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The Impact of Intellectual Capital on Performance of Commercial Banks in Mongolia

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Abstract

In this paper, we examine the impact of intellectual capital on financial performance of commercial banks in Mongolia using the financial data between 2011 and 2021. The performance impact of intellectual capital on business results is measured by the value-added intellectual coefficient (VAIC) methodology which was used to analyze the data in random and fixed effects models. Statistical analysis shows that the human capital and capital employed has positive effect on return on equity. Structural capital and capital employed has positive effect on return on total assets. Human capital has positive effect on net interest margin while capital employed has negative effect on net interest margin. Our recommendation is that in order to increase profitability of Mongolian commercial banks they should measure impacts of their intellectual capital and human capitals.

Keywords

Commercial Bank, Financial Performance, Human Capital, Intellectual Capital, Value Added Intellectual Coefficient Methodology

1. Introduction

Intellectual capital has a big effect on business profitability performance. Intellectual capital can be defined as an intangible asset that is not reflected in a firm's balance sheet, but that affects a firm's financial performance and profitability (Edvinsson, 1997). Therefore, the balance sheet does not represent the real assets of the firm (Lhaopadchan, 2010). In today's world, it is increasingly proven that intellectual capital has a greater impact on economic value (Pulic, 1998; Öztürk & Demirgüneş, 2007; Ozkan et al., 2017). Public acknowledges the company as composition of individuals with specific knowledge which encourages company's innovation and important factor for it (Subramaniam &

Youndt, 2005). Moreover, appropriate structural mechanism is crucial for turning the human capital, intellectual ideas and knowledge into physical asset and profit. Information technologies and the communication system of the company give the opportunity to employ knowledge. Thus, intellectual capital can be divided into human capital and structural capital.

Structural capital encourages individual to employ knowledge and learning. The components of human capital—knowledge, experience, and skills—support the growth of structural capital.

In other words, utilization of structural capital depends on human capital and the efficiency of human capital depends on the quality of structural capital.

In addition to intellectual capital, tangible capital is another asset that contributes to business profit. This capital is called capital employed.

Optimal employment of these three kinds of capitals—human capital, structural capital and capital employed—has significant effect on company's financial performance.

Haris et al. found that capital efficiency and human capital efficiency have a positive effect and structural capital efficiency has a negative effect on the financial performance of Pakistani banks (Haris et al., 2019). Poh et al. found that the return on equity of Malaysian banks is directly affected by human capital efficiency and structural capital efficiency (Poh et al., 2018). Weqar et al. concluded that the influence of human capital is the most important in increasing the profitability and productivity of the Indian banking sector (Weqar et al., 2020). Mouthino et al. concluded by Iberian banks' global performance is mainly determined by their human capital efficiency (Moutinho et al., 2021). The structural capital efficiency is the essential drivers of value in achieving high performance at Islamic banks. The human capital efficiency negatively affects the performance of Islamic banks (Rehman et al., 2022). Tran and Vo concluded that Malaysian banks are clearly the top performers in HCE while public sector banks are the top performers in CEE (Tran & Vo, 2018).

In this paper, we analyze the impact of these capitals on financial performance of commercial banks in Mongolia.

2. Literature Review

The purpose of business is to create and increase value. The company's all resources can be expressed by the concept of added value. Researchers have acknowledged that changing the traditional method of measuring performance based on intellectual capital and using a new method is more appropriate in today's economic conditions, and have proposed their own methods (Edvinsson, 1997; Pulic, 2000).

In order to improve competitive advantage, a company must acquire resources and develop skills (Cheng et al., 2010). While physical assets are relatively easy to acquire, intellectual capital is more difficult to acquire. Also, intellectual capital is difficult and complicated to measure (Kweh et al., 2019). In recent knowledge-based economy, a company can use intellectual capital to work

effectively. Intellectual capital creates a competitive advantage and improves company performance (Dzenopoljac et al., 2017; Osinski et al., 2017). According to previous studies, the use of intellectual capital information can prevent material errors and omissions (Brennan, 2001; Smriti & Das, 2018). The use of intellectual capital can be one of the drivers of increasing business value.

Human capital provides a firm with market opportunities and competitive advantage in the market. This shows that the productivity, skills, and abilities of employees have a significant impact on profitability (Brennan, 2001). However, some studies have concluded that human capital has no effect on total capital return (Dzenopoljac et al., 2017; Smriti & Das, 2018).

Each company has structural capital that differentiates it from others, such as organizational culture, management philosophy, technology, and information resources create the identity of this organization. Some researchers (Bontis et al., 2000; Firer & Williams, 2003; Nadeem et al., 2018) have concluded that this differentiation has a positive effect on the company's profitability, while others have found that it does not (Ousama & Fatima, 2015).

Capital employed are physical resources that affect the ability to earn income, so they can increase the return on capital of total assets. Researchers have concluded that invested capital positively affects profitability and increases return on equity (Smriti & Das, 2018).

Many researchers have evaluated the impact of intellectual capital efficiency on financial performance in the banking sector (Tiwari & Vidyarthi, 2018; Vidyarthi & Tiwari, 2020). They noted in their paper that the efficiency of the capital employed must be considered. Because capital employed is the main asset of the bank operations.

One of the factors affecting the financial performance of a bank is the amount of total assets, as the scale of operations increases, total assets increase. Many researchers have studied the effect of total assets on bank performance. Many studies displayed different results such as: total assets has no effect on bank performance (Ozkan et al., 2017), has a positive effect (Nawaz & Haniffa, 2017), and has a negative effect (Mohapatra et al., 2019).

In the sense that a bank is engaged in a trust business, it works efficiently by collecting capital from others and circulating it. The results of many studies show that financial performance is negatively affected by spending on borrowed (Ozkan et al., 2017; Poh et al., 2018).

Profitability is often used to measure financial performance because it reflects the results of business operations. Profitability describes how well a company manages its business. Return on total assets and return on equity, which represent profitability, are often used to measure a company's financial performance. Return on total assets measures a company's ability to generate a return on assets over a period of time. Return on equity refers to the return on common stockholders and is considered one of the most important financial indicators for investor decision-making. A study on the performance of 33 banks in Pakistan found that human capital in the banking sector has a positive relationship

with return on total assets and return on equity (Haris et al. 2019), in a study of the performance of 143 banks in Eastern European countries, concluded that human capital has a negative relationship with the net interest margin (Căpraru & Ihnatov, 2014).

3. Theory/Empirical Model

We employed $VAIC^{TM}$, model to examine the value added of banking sector, introduced by Pulic (Pulic, 1998).

$$VA_i = OP_i + EC_i + A_i \tag{1}$$

Variables are:

VA_i: value added of i-th bank,

OP_i: operational profit of i-th bank,

EC_i: employment cost of i-th bank,

A_i: amortization cost of i-th bank.

Value added coefficient was calculated with following formula:

$$VAIC_i = HCE_i + SCE_i + CEE_i \tag{2}$$

HCE_i: Human capital efficiency of i-th bank,

SCE_i: Structural capital efficiency of i-th bank,

CEE_i: Capital employed efficiency of i-th bank.

However, the components of VAIC are calculated as follows:

$$CEE_i = \frac{VA_i}{EC_i} \tag{3}$$

HCE_i and SCE_i are calculated as follows:

$$HCE_i = \frac{VA_i}{EC_i} \tag{4}$$

$$SC_i = VA_i - EC_i \tag{5}$$

$$SCE_i = \frac{SC_i}{VA_i} \tag{6}$$

In Equations (4), (5) and (6), EC_i refers to the personnel expenses of the bank i and SC_i refers to the difference between VA_i and EC_i.

3.1. Human Capital Efficiency (HCE)

From the economics theory perspective, employee's knowledge, skills and experiences have significant impact on performance of company (Tran & Vo, 2018; Becker, 1964; Schult, 1961). Company's physical capital can be increased with the help of knowledge, skills, creativity, ideas and experiences of every individuals working in the company. Many researchers, including Ozkan et al. (2017), Nawaz & Ohlrogge (2022), showed that human capital have positive impact on financial performance of commercial bank. Therefore, we assumed that human capital have positive impact on bank's profitability and one of the important factor of efficiency in banking industry.

H1. Human capital have positive effect on bank's profitability.

3.2. Structural Capital Efficiency (SCE)

Structural Capital is composition of organization culture, environment, rules, guidelines, information technology and other non physical capitals which support expansion of physical assets used for business operation and its efficiency (Edvinsson, 1997). The structural capital was investigated as having positive effect on the performance of Vietnamese and Chinese banks (Vidyarthi & Tiwari, 2020; Xu et al., 2019; Tran & Vo, 2022) and opposite result have examined for Indian bank (Mohapatra et al., 2019). In this paper, we assumed that structural capital has a positive impact on bank operation.

H2. Structural Capital has positive effect on bank's profitability.

3.3. Capital Employed Efficiency (CEE)

Bank uses both physical and non physical capital for its operation. Even though intellectual capital is crucial for performance, physical capital also has a great role in improving performance (Pulic, 1998; Goh, 2005). Capital employed showed positive impact on bank's profitability from the Vietnam and Africa's experience (Tran & Vo, 2022; Adesina, 2018). Therefore, we state following assumption

H3. Capital Employed Efficiency has positive effect on bank's profitability.

3.4. Bank Size (Size)

Many studies on relation between bank's profitability and total asset have been conducted until now. Both positive and negative effects have examined. Some explained that bank earns higher return as total asset increases (Iannotta et al., 2007), on the other side, some studies showed negative relation. When bank has great amount of total asset, it becomes hard to manage and maintain these asset which results higher cost and lower profit (Pasiouras & Kosmidou, 2007). Hence, we included SIZE variable in model by using logarithm transformation on total asset.

H4. Bank size has positive or negative impact on bank's profitability.

3.5. Leverage (LEV)

Profitability can be improved by how well banks manage their borrowed fund. Leverage is significant drivers of bank efficiency as well (Vidyarthi, 2019). On the other side, the funds collected from other sources incur costs which negatively affect profitability. Therefore, leverage is included as a control variable and the following assumption is proposed. Leverage calculated by the ratio of total debt to total assets.

H5. Leverage is crucial for bank's profitability.

The idea that the success of the company is determined by the employees, their participation and performance is noted in many scientific articles (Bonet et al., 2011; Sims, 2002). Therefore, we chose to represent the performance of the

banking sector with return on total assets (ROA), return on equity (ROE), and net profit margin (NIM).

Return on total assets represents how effectively management team is using its assets to generate profits, while return on equity represents business performance for investors. Return on equity shows how well a company is using investments to generate earnings growth. The level of net profit shows how optimally the cost of resources is used for the bank and the total return obtained from the capital employed. Therefore, above indicators were selected as dependent variables to represent the bank's performance and evaluated the financial performance of the commercial bank with following models.

$$ROA = \beta_0 + \beta_1 HCE + \beta_2 SCE + \beta_3 CEE + \beta_4 LEV + \beta_5 SIZE + \varepsilon \quad (1)$$

$$ROE = \beta_0 + \beta_1 HCE + \beta_2 SCE + \beta_3 CEE + \beta_4 LEV + \beta_5 SIZE + \varepsilon \quad (2)$$

$$NIM = \beta_0 + \beta_1 HCE + \beta_2 SCE + \beta_3 CEE + \beta_4 LEV + \beta_5 SIZE + \varepsilon \quad (3)$$

3.6. Data Collection and Main References

In 1991, Bank Act was legislated and two-staged bank structure had been arranged in Mongolia. 12 commercial banks are operating in Mongolia by September, 2022. Among these 12 banks, M bank started its operation in 2022. Therefore, we used other 11 banks data due to continuity of data series such as human capital, structural capital, capital employed, leverage to examine the impact on financial performance of banks. Primary data was collected from annual reports, audited financial statements of each bank. Data set covers the period between 2011 and 2021. Only Bogd bank has been operating since 2014 and other banks' operation period fully covers selected period of this paper (Figure 1).

Total asset return (Figure 1), equity return and net interest margin of banks had decreased until 2016. This decreasing trend possibly resulted from net interest margin decrease due to competition between banks, specifically the systemically significant commercial bank impact were great. The increase of above

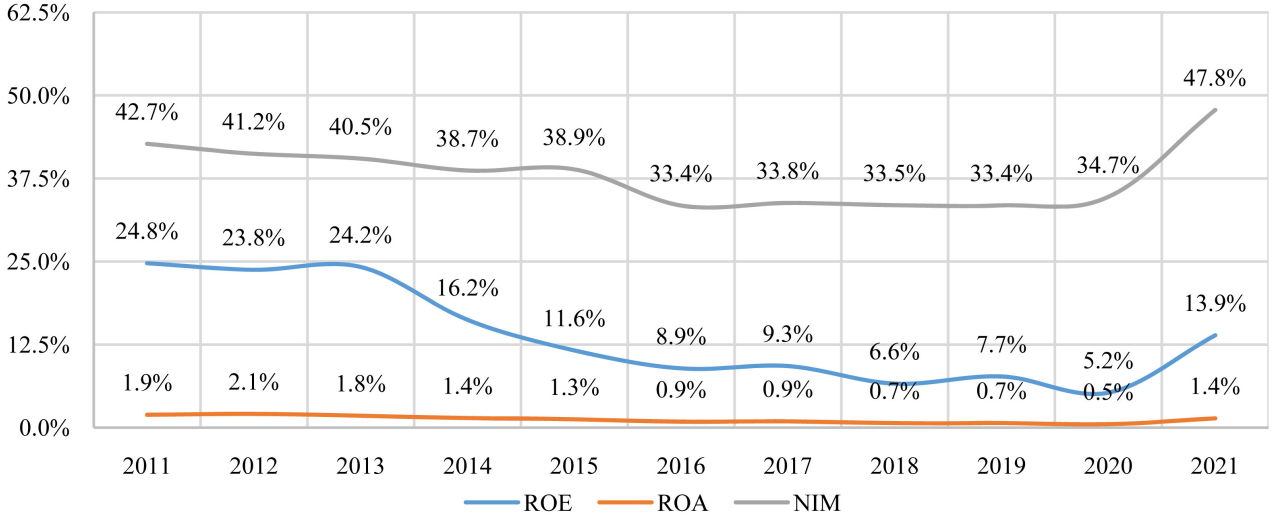

Figure 1. ROA, ROE, NIM of commercial banks. Source: Financial reports of Banks, authors' calculation.

indices in 2021 is caused by the implementation of law on "Prevention, Combat, and Reduction of Social and Economic Impacts of the COVID-19" which became effective from April 29th, 2020. Law clause "10.4 Interest rate income for current account and demand deposit account will not be payed during pandemic" played role in significantly decreasing funding cost of banks during pandemic (Table 1).

4. Empirical Results

In order to choose model between random effect model and fixed effect model, Hausman Random Effect Test was used and examined. Theoretically, if hypothesis 0 is rejected, fixed effect model is appropriate for examination and opposite result suggests random effect model. Statistical significance of model coefficients are tested with t-test under the following hypothesis H_0: $\beta_j = 0$ (j…, k). When p-value for given t statistics is calculated more than 0.1, variable is examined as not significantly significant in model. In that case, we exclude relevant variable from model and re-run the model calculation. R square indicates how well the selected independent variables are explaining the dependent variable of the model. About auto-correlation, Durbin Watson statistics measure is used in this model (Table 2).

For ROA model, hypothesis 0 of Hausman test was rejected and estimated fixed effect model. Selected independent variables in this model explain 98.5 percentage of dependent variable ROA according to the R squared.

For ROE model, hypothesis 0 of Hausman test was rejected and estimated fixed effect model. Selected independent variables in this model explain 59.2 percentage of dependent variable ROE. In order to prevent from auto-correlation issue, one period lagged variable is added in the estimation as seen in the table.

Table 1. Descriptive statistics of variables.

	ROA	ROE	NIM	HCE	CEE	SCE	SIZE	LEV
Mean	−0.000602	−0.095350	0.371660	1.989375	0.017580	0.068435	20.61087	0.881800
Median	0.008791	0.069324	0.365170	2.261402	0.023898	0.585595	20.84722	0.903287
Maximum	0.120080	0.807675	1.000000	9.761488	0.147325	2.537143	23.32324	1.808944
Minimum	−0.653364	−16.81047	−1.714923	−24.86275	−0.618787	−25.78201	16.10677	0.035260
Std. Dev.	0.070843	1.655518	0.284077	3.533487	0.069603	3.305866	1.708155	0.205508
Skewness	−7.687042	−9.940667	−3.647480	−4.752659	−7.457594	−6.641522	−0.321484	0.587424
Kurtosis	70.47231	100.8861	29.86030	35.89238	68.35522	48.20413	2.053262	14.56348
Jarque-Bera	20951.33	43649.14	3389.278	5128.637	19660.24	9711.855	5.730027	591.0381
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.056982	0.000000
Sum	−0.063185	−10.01178	39.02434	208.8843	1.845895	7.185657	2164.142	92.58899
Sum Sq. Dev.	0.521947	285.0369	8.392744	1298.495	0.503834	1136.590	303.4506	4.392282
Observations	105	105	105	105	105	105	105	105

Table 2. Factor regression analysis of bank profitability.

	Models		
	ROA	ROE	NIM
Lag 1		−1.5097*** (0.2099)	−0.4431*** (0.1247)
HCE		0.4498*** (0.0870)	0.0496** (0.0193)
SCE	0.0007*** (0.0002)		
CEE	0.9985*** (0.0126)	15.6162** (7.0507)	−2.8323*** (0.9442)
LEV		−2.4967*** (0.7227)	−1.4671*** (0.2089)
SIZE	0.0010** (0.0009)		
C	−0.0382*** (0.0095)	0.8617 (0.6377)	1.7804*** (0.2156)
R-squared	0.985	0.592	0.597
S. E. of regression	0.009	1.130	0.198
n	114	96	96
Durbin-Watson stat	1.104	1.617	1.924
Hausman test			
Chi-Sq. Stat	1.11	0.38	21.75
P-value	0.776	0.984	0.000

Source: Authors calculation.

For NIM model, hypothesis 0 of Hausman test was rejected and estimated fixed effect model as well as ROA model and ROE model. Selected independent variables in this model explain 59.7 percentage of dependent variable NIM. In order to prevent from auto-correlation issue, one period lagged variable is added in the estimation as seen in the table. From the result, the coefficient of lagged variable showed statistical significance and it indicates the current value of NIM is dependent on previous period NIM result.

Independent variable HCE has significant positive impact on both ROE and NIM. In other words, Human Capital Efficiency encourages equity return which shows demand on assessing human capital efficiency by stake holders. Since bank is service providing business, the employees often deal with customers which show positive effect on net interest margin. This result also proves hypothesis 1—Human capital have positive effect on bank's profitability.

SCE have significant impact only on ROA as shown in Table 2. Apart from human capital, structural capital is a type of non-physical capital that has a posi-

tive effect on physical capital utilization which also proved hypothesis 2. As banks expand their operations and increase their total assets, they should increase their investments in intellectual capital.

CEE displayed significant impact on ROA, ROE and NIM. This result also proves that capital employed have a quite great impact on bank performance.

SIZE showed significant positive impact on ROA. From regression result, for Mongolian commercial banks, return on asset rises as total asset value rises.

Only LEV showed significant negative impact on ROA and NIM. The funding cost rises along with the amount of borrowed funds, which lowers return on assets and has a negative impact on the net interest margin.

5. Conclusion

In this paper, we examined the contribution of human capital, structural capital and capital employed on bank performance using 11 commercial bank's financial data between 2011 and 2021, which are operating in Mongolia. The main results were as following: human capital efficiency showed positive impact on equity return and net interest margin, structural capital showed positive impact on total asset effectiveness, capital employed showed positive impact on bank performance figures. According to the results of the research, the optimal use of intellectual capital will create conditions for improving the financial performance of the banking sector. Therefore, encouraging human capital improvement can be beneficial for stake holders and management team to increase financial return. Mongolian commercial banks should measure and report their investments in human capital and make decisions based on it. One of the results of this paper suggests that employing both physical capital and intellectual capital can possibly increase financial performance of banks.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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