastructural assets (Brooking,1996,1997). Sveiby (1997), on the other hand, defined IC as a package of helpful knowledge. It encompasses the firms' external structure, internal structure, and individual competency. Together, IC encompasses the collection of all intangible assets, such as intellectual property, resources, and capabilities, including employee skills. Organizations achieve a sustained competitive advantage by efficiently transforming knowledge, indicating that IC drives firm performance and value development.

Previous IC performance studies used Pulic's (2000) value-added intellectual capital (VAIC) technique to quantify IC and component performance. This approach has been used in several investigations (e.g., El-Bannany, 2008; Hidayah & Adityawarman, 2017; Meressa, 2016; Duho & Onumahb, 2019). Although VAIC is widely used, it is not immune to criticism. Some researchers have identified significant limitations in the VAIC model. VAIC is an insufficient measure of IC performance due to its failure to account for elements such as relational capital (RC) within its VAIC components (Vishnu & Gupta, 2014). Further, misleading interpretation is expected if the VAIC measure yields a negative result due to a negative book value of equity or operating profit in the calculated measurement. The firm's intangible human, structural, and relational capital drive IC accumulation, but the VAIC model eliminates relational capital, resulting in inaccurate forecasts (Stahle et al., 2011; Nimtrakoon, 2015).

Many scholars have tried expanding and revising the VAIC model in response to the abovementioned constraints and critiques (Vishnu & Gupta, 2014). This study uses the MVAIC model, which integrates physical, human, structural, and relational capital components to boost component explanatory power (Nimtrakoon, 2015; Buallay, 2019; Yao et al., 2019; Aybars & Oner, 2022). The current study assesses IC efficiency by assuming that physical capital is necessary for human capital to provide added value.

To measure IC efficiency for insurance 'i' in year 't' using the MVAIC approach, execute the following consequential calculations:

- Value added (VAit) = Output: Input; output includes total income, and input includes total operational cost minus investment cost for labor.
- Human Capital Efficiency (HCEit) = VA/HC, HC: Human capital includes employee-related costs considered investments.

- Structural Capital Efficiency (SCEit) = SC/VA, SC is structural capital, calculated as SC = VA-HC.
- Relational Capital Efficiency (RCEit) = RC/VA; RC stands for relational capital and includes marketing and selling costs
- Capital Employed Efficiency (CEEit) = VA/CE, CE refers to capital employed, which is calculated as the book value of the net assets of the insurance firm.

1.2 Factors Affecting IC Efficiency

Empirical research has identified several key elements that significantly impact IC's efficiency. These factors include profitability, company size, age, risk, human resource intensity, barriers to entry, and leverage. This section provides a comprehensive analysis of the literature on determining factors.

1.2.1 Profitability

El-Bannany (2008, 2012) states that managers of successful companies have more resources to encourage innovation and motivate employees, while managers of failing companies have fewer resources, which can hurt the company's profitability. So, managers of unsuccessful companies will be preoccupied with why the company failed, leaving little time for innovation, staff motivation, and training. Empirical studies show a positive relationship between profitability and IC efficiency. For instance, Ousama et al. (2012) demonstrated a positive correlation between the profitability and IC of enterprises in Malaysia-listed companies. The empirical studies conducted by El-Bannany (2008), El-Bannany (2012), Mondal & Ghosh (2012), and Meressa (2016) have all provided evidence supporting a positive correlation between profitability and intellectual capital performance in UK, UAE, India, and Ethiopia banks, respectively. The following hypothesis is offered based on the preceding discussion:

Hypothesis 1: Profitability has a positive and significant effect on the IC Efficiency of insurance companies in Ethiopia

1.2.2 Firm Size

The size of a firm is crucial and has a favorable impact on the intellectual capital performance of enterprises (El-Bannany, 2015; Bharathi Kamath, 2008). Larger enterprises' access to the money market and social visibility may push them to conduct innovative activities to maintain their strategic positions in the market, improving IC performance (El-Bannany,2012). Previous empirical research on firm size and intellectual performance is inconclusive. For instance, El-Bannany (2012) discovered that the size of banks in the UAE enhances the performance of IC. The author hypothesized that large companies have more external facilities, such as capital and government aid, and are more transparent in their economic activity, which attracts investors and hires better-qualified employees. Olohunlana & Odeleye (2023) found that Nigerian banks' IC efficacy is positively and statistically connected with company size. The author hypothesized that larger, more lucrative companies spend more on IC stock, enhancing efficiency. However, Joshi et al. (2010) found discrepancies in Australian bank IC performance. The authors mentioned that

bank size did not affect IC's performance. Hidayah & Adityawarman (2017) found that firm size does not affect IC performance in Indonesian firms. According to Kweh et al. (2015), size negatively affects IC efficiency in Indonesian stock exchange-listed software companies. Based on the information presented above, the following hypothesis is proposed:

Hypothesis 2: Firm size has a positive and significant effect on the IC Efficiency of insurance companies in Ethiopia.

1.2.3 Human Resource Intensity (HRI)

Providing investments and incentives to employees is a more practical approach to enhancing intellectual capital performance (El-Bannany, 2008). This would motivate innovation, such as offering new services to clients. Human capital theory connects HRI and intellectual capital performance (Babajee, 2021). The theory suggests that companies that invest in employee development, especially in education and training, improve firm productivity and profitability. Previous studies confirmed mixed results in the relationship between HRI and IC efficiency of firms. For instance, El-Bannany (2008) and Meressa (2016) examined UK and Ethiopian banks' IC performance. The authors found that banks with high staff cost-to-total income ratios had better intellectual capital performance. However, Kweh et al. (2015) and Duho & Onumah (2019) found contradicting results on IC efficiency and its determinants in Malaysian software businesses and Ghanaian banks, respectively. They all found that HRI negatively impacts IC performance. Based on the above discussion, the following hypothesis is proposed:

Hypothesis 3: Human resource intensity has a positive and significant effect on the IC Efficiency of insurance companies in Ethiopia.

1.2.4 Barriers to Entry

Entry barriers are competitive pressure disruptions that delay market dynamics and impair organizational efficiency, innovation, and worker motivation (El-Bannany, 2008; Babajee, 2021). Empirical studies examining entry barriers have indicated mixed results. For example, Hidayah & Adityawarman (2017) examined Indonesian Syariah Banks' intellectual capital performance from 2010 to 2015. They found that barriers to entry do not significantly influence the intellectual capital performance of banks. Another study by Babajee (2021) discovered empirical evidence from Mauritius hotels supporting Hidayah & Adityawarman (2017) findings. On the contrary, El-Bannany (2008) investigated determinants of UK banks' intellectual capital performance and found that barriers to entry negatively affect the intellectual capital performance of banks. Based on the above discussion, the following hypothesis is proposed:

Hypothesis 4: Barriers to entry have a negative and significant effect on the IC Efficiency of insurance companies in Ethiopia.

1.2.5 Leverage

The agency theory suggests that intellectual capital performance can be predicted by utilizing company leverage and voluntary disclosure (White et al., 2007). An organization's leverage increases agency costs because debtholders may shift wealth to shareholders (Babajee, 2021). The literature on value-added IC uses the ratio of total debt to book value of total assets as a measure

of company leverage (Dzenopoljac et al., 2017; Mondal & Ghosh, 2012). Duho & Onumah (2019) established a negative relationship between leverage and IC performance in banks operating in Ghana. Aziz & Hashim (2017) found a negative association between leverage and Malaysian Islamic banks' value-added intellectual capital. Babajee (2021) found no correlation between IC performance and leverage in Mauritius hotels. The preceding discussions suggest the following hypothesis:

Hypothesis 5: Leverage has a positive and significant effect on the IC Efficiency of insurance companies in Ethiopia.

1.2.6 Age of firm

According to Zheng et al. (2010), firms' inventive capability improves with age. The authors hypothesized that the age of a corporation has a favorable impact on its intellectual performance, which subsequently contributes to a good influence on its financial success. According to El-Bannany (2012, 2015), older organizations perform better than younger ones due to staff experience, goodwill, branding, and economies of scale, which may be turned into a competitive advantage and represented in internal, external, and human capital. El-Bannany (2012) revealed that bank age statistically influences IC performance in UAE banks. Another study was conducted by Meressa (2016) on determinants of IC performance of banks in Ethiopia using panel data from 2010 to 2015 and the age of banks affecting IC performance. Youndt et al. (2004) discovered that firm age did not substantially impact corporate IC profiles. Based on the evidence mentioned earlier, the following hypothesis is formulated:

Hypothesis 6: Firm age has a positive and significant effect on the IC Efficiency of insurance companies in Ethiopia.

1.2.7 Firm Risk

Risk is the possibility of experiencing unfavorable consequences due to specific actions (El-Bannany, 2013). According to El-Bannany (2012), risk is the probability of encountering an adverse result, such as a financial loss. Various factors, including economic, translation, and transaction risks, can impact this. As per the findings of Asare et al. (2017), insurance portfolios considered high-risk are more likely to encounter significant claims payments. According to El-Bannany (2008), improving IC performance can help reduce the adverse effects of increased risk. Therefore, companies aim to minimize the adverse impact of these risks, which can lead to better intellectual performance than those in less risky positions (El-Bannany, 2012). Given the previously described evidence, the following hypothesis is proposed:

Hypothesis 7: Firm risk has a positive and significant effect on the IC Efficiency of insurance companies in Ethiopia.

2. DATA AND METHODOLOGY

The study utilized an explanatory research design and longitudinal data to investigate the factors affecting the IC efficiency of insurance companies in Ethiopia. The IC efficiency determining variables were obtained from the audited annual reports of insurance companies founded in the National Bank of Ethiopia Insurance Supervision Department and the Association of Ethiopian Insurers from 2013-14 through 2022-23. The number of insurance companies in Ethiopia stood at

18 as of the end of the 2022 financial year. The study selected only 16 insurance companies based on the following exclusion criteria. The insurance companies with less than ten years of audited annual reports were eliminated from the research.

2.1 Model Specification

This study employs panel regression analysis to determine whether there is a correlation between the independent and dependent variables. Gujarati & Porter (2010) asserts that panel data has several advantages, including providing more informative data, more variability, less collinearity across variables, increasing degrees of freedom, and improving efficiency. This study examines a range of 10 years and 16 insurance companies with 160 observations. Therefore, panel datasets with many cross-sectional units and fewer periods are used as short panel data. Hence, this study utilizes short panel data and a balanced panel regression model. Below is the detailed specification of the model employed in this scenario:

$$\mathbf{MVAICit = \beta 0 + \beta 1BEit + \beta 2ROAit + \beta 3LnAGEit + \beta 4LogSIZEit + \beta 5LEVit + \beta 6HRIit + \beta 7RISKit + \varepsilon it}$$

Where: β_0 = Intercept, MVAIC= Modified Value-Added Intellectual Coefficient; BE= Barriers to Entry, ROA= Profitability, LnAGE = Natural logarithm of Firm age, LogSIZE = Logarithm of Firm size, LEV= Leverage, HRI= Human resource intensity and RISK = Firm risk.

2.2 Method of Data Analysis

This study utilized descriptive statistics such as the mean, standard deviation, minimum, and maximum values for the explanatory and dependent variables. In addition, inferential statistical methods are employed to make inferences about the associations between variables and are crucial for hypothesis testing. The econometric model specification tests were used to select the best suitable panel models. Furthermore, diagnostic tests were performed to evaluate the underlying assumptions of the usual linear regression model. The data in this study was analyzed using the statistical software package 'STATA' version 15.

2.3 Measurement of Variables

Dependent Variable: As previously stated, this study analyzes the factors that affect the IC efficiency of insurance companies in Ethiopia. Therefore, the measurement of IC efficiency is determined by the dependent variable known as MVAIC, which is mentioned above.

Independent variables: The independent variables are quantified in the following manner:

Table 1 Displays the metrics of the independent variables utilized in this study.

Variables	Measurement
Barriers to entry (BE)	The ratio of fixed assets to the total assets of firm i in year t, as argued by El-Bannany (2008) and Babajee (2021).
Profitability (ROA)	The ratio of profit after tax to the firm's average assets is i in year t, as argued by Kweh et al. (2015), Meressa (2016), and Babajee (2021).
Firm Size (SIZE)	The logarithm of total asset firm i in year t argued by El-Bannany (2013) and El-Bannany (2015)

Firm Risk (RISK)	The ratio of net claims paid to the net premium earned of firm i in year t
Leverage (LEV)	The ratio of total debt to total assets of firm i in year t as argued by (Olarewaju & Msomi, 2021).
Human Resource Intensity (HRI)	The ratio of staff cost to total revenue of firm i in year t, as argued by El-Bannany (2008) and Meressa (2016)
Firm age (AGE)	The natural logarithm of a firm, from starting a business until each year of the research period for the year t, is argued by El-Bannany (2013) and Hidayah and Adityawarman (2017).

Source: Own computations in Stata 15

3. RESULTS AND DISCUSSION

This part presents the results and analysis of the study using descriptive statistics, correlation analysis, and an econometrics model implemented in three stages.

3.1 Descriptive Statistics

Table 2 presents the descriptive statistics for the IC efficiency evaluated by MVAIC and the independent variables chosen for this investigation. The IC efficiency value for the sample insurance companies over the study period ranges from 0.838 to 2.019, as measured by the natural logarithm of the MVAIC. The average MVAIC level is 1.470. The independent factors represented by profitability, firm size, firm age, firm risk, human resource intensity, barriers to entry, and leverage vary as well, which lends additional credibility to the study's results, as noted by Naser and Al-Khatib (2000).

Table 2 Descriptive Statistics of Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
LnMVAIC	160	1.470	0.273	0.838	2.019
BE	160	0.113	0.052	0.039	0.225
ROA	160	0.083	0.022	0.050	0.146
LnAGE	160	2.584	0.745	0.000	3.850
LogSIZE	160	8.956	0.454	7.462	10.23
LEV	160	0.500	0.105	0.216	0.649
HRI	160	0.267	0.069	0.060	0.379
RISK	160	0.451	0.089	0.274	0.634

Note: LnMVAIC is the natural logarithm of modified value-added intellectual capital; BE is barriers to entry; ROA is profitability; LnAGE is the natural logarithm of firm age; LogSIZE is the logarithm of firm size; LEV is leverage; HRI is human resource intensity; RISK is firm risk.

Source: Own computations in Stata 15

3.2 Diagnostic Tests

Multicollinearity is a statistical problem that occurs when there is a high correlation between two or more independent variables in a regression model, which can result in misleading conclusions (El-Bannany, 2012). The correlation matrix is a widely employed method in statistical literature for identifying this issue. If the correlation coefficient between two variables exceeds

0.80, it suggests the presence of multicollinearity (Gujarati & Porter, 2010). One possible solution to this problem is to remove one of the highly linked variables. The correlation matrix in Table 3 reveals that the most significant coefficient value (0.778) exists between LogSIZE and LnAGE. This value, which is below 0.80, implies the absence of multicollinearity. In addition, the variance inflation factor (VIF), a more dependable measure than the correlation matrix, indicates that the average VIF of 2.34 is below the threshold of 10, suggesting the absence of multicollinearity problems.

Additionally, in panel data spanning ten years or more, there is a chance of non-stationary shocks that can impact the long-term equilibrium of the data. A Levin-Lin-Chu (LLC) panel unit-root test was used to assess data stationarity (Levin et al., 2002). The test result showed that all variables are stationary at a significant p-value ($p<0.01$), suggesting no presence of a unit root (Table 4).

Table 3 Pairwise Correlations Matrix

Variables	(LnMVAIC)	(BE)	(ROA)	(LnAGE)	(LogSIZE)	(LEV)	(HRI)	(RISK)	VIF	1/VIF
LnMVAIC	1.000									
BE	-0.471***	1.000							1.37	.731
ROA	0.744***	-0.346***	1.000						2.60	.384
LnAGE	0.356***	0.054	0.197**	1.000					2.62	.382
LogSIZE	-0.323***	0.069	0.242***	0.778***	1.000				2.70	.370
LEV	-0.765***	0.456***	-0.736***	-0.273***	-0.285***	1.000			2.84	.353
HRI	-0.757***	0.307***	-0.646***	-0.328***	-0.362***	0.622***	1.000		2.19	.457
RISK	0.749***	-0.363***	0.618***	0.178**	0.259***	-0.631***	-0.617***	1.000	2.05	.488
Mean VIF									**2.34**	

Source: Own computation

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 4 Levin, Lin, and Chut (LLC) Unit Root Tests

Variable	Adjusted t-Statistics	P-value
LnMVAIC	-3.0943	***
BE	-2.8360	***
ROA	-3.5488	***
LogSIZE	-3.6991	***
RISK	-2.5746	***
LEV	-13.9925	***
HRI	-5.6683	***
LnAGE	-34.1866	***

Source: Own computation

*** $p<.01$

The panel regression analysis commenced by employing the Breusch and Pagan (1980) test, which revealed that the variances among entities are not zero, indicating the presence of a panel effect, rendering pooled OLS an inconsistent estimator for the panel data. Subsequently, the application of fixed and random effects follows, and Hausman test statistics serve as a foundation for selecting between fixed and random effects. The Hausman test helps to assess whether the individual-specific effects are correlated with the explanatory variables in the mode. The result of the Hausman test is insignificant ($p > 0.05$), meaning the test statistic is not large enough to reject the null hypothesis. Thus, when the Hausman test is insignificant, the decision is to use the random effects model for analysis, as it is assumed to be appropriate for the data given the lack of correlation between individual effects and the explanatory variables. Further, heteroskedasticity was assessed using the Breusch-Pagan/Cook-Weisberg test, and the test results rejected the null hypothesis, signifying the presence of heteroskedasticity. The study also performed the Wooldridge (2010) autocorrelation test, which showed no first-order autocorrelation in the dataset. Therefore, the analysis utilized Rogers (1993) clustered robust standard errors to address the presence of heteroskedasticity across clusters of observations, which is appropriate for the balanced panel data.

3.3 Regression Analysis

The regression analysis was used to determine the impact of barriers to entry, profitability, firm age, firm size, leverage, human resource intensity, and risk on the IC efficiency proxied by MVAIC of the insurance industry in Ethiopia. The result of the standard error in regression revealed that variables influencing IC efficiency are a good fit with an adjusted R-square of 81%. This meant the study's explanatory variables explained 81% of the MVAIC. The remaining 19% comes from factors not included in the regression model. The F-statistics for the model are also very significant, with Prob > chi2 = 0.0000, indicating that the regression model has predictive solid potential and an excellent fit.

Table 4 Regression Results

LnMVAIC	Coef.	Robust St. Err.	t-value	p-value	[95% Conf	Interval]	Sig
BE	-0.671	0.266	-2.52	0.012	-1.193	-0.149	**
ROA	2.447	0.882	2.78	0.006	0.719	4.175	***
LnAGE	0.107	0.027	3.96	0.000	0.054	0.159	***
LogSIZE	-0.075	0.035	-2.15	0.031	-0.143	-0.007	**
LEV	-0.512	0.111	-4.62	0.000	-0.729	-0.295	***
HRI	0.914	0.229	4.00	0.000	1.362	0.466	***
RISK	0.879	0.161	5.46	0.000	0.563	1.194	***
Constant	1.843	0.301	6.12	0.000	1.253	2.433	***
Mean dependent var		1.470	SD dependent var			0.273	
Overall r-squared		0.807	Number of obs			160	
Chi-square		348.205	Prob > chi2			0.000	
R-squared within		0.761	R-squared between			0.870	

**** p<.01, ** p<.05, * p<.1*

Note: LnMVAIC- natural logarithm of modified value-added intellectual capital; BE- barriers to entry; ROA- profitability; LnAGE- natural logarithm of firm age; LogSIZE- logarithm of firm size; LEV-leverage; HRI-human resource intensity; RISK-firm risk

Source: Own computation in Stata 15

As shown in Table 4, profitability measured by ROA has a positive and significant effect ($p<0.01$) on the IC efficiency of insurance companies in Ethiopia proxied by MVAIC with a coefficient value of 2.447. The positive results suggest that profitable insurance companies are better positioned to invest in their human capital through training, development, and retention initiatives. Higher profits also enable investments in advanced technologies and systems that bolster structural capital, enhancing overall operational efficiency. Additionally, profitable firms can nurture stronger relationships with clients and partners, thereby boosting relational capital. These investments collectively improve the efficiency of intellectual capital, driving further profitability in a virtuous cycle. As a result, the hypothesis that profitability has a positive and significant effect on the IC Efficiency of insurance companies in Ethiopia is supported. The result of this study supports the findings drawn in earlier studies by Babajee (2021), Meressa (2016, El-Bannany (2012), and El-Bannany (2008), who asserts that profitable firms can allocate more time towards intellectual activities, such as motivation to incentivize their employees to improve their performance and invest in research and development. Later, these processes will increase companies' IC efficiency. However, Weqar et al. (2021) discovered no statistically significant association between profitability and IC efficiency.

Similarly, the result demonstrates that risk has a statistically significant positive effect ($p< 0.01$) on the IC efficiency of insurance companies in Ethiopia evaluated by MVAIC with a coefficient value of 0.829. The finding indicates that higher risk levels often necessitate more sophisticated risk management practices and innovative solutions, fostering an environment where IC is highly

valued and effectively utilized. Companies facing greater risks will likely invest more in understanding and mitigating these risks, leading to improved IC capabilities. Hence, the hypothesis that firm risk positively and significantly affects the IC Efficiency of insurance companies in Ethiopia is supported. The findings of this study are consistent with Hidayah & Adityawarman (2017), El-Bannany (2012), and El-Bannany (2013), who contend that firms in high-risk positions exhibit better intellectually than those in less vulnerable positions due to their efforts to mitigate the adverse effects of risks on customer and investor perception. Conversely, specific studies on intellectual capital performance have discovered that the link is not statistically positive Meressa, (2016).

The findings also revealed that age has positive and significant effects ($p< 0.01$) on IC efficiency as evaluated by the MVAIC of insurance companies in Ethiopia. The positive impact of firm age verified that older insurance companies tend to have established processes, experienced management teams, and a wealth of accumulated knowledge, all of which contribute to superior structural and human capital. Furthermore, the longevity of these firms often translates into robust client relationships and a strong market reputation, enhancing relational capital. These factors combined result in more efficient use of IC compared to younger firms, which may still be developing these critical assets. As a result, the hypothesis that firm age has a positive and significant effect on the IC Efficiency of insurance companies in Ethiopia is supported. The results of this study align with the findings of El-Bannany (2015) and El-Bannany (2012), who suggested that older companies tend to have better intellectual capital performance than younger ones. The potential reason is attributed to their experience in effectively utilizing the various components of IC, including internal, external, and human capital resources. However, the outcome of this study is inconsistent with Forte et al. (2017) and Meressa (2016).

On the other hand, barriers to entry have a statistically significant adverse impact ($p<0.05$) on the IC efficiency of insurance companies in Ethiopia, measured by MVAIC with a coefficient value of -0.728. The findings revealed that when barriers to entry are high, the competitive pressure to innovate and enhance IC may be reduced. Established companies in such markets might become complacent, relying on their entrenched position rather than continuously improving their intellectual assets. This can lead to stagnation in IC efficiency over time. As a result, the hypothesis that barriers to entry have a negative and significant effect on the IC Efficiency of insurance companies in Ethiopia is supported. The finding is consistent with Babajee (2021), Yudaruddin et al. (2018), and El-Bannany (2012), indicating that companies operating in industries with significant barriers to entry are less inclined to foster and inspire their employees to engage in innovative activities due to the lack of competition. Consequently, this circumstance could potentially have an adverse effect on the performance of IC efficiency. However, the current result contradicts Hidayah & Adityawarman (2017) those who contend that entry barriers do not affect intellectual capital performance.

Similarly, the regression result indicates that human resource intensity has a significant positive effect ($p<0.01$) on the IC efficiency of insurance companies in Ethiopia evaluated by MVAIC with a coefficient of 0.941. The result suggests that a workforce rich in expertise, experience, and

innovation drives the creation and application of IC. Insurance companies with high human resource intensity can more effectively develop innovative products, improve customer service, and streamline operations, thereby maximizing the efficiency of their IC. As a result, the hypothesis that human resource intensity has a positive and significant effect on the IC Efficiency of insurance companies in Ethiopia is not supported. The study is consistent with the empirical findings of Meressa (2016) and Babajee (2021), who found that investment in intellectual capital is positive and significant. However, the result contradicts El-Bannany (2008) and Duho & Onumahb (2019), who suggest that investments made in human resources without rigorous assessment may decrease IC efficiency.

The empirical results also indicate that leverage has a negative and significant ($p<0.01$) impact on the IC efficiency of insurance companies in Ethiopia as measured by MVAIC with a coefficient value of -0.512. The negative effect implies that highly leveraged insurance companies may face financial constraints that limit their ability to invest in IC. High debt levels can restrict funds available for training, technology upgrades, and other critical human and structural capital investments. Furthermore, the pressure to meet debt obligations can divert from long-term IC development to short-term financial performance. As a result, the hypothesis that leverage has a negative and significant effect on the IC Efficiency of insurance companies in Ethiopia is supported. The finding of this study is consistent with Duho & Onumahb (2019) and Babajee (2021), who posited that companies with a substantial debt capital structure may redirect resources from innovation and human resource development towards debt servicing, resulting in a negative impact on IC efficiency.

Additionally, the study revealed that size has a statistically significant negative effect ($p<0.05$) on IC efficiency measured by MVAIC insurance companies in Ethiopia with a coefficient of -0.075. The finding implies that larger insurance companies may struggle with communication and coordination across extensive structures, impeding the effective deployment of IC. Additionally, larger firms might experience slower decision-making processes and less agility, reducing their ability to quickly adapt and innovate, which are crucial for maintaining high IC efficiency. As a result, the hypothesis that firm size has a positive and significant effect on the IC Efficiency of insurance companies in Ethiopia is not supported. The result of the study is in line with that of Duho & Onumahb (2019), Aziz & Hashim (2017), Forte et al. (2017), Goebel (2015), Kweh et al. (2015) and Holden & El-Bannany (2004) who claim that large firms appear to possess a significantly lower level of IC value. The potential reason for the considerable negative impact of size on IC value may be that as size and complexity increase, it becomes more challenging to generate IC value. On the other hand, the result is inconsistent with previous empirical studies by Babajee (2021) and El-Bannany (2012).

5.1 CONCLUSIONS AND RECOMMENDATIONS

This study seeks to empirically investigate the factors that influence the IC efficiency of insurance companies in Ethiopia using a balanced panel dataset of 16 insurance companies and ten years of audited annual financial reports from 2013-14 to 2022-23. The study also utilizes MVAIC to measure IC efficiency. Following the appropriate diagnostic tests, a robust random panel

regression was used to address the issue of heteroskedasticity. The dependent variable is IC efficiency, as evaluated by MVAIC, and the explanatory variables are profitability, risk, firm age, barriers to entry, leverage, firm size, and human resource intensity.

The findings revealed that profitability, risk, firm age, and HRI significantly positively affected the IC efficiency of insurance companies in Ethiopia, as evaluated by MVAIC. The significant positive effect of profitability, firm age, human resource intensity, and risk on IC efficiency suggests that organizations with higher profitability, greater experience, substantial investment in their workforce, and a willingness to take risks are better at leveraging their IC. Profitability provides the financial resources necessary for investing in IC, such as research and development, employee training, and innovation. Meanwhile, a willingness to take risks can lead to exploring new ideas, adopting new technologies, and implementing innovative strategies, all of which can enhance IC efficiency. Older firms may benefit from accumulated knowledge, experience, and established processes, making them more efficient in utilizing their IC. The significant positive effect of HRI on IC efficiency suggests that insurance companies investing more in their human resources through activities like training, development, and retaining skilled employees are more likely to enhance the efficiency of their IC. Therefore, insurance companies in Ethiopia should focus on increasing profitability through operational improvements and innovation, leveraging their accumulated experience to capture and share valuable knowledge, and investing heavily in human resource development by offering training and fostering a culture of continuous learning. Furthermore, Encouraging risk-taking can drive innovation and new ideas

In contrast, the significant negative effect of barriers to entry, leverage, and firm size on the IC efficiency of insurance companies in Ethiopia suggests that these factors are detrimental to how effectively these companies can utilize their intellectual assets. High barriers to entry may limit competition within the Ethiopian insurance sector, leading to reduced innovation and a lack of urgency in optimizing IC. Hence, policymakers and insurance regulators should focus on reducing entry barriers to encourage a more competitive environment. Excessive leverage, or heavy reliance on debt, can strain financial resources, leaving less room for investments in IC, such as employee training and technological advancements. Effective management of financial leverage is crucial, requiring balanced capital structures and improved cash flow to support IC investment. Additionally, larger insurance firms may struggle with bureaucratic inefficiencies, slow decision-making, and difficulties in fostering a culture of innovation, which can further diminish their ability to capitalize on intellectual assets. Therefore, large insurance companies should streamline operations and enhance agility by adopting decentralized decision-making and cross-functional teams.

The study has significant implications for researchers. Potential future studies could encompass several industries, such as banks, microfinance, hotels, and manufacturing companies. The next phase involves an independent investigation of each dimension (human, relational, structural, and capital employed) and their respective drivers. Furthermore, the comparison between developed and developing countries is feasible due to cultural disparities, particularly organizational culture.

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