**Intellectual Capital and Bank Profitability: Evidence from Conventional and Islamic Bank in Indonesia**

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**Abstract**

This study investigates the effect of intellectual capital on conventional and Islamic bank profitability in Indonesia. Our data consist of conventional and Islamic banks operated in Indonesia form 2010 to 2016 annually. Since our data are panel, we employ panel regression. Intellectual capital is measured by using Value Added Intellectual Capital (VAIC). Our result show that intellectual capital has significant impact on bank profitability only in conventional bank. We also attempt to estimate the impact of VAIC component, such as Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE) and Capital Employed Efficiency (CEE), on conventional and Islamic bank profitability. The results show that HCE is strongly significant in both bank. However, CEE, only significant in Islamic banks, while SCE does not have significant effect on both type of bank profitability. Our results indicate that conventional banks synergize their intellectual and physical capital in creating profit better than Islamic banks. Thus, this research could be a critique to Indonesian Islamic banking industry in determining and overcome their weakness.

**Keywords:** bank profitability, Intellectual Capital, VAIC.

**JEL Classification:** G21, G32, G32

1. **Introduction**

In the recent years, knowledge-based resource has been considered as a factor that play important role in creating value and competitive advantage of the firms (Pablos, 2002). As a need to improve, resources which have been embedded within organization should be organized well. Then, the notion of intellectual capital is arise.

Indonesia is a potential market for islamic bank because the majority of people is moeslem. However, Islamic banks in Indonesia is lacked of growth. Indeed, islamic banks have achieved the target of market share, 5%. However, the market share islamic bank relatively remain stagnant. Some practitioners argue that islamic bank has inferior management skill compared to conventional banks. Thus, in this study we focus on investigate the effectiveness of intellectual capital in islamic an conventional banks. Intellectual capital is a concept that the ability of organization in digging information, organize the data, and using their asset effectively. This concept is mostly in the form of intangible asset and does not shown in financial statement. Intellectual capital may be more essential in islamic bank, rather than conventional bank since Islamic banking industry finances small micro enterprises more than conventional banking (Shaban et al, 2014). This activity largely relies on soft information and need creative method to extract. Thus, intellectual capital may become importance to Islamic banks. In addition, islamic banks investment options are more limited than conventional banks. For example, islamic banks can not invest their funds in derivative asset since it is considered as a gambling based on syariah law. Therefore, islamic bank manager should have abundant information to optimize their investment.

Our study focus the impact of intellectual capital application in banking industry since intellectual capital is more crucial in banking industry than any other industries. Banking industry uses a lot of intangible assets for its operation and survival (Kamath, 2007) and it is highly service-oriented industry (Meles et al. 2016). Nevertheless, most empirical intellectual capital studies only focus on conventional bank or islamic bank only. Thus, in this study, we attempt to include conventional banks and islamic banks. By examining both, we could compare and understand whether any differences of intellectual capital applied between them.

In this study, we examine the effect of intellectual capital on bank profitability. Our sample is 102 conventional banks and 12 Islamic banks operated in Indonesia between 2010 and 2016. VAIC developed by Pulic (1998) is chosen to measure intellectual capital since this indicator is widely recognized as intellectual capital measurement in many intellectual capital studies. This research has also contribution to islamic economics by examining the behavior of islamic banking. Based on Susamto (2018), our study has a contribution to islamic economics by evaluating the actual behavior of islamic banks in managing their intellectual capital and compare it to the behavior of conventional banks. Thus, our study can be an advice to move the behavior islamic banks to be closer to its ideal. In addition, the number of studies that using conventional and islamic banks data and comparing the result is relatively limited. Most of studies of intellectual capital only analyze either islamic banks, conventional banks, or never care its types.

Our study consists of five sections. The first section reveals the importance of this study. The second section explains the concept of intellectual capital and reviews some intellectual capital literature. The third section explains data, variables and methods. In the fourth section, the empirical results are reviewed. The last section summarizes the result of this study

1. **Hypotheses Development**

***The Development of Intellectual Capital***

In the last decade, intellectual capital has considered as an important driver in creating added value for the firms. However, intellectual capital is often shows as intangible assets and is not shown on balance sheet explicitly (Edvinsson, 1996). Thus, researchers have tried to take identify element that formed intellectual capital. Then, its lead to many varieties of definitions. Take for example; Martinez and Garcia-Meca (2005) propose that intellectual capital consists of knowledge, information, intellectual property and experience that can create wealth. Bayburina and Golovko (2009) explain that intellectual capital includes human capital, process capital, client capital, innovation capital, and network capital. (Bontis, 1999) defines intellectual capital as a set human capital, relational capital, and structural capital.

Human capital is defined as collection of individual or employees’ knowledge, skills and expertise that formed organization character (Bontis, 1999). It is the main source of innovation and strategic renewal within organization. Structural capital presents the mechanism and organization structures that support employee to generate their optimum performance and thus enhance organization’s competitive advantage (Bontis, 1999). Databases, organization chart, management processes, procedures and business strategies are items related to structural capital. Structural capital can be referred as an activity that have been planed and usually tend to have repetitive traits. Relational Capital (RC) is the complex relationship between organization and external world (Meles, et al 2016). Relational Capital refers to all intangible assets, which regulate and manage the relationships of an organization. It comprises the organization's relationships with its customers, suppliers, shareholders and other stakeholders (Ozkan et al. 2017).

However, there is no measurement that can represent those three elements perfectly. The indicators expressing intellectual capital tend to apply subjective judgment (Pulic, 1998). Thus, Pulic (1998) propose indicators that can minimize the bias, namely value added intellectual coefficient (VAIC). Based on operational definition, VAIC calculates the contribution of human capital, structural capital, and physical capital in creating value added for the firm. It changes relational capital to physical capital because physical capital can be expressed and calculated in monetary terms easier than relational capital. Physical capital has important role in creating value added because it helps human capital and structural capital to perform well. Firms that have better physical capital can provide more facilities and utilities to support employee in applying their knowledge and procedures. Nowadays, VAIC is widely accepted in almost every intellectual capital empirical studies in measuring intellectual capital.

Pulic’s concept of intellectual capital also aligns with resource-based view. Resource-based view sees the exploitation of physical capital in firm needs socially complex resources (Barney, 1991). Firms that posses this socially complex resources can fully exploit their physical capital efficiently more than other firms. These socially complex resources are intangible asset associated with culture, knowledge, social relations, business strategy, etc.

There are a lot of studies that have conducted by various researchers. Using 17 islamic banks in Malaysia, Ousama and Fatima (2015) found VAIC had positive effect on return on asset and return on equity. They also found that all components of VAIC had positive effect on return on equity, while only CEE that had positive effect on return on asset. Using 5749 annually US banks from 2005 to 2012, Meles et al. (2016) found that VAIC had positive effect on return on average assets and return on average equity.

Some studies have found other results regarding on the correlation between VAIC and bank profitability. Ozkan et al. (2017) using data of 44 Turkey banks found that there was no significant effect between VAIC and return on asset. For VAIC components, only HCE and CEE had positive effect on return on asset. Puntillo (2009), using data of 21 banks listed in Italian Stock Exchange, found that only CEE that has positive impact on return on asset.

Previous empirical studies were mostly only focused on one type of bank, neither islamic nor conventional banks only. Thus, we try to fill the gap by investigate the impact of intellectual capital on islamic banks and conventional banks simultaneously. In this research, we investigate the relationship of intellectual capital and its component based on VAIC on bank profitability in islamic bank and conventional banks located in Indonesia.

In this research, we investigate the relationship of VAIC and its component on bank profitability in islamic bank and conventional banks located in Indonesia. Based on the phenomenon and current debates, some hypotheses are able to be formulated:

H1: The value added intellectual capital coefficient (VAIC) has positive effect on return on asset

H2: Human capital efficiency coefficient (HCE) ) has positive effect on return on asset

H3: Structural capital efficiency coefficient (SCE) ) has positive effect on return on asset

H4: Capital employed efficiency coefficient (CEE) ) has positive effect on return on asset

1. **Method, Data, and Analysis**

Our sample consists of islamic banks and conventional banks, both are listed and unlisted in capital market, operated in Indonesia. There are 114 banks, 102 conventional banks and 12 islamic banks. Our data are annually, collected from 2010 to 2016. It were collected from Financial Services Authority of Indonesia (OJK). In this study, we only examine banks that currently are still operating in Indonesia. In order to have better standard error, we use clustering standard error in each methods (Cameron and Miller, 2015). Bank level cluster is used to control unobserved effect across bank.

Our dependent variable is return on asset ratio. This variable reflects bank profitability. It generates from the ratio of net income to total asset. This ratio measure the ability of a firm in generating income on certain level of total asset it had.

There are two main independent variables in our research. The first variable represents intellectual capital. Intellectual capital is measured by Value added intellectual capital (). This measurement is founded by Pulic (1998). , is composed by three component. They are human capital efficiency (), capital employed efficiency () and structural capital efficiency (). This component also included separately with VAIC as main independent variables since measures all whole components in one measurement. By examine it separately, we could found which component is more important in creating bank profitability.

In order to calculate and its components, the total value added () is needed to be calculated first. is the organization’s ability to in creating value added. It is calculated as the difference between output and input. The output is the total revenue generated by the services provided by the bank to the clients and the input is all the expenses occurred during the production minus personnel expense.

Human capital efficiency () is defined as the contribution of one unit of human capital expenses on value added. The human capital expenses () based on bank’s overall payroll.

The second component is . This phase measures the contibution of structural capital () in generating value added. is calculated by substracting from . Here is the formula:

The last component, represents the contribution of tangible asset on bank value added. Having good tangible asset (physical and financial asset), intellectual capital will perform more effective and efficient, for example, bank that has good computer server can reduce the number of error then increase customers satisfaction in transferring their money. In this formula, refers to the sum of physical and financial capital of the banks (Chen et al., 2005). Here is the formula of calculating CE and CEE:

To prevent omitted variable bias, control variables are included. Those variables consist of two categories, such as bank level variables and macroeconomics variables. Bank level variables are banks size, capital ratio, loan loss provision ratio, loan ratio and bank efficiency. Inflation and growth of gross domestic product are macroeconomic variables.

Bank size is measured as natural logarithm of banks total asset (LnTA). Bank with large size has economic of scale, reducing it cost significantly (Bourke, 1989; Goddard et al 2004). Thus, we expect bank size has positive effect on bank profitability. Capital ratio, measured by equity to total asset (CAP), reflects additional power of bank to face financial crises or unstable macroeconomic condition (Menicucci and Paolucci, 2016). well capitalized banks tend to have less cost of capital, causing a positive effect on bank profitability. Loan loss provision shows how much expense set aside as an allowance for uncollected loans relative to its total loans (LLP). In other words, this ratio reflects bank’s loan portfolio quality. The high number of this ratio indicates higher risk of the loan portfolio and, therefore, a lower profitability (Miller and Noulas, 1997). Thus, we expect loan loss provision ratio negatively affect bank profitability. Total loan to total asset or famously called as loan ratio (LOANTA) is ratio that reflect the ability of bank to fulfill the loan relative to its total asset. The impact of loan ratio on bank profitability is very difficult to predict. Higher loan ratio may lead to higher credit risk and, therefore, reduces its profitability (Staikauras and Wood, 2004). However, bank with high loan ratio may have high profit as the consequences of the added business activity. Even though this variable has no steady impact direction on bank profitability, we still include this variable to avoid omitted variable bias.

For macroeconomic variables, inflation (INF) and growth of gross domestic product (GrGDP) are included in our models. Demirguc-Kunt and Huizinga (2000) identify that business cycle can be reflected by growth of gross domestic product. They found growth of gross dometic product has positive association with bank profitability. For inflation, it has no fix association with bank profitability. Some studies found that there is positive association with bank profitability (Demirguc-Kunt and Huizinga, 2000; Tan and Floros, 2012), while others found reversed result (Sufian and Chong, 2008). Boyd and Champ (2006) suggest that if future inflation can be anticipated by banks and the rate of inflation is not extreme, it will not harm bank profitability

1. **Results**

***Statistic Descriptive and Correlation Matrix***

Our data are unbalanced and collected annually from 2010 and 2016. The total observations are 793 observations, 713 for conventional banks and 80 for islamic banks. Our statistic descriptive shows mean, standard deviation, minimum value, maximum value and Mann-Whitney z-test result. This descriptive statistic shows the basic profiles and differences between conventional and islamic banks data. Before we compare the profile of conventional and islamic banks, we found an odd as it is shown on the table above. The value of loan loss provision of conventional banks is zero. Thus, we try to find the explanation. Based on data, we found that four foreign conventional banks have zero loan loss provision. Our finding aligns with Financial Services Authority (OJK) since they have asked foreign bank to give more contribution on Indonesia economy.

TABLE 1. Statistic Descriptive

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Variable | Conventional Banks | | | | | Islamic Banks | | | | | z-test |
| Obs | Mean | Std. Dev. | Min | Max | Obs | Mean | Std. Dev. | Min | Max |  |
| ROA | 713 | 0.013 | 0.015 | -0.117 | 0.053 | 80 | 0.004 | 0.027 | -0.169 | 0.056 | 5.588\*\*\* |
| LLP | 713 | 0.021 | 0.032 | 0.000 | 0.613 | 80 | 0.033 | 0.057 | 0.009 | 0.414 | -5.760\*\* |
| LOANTA | 713 | 0.629 | 0.114 | 0.092 | 0.880 | 80 | 0.685 | 0.123 | 0.082 | 0.890 | -5.719\*\*\* |
| CAP | 713 | 0.149 | 0.096 | -0.009 | 0.889 | 80 | 0.167 | 0.124 | 0.055 | 0.613 | 0.834 |
| VAIC | 713 | 2.870 | 2.381 | -22.40 | 18.45 | 80 | 2.731 | 3.687 | -11.61 | 29.30 | 1.883\* |
| HCE | 713 | 2.340 | 1.942 | -16.06 | 17.47 | 80 | 1.759 | 2.124 | -12.52 | 6.400 | 2.630\*\*\* |
| SCE | 713 | 0.479 | 1.156 | -22.45 | 11.77 | 80 | 0.931 | 3.284 | -0.127 | 29.34 | 1.128 |
| CEE | 713 | 0.051 | 0.260 | -0.126 | 5.382 | 80 | 0.040 | 0.044 | -0.169 | 0.181 | -0.618 |
| LnTA | 713 | 16.21 | 1.700 | 11.797 | 20.68 | 80 | 15.66 | 1.334 | 12.727 | 18.18 | 2.840\*\*\* |
| GrGDP | 713 | 0.056 | 0.005 | 0.049 | 0.065 | 80 | 0.056 | 0.005 | 0.049 | 0.065 | 0.211 |
| INF | 713 | 0.054 | 0.022 | 0.030 | 0.083 | 80 | 0.054 | 0.022 | 0.030 | 0.083 | 0.100 |

ROA denotes return on asset, VAIC denotes value added intellectual capital, LLP denotes loan loss provision, LOANTA denotes loan to total asset, CAP denotes equity to total asset, LnTA denotes natural logarithm of total asset, GrGdp denotes growth of gross domestic product, and INF denotes inflation rate. Asterisk (\*\*\*), (\*\*) and (\*) indicate statistically difference at 1%, 5%, and 10% significance level

Overall, the performance indicators show that conventional banks have outperform islamic banks. Based on return on asset, the value of average return on asset of conventional banks surpasses islamic banks significantly. The average value of loan loss provision of conventional banks is also significantly less than islamic banks. It indicates that the quality of conventional banking industry loan is better than islamic banking industry. The average value of loan ratio of islamic banks strongly exceeds conventional banks. It means islamic banks have more courage to put their asset more on credit. Our statistic descriptive also shows that the average value of ln total asset of conventional banks is significantly bigger than islamic banks. For the intellectual capital indicators, VAIC and HCE shows significantly difference between islamic and conventional banks. Its show that conventional banks, on the average, have VAIC and HCE higher than islamic banks.

In addition, we also shows correlation matrix of each independent variables in order to show that there is no multicolinearity. Since we conduct two regressions based on the type of banks, conventional and islamic banks, we also divide our correlation matrix into two category. We also omit the correlation of VAIC on its component since by definition, the correlation of VAIC on its component, HCE, SCE and CEE, must be have correlation. To make our table more efficient, we show two correlation matrixes on one table. The correlation matrix of conventional banks data are shown in bold letter, while islamic banks are in italic letter. Our result shows that there is no value more than 0.800. Thus, we can conclude that there is multicolienarity on each independent variable.

Table 2. Correlation Matrix

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | LLP | LOANTA | CAP | VAIC | HCE | SCE | CEE | LnTA | GrGDP | INF |
| LLP | 1 | *0,134* | *0,292* | *-0,418* | *-0,726* | *0,009* | *-0,6* | *-0,113* | *-0,199* | -0,192 |
| LOANTA | **0.008** | 1 | *-0,432* | *-0,341* | *-0,3* | *-0,187* | *-0,176* | *0,509* | *-0,405* | -0,025 |
| CAP | **-0.065** | **-0.187** | 1 | *0,158* | *0,032* | *0,157* | *-0,07* | *-0,638* | *0,171* | -0,025 |
| VAIC | **-0.067** | **0.103** | **-0.102** | 1 | *0,47* | *0,815* | *0,259* | *-0,225* | *0,298* | 0,168 |
| HCE | **-0.102** | **0.107** | **-0.112** | **0.868** | 1 | *-0,128* | *0,662* | *0,028* | *0,238* | 0,22 |
| SCE | **0.034** | **0.023** | **-0.024** | **0.567** | **0.098** | 1 | *-0,151* | *-0,271* | *0,18* | 0,045 |
| CEE | **-0.005** | **0.047** | **0.002** | **0.154** | **0.050** | **0.011** | 1 | *0,046* | *0,113* | 0,149 |
| LnTA | **0.157** | **0.159** | **-0.442** | **0.223** | **0.243** | **0.051** | **-0.001** | 1 | *-0,293* | -0,048 |
| GrGDP | **0.047** | **-0.170** | **-0.033** | **0.060** | **0.064** | **0.024** | **-0.036** | **-0.189** | 1 | 0,171 |
| INF | **-0.024** | **0.030** | **-0.054** | **0.055** | **0.071** | **0.004** | **-0.045** | **-0.042** | **0.170** | 1 |

ROA denotes return on asset, VAIC denotes value added intellectual capital, LLP denotes loan loss provision, LOANTA denotes loan to total asset, CAP denotes equity to total asset, LnTA denotes natural logarithm of total asset, GrGdp denotes growth of gross domestic product, and INF denotes inflation rate

***Regression Analysis***

In these regression analyses, Fixed effect is chosen because our data is panel. By using this method, we can minimize error time invariant compared to ordinary least square (OLS). However, we also show the result using OLS method to check the result consistency and stability. In this study, we classify the analysis into two, full sample and split the sample by bank type.

Table 3. Regression Result: The Effect of VAIC on Bank Profitability

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Full Sample | | | Full Sample | | |
|  | Fixed Effect | | | OLS | | |
|  | (1) | (2) | (3) | (1) | (2) | (3) |
| VARIABLES | ROA | ROA | ROA | ROA | ROA | ROA |
|  |  |  |  |  |  |  |
| VAIC | 0.003\*\* | 0.002\*\* | 0.002\*\* | 0.003\*\*\* | 0.003\*\*\* | 0.002\*\*\* |
|  | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| LLP |  | -0.167 | -0.159 |  | -0.149\*\* | -0.154\*\* |
|  |  | (0.129) | (0.120) |  | (0.070) | (0.069) |
| LOANTA |  | -0.005 | 0.001 |  | -0.005 | -0.000 |
|  |  | (0.011) | (0.011) |  | (0.008) | (0.008) |
| CAP |  | -0.006 | 0.021\* |  | -0.004 | 0.001 |
|  |  | (0.009) | (0.012) |  | (0.011) | (0.011) |
| LnTA |  | -0.003\*\* | 0.006 |  | 0.002\*\* | 0.002\*\*\* |
|  |  | (0.001) | (0.004) |  | (0.001) | (0.001) |
| GrGDP |  |  | 0.799\*\*\* |  |  | 0.556\*\*\* |
|  |  |  | (0.281) |  |  | (0.094) |
| INF |  |  | 0.040\*\* |  |  | 0.033\*\*\* |
|  |  |  | (0.016) |  |  | (0.011) |
| Constant | 0.003 | 0.057\*\*\* | -0.134\* | 0.003 | -0.013 | -0.057\*\*\* |
|  | (0.004) | (0.018) | (0.080) | (0.003) | (0.012) | (0.015) |
|  |  |  |  |  |  |  |
| R-square | 0.234 | 0.365 | 0.411 | 0.217 | 0.329 | 0.359 |
| Observations | 793 | 793 | 793 | 793 | 793 | 793 |
| Number of Bank | 116 | 116 | 116 | 116 | 116 | 116 |

ROA denotes return on asset, VAIC denotes value added intellectual capital, LLP denotes loan loss provision, LOANTA denotes loan to total asset, CAP denotes equity to total asset, LnTA denotes natural logarithm of total asset, GrGdp denotes growth of gross domestic product, and INF denotes inflation rate. Asterisk (\*\*\*), (\*\*) and (\*) indicate statistically significant at 1%, 5%, and 10% significance level. Figures in round (.) brackets are clusteredstandard error while the value above it is coefficient value.

Table 3 shows the impact of VAIC on ROA in Indonesia banking industry. VAIC has positive effect on return on asset. the results show that the effect of VAIC remain positive significant (p-value < 0.01), though macroeconomics and bank specific variables have included. When OLS method is applied, the level of significance of VAIC is increased.

Besides, we also analyze the effect of VAIC on ROA based on bank classification, conventional and islamic banks. Thus, we split our sample based on bank type. Fixed effect is chosen since it can reduce time invariant error. The results show that the effect of VAIC remain positive significant (p-value < 0.01), though macroeconomics and bank specific variables have included. For control variables, INF and GrGDP have strong positive effect on ROA. Contrast to conventional banks, the effect of VAIC on ROA in islamic banks is not significant in every test. In addition, macroeconomic variables has no significant effect on ROA in islamic, only bank specific effect that have significant impact on ROA. LLP and LOANTA have negative effect on ROA, while CAP and LnTA have positive ones.

Table 4. Split Sample Regression Result: The Effect of VAIC on Bank Profitability

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Conventional Banks | | | Islamic Banks | | |
|  | Fixed Effect | | | Fixed Effect | | |
|  | (1) | (2) | (3) | (1) | (2) | (3) |
| VARIABLES | ROA | ROA | ROA | ROA | ROA | ROA |
|  |  |  |  |  |  |  |
| VAIC | 0.003\*\*\* | 0.003\*\*\* | 0.003\*\*\* | 0.003 | 0.000 | 0.001 |
|  | (0.001) | (0.001) | (0.001) | (0.004) | (0.001) | (0.001) |
| LLP |  | -0.026 | -0.028 |  | -0.433\*\*\* | -0.392\*\*\* |
|  |  | (0.071) | (0.067) |  | (0.051) | (0.050) |
| LOANTA |  | 0.009 | 0.013 |  | -0.047\*\* | -0.039\* |
|  |  | (0.008) | (0.009) |  | (0.019) | (0.019) |
| CAP |  | -0.011 | 0.006 |  | 0.004 | 0.032 |
|  |  | (0.008) | (0.009) |  | (0.023) | (0.034) |
| LnTA |  | -0.004\*\*\* | 0.001 |  | 0.006 | 0.017\*\*\* |
|  |  | (0.001) | (0.002) |  | (0.004) | (0.004) |
| GrGDP |  |  | 0.472\*\*\* |  |  | 1.082\*\*\* |
|  |  |  | (0.158) |  |  | (0.293) |
| INF |  |  | 0.034\*\*\* |  |  | -0.021 |
|  |  |  | (0.010) |  |  | (0.028) |
| Constant | 0.005 | 0.073\*\*\* | -0.043 | -0.005 | -0.048 | -0.291\*\*\* |
|  | (0.003) | (0.015) | (0.044) | (0.011) | (0.052) | (0.072) |
|  |  |  |  |  |  |  |
| R-square | 0.259 | 0.301 | 0.331 | 0.208 | 0.874 | 0.885 |
| Observations | 713 | 713 | 713 | 80 | 80 | 80 |
| Number of Bank | 104 | 104 | 104 | 12 | 12 | 12 |

ROA denotes return on asset, VAIC denotes value added intellectual capital, LLP denotes loan loss provision, LOANTA denotes loan to total asset, CAP denotes equity to total asset, LnTA denotes natural logarithm of total asset, GrGdp denotes growth of gross domestic product, and INF denotes inflation rate. Asterisk (\*\*\*), (\*\*) and (\*) indicate statistically significant at 1%, 5%, and 10% significance level. Figures in round (.) brackets are clusteredstandard error while the value above it is coefficient value.

In order to determine the specific component of intellectual capital which has impact on profitability, we conduct several regressions. Table 5 shows the effect of VAIC components on ROA. Similar to previous test, Fixed effect and OLS is applied. The result of table 5 shows that only HCE is the most important element of VAIC in generating profit. The result is strong since the efffect of HCE is consistent in every model. Other component has no significant effect. For macroeconomics, GrGDP has consistent positive significant effect on the profitability .

Table 5. Regression Result: The Effect of VAIC Component on Bank Profitability

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Full Sample | | | Full Sample | | |
|  | Fixed Effect | | | OLS | | |
|  | (1) | (2) | (3) | (4) | (5) | (6) |
| VARIABLES | ROA | ROA | ROA | ROA | ROA | ROA |
|  |  |  |  |  |  |  |
| HCE | 0.007\*\*\* | 0.007\*\*\* | 0.006\*\*\* | 0.005\*\*\* | 0.004\*\*\* | 0.004\*\*\* |
|  | (0.001) | (0.001) | (0.001) | (0.002) | (0.001) | (0.001) |
| SCE | -0.000 | -0.000 | -0.000 | -0.000 | 0.000 | 0.000 |
|  | (0.000) | (0.000) | (0.000) | (0.001) | (0.001) | (0.001) |
| CEE | -0.001 | -0.001 | -0.001 | 0.003 | 0.003 | 0.003 |
|  | (0.001) | (0.001) | (0.001) | (0.004) | (0.004) | (0.004) |
| LLP |  | -0.094 | -0.092 |  | -0.123\* | -0.128\*\* |
|  |  | (0.088) | (0.083) |  | (0.065) | (0.064) |
| LOANTA |  | -0.002 | 0.003 |  | -0.006 | -0.001 |
|  |  | (0.009) | (0.008) |  | (0.009) | (0.009) |
| CAP |  | 0.010 | 0.027\*\* |  | -0.005 | 0.000 |
|  |  | (0.008) | (0.012) |  | (0.012) | (0.012) |
| LnTA |  | -0.003\*\* | 0.003 |  | 0.001 | 0.001\*\* |
|  |  | (0.001) | (0.002) |  | (0.001) | (0.001) |
| GrGDP |  |  | 0.564\*\*\* |  |  | 0.507\*\*\* |
|  |  |  | (0.167) |  |  | (0.100) |
| INF |  |  | 0.017 |  |  | 0.025\*\* |
|  |  |  | (0.012) |  |  | (0.011) |
| Constant | -0.004 | 0.043\*\* | -0.089\* | 0.001 | -0.007 | -0.047\*\*\* |
|  | (0.003) | (0.018) | (0.049) | (0.003) | (0.012) | (0.015) |
|  |  |  |  |  |  |  |
| R-square | 0.597 | 0.645 | 0.665 | 0.339 | 0.408 | 0.433 |
| Observations | 793 | 793 | 793 | 793 | 793 | 793 |
| Number of Bank | 116 | 116 | 116 | 116 | 116 | 116 |

ROA denotes return on asset, HCE denotes human capital efficiency, SCE denotes structural capital efficiency, CEE denotes capital employed efficiency, LLP denotes loan loss provision, LOANTA denotes loan to total asset, CAP denotes equity to total asset, LnTA denotes natural logarithm of total asset, GrGdp denotes growth of gross domestic product, and INF denotes inflation rate. Asterisk (\*\*\*), (\*\*) and (\*) indicate statistically significant at 1%, 5%, and 10% significance level. Figures in round (.) brackets arestandard error while the value above it is coefficient value

Similat to previous test, we also examine the effect of VAIC components on bank profitability based bank type. fixed effect is conducted in this analysis. The result of table 6 shows that HCE is the most important element of VAIC, both for conventional and islamic banks in generating profit (p-value < 0.01). Other component has no effect on bank profitability. For bank specific control variables, only loan loss provision has significant roles in generating ROA. Nevertheless, this effect is only occurred in Islamic banks LLP and LnTA have signficant effect on ROA. Our finding also find that INF and GrGDP have significant effect on the profitability of conventional bank, while inflation is only has significant effect on the profitability of islamic bank.

Table 4. Split Sample Regression Result: : The Effect of VAIC Component on Bank Profitability

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Conventional Banks | | | Islamic Banks | | |
|  | Fixed Effect | | | Fixed Effect | | |
|  | (1) | (2) | (3) | (4) | (5) | (6) |
| VARIABLES | ROA | ROA | ROA | ROA | ROA | ROA |
|  |  |  |  |  |  |  |
| HCE | 0.006\*\*\* | 0.006\*\*\* | 0.005\*\*\* | 0.008\*\*\* | 0.005\*\*\* | 0.005\*\*\* |
|  | (0.001) | (0.001) | (0.001) | (0.002) | (0.001) | (0.001) |
| SCE | 0.000 | 0.000 | 0.000 | 0.000 | -0.000 | -0.000 |
|  | (0.001) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| CEE | -0.001 | -0.000 | -0.000 | 0.260 | 0.131 | 0.112 |
|  | (0.001) | (0.001) | (0.001) | (0.194) | (0.074) | (0.085) |
| LLP |  | -0.009 | -0.011 |  | -0.221\*\*\* | -0.214\*\*\* |
|  |  | (0.049) | (0.046) |  | (0.017) | (0.026) |
| LOANTA |  | 0.008 | 0.012 |  | -0.012\* | -0.009 |
|  |  | (0.009) | (0.009) |  | (0.006) | (0.006) |
| CAP |  | 0.001 | 0.016\* |  | 0.031 | 0.034 |
|  |  | (0.007) | (0.009) |  | (0.018) | (0.024) |
| LnTA |  | -0.004\*\*\* | 0.001 |  | 0.004 | 0.007 |
|  |  | (0.001) | (0.002) |  | (0.002) | (0.004) |
| GrGDP |  |  | 0.445\*\*\* |  |  | 0.452 |
|  |  |  | (0.137) |  |  | (0.252) |
| INF |  |  | 0.021\* |  |  | -0.066\*\* |
|  |  |  | (0.011) |  |  | (0.024) |
| Constant | -0.000 | 0.054\*\*\* | -0.053 | -0.021\*\*\* | -0.061 | -0.141 |
|  | (0.002) | (0.016) | (0.040) | (0.004) | (0.040) | (0.085) |
|  |  |  |  |  |  |  |
| R-square | 0.485 | 0.511 | 0.534 | 0.901 | 0.974 | 0.979 |
| Observations | 713 | 713 | 713 | 80 | 80 | 80 |
| Number of Bank | 104 | 104 | 104 | 12 | 12 | 12 |

ROA denotes return on asset, HCE denotes human capital efficiency, SCE denotes structural capital efficiency, CEE denotes capital employed efficiency, LLP denotes loan loss provision, LOANTA denotes loan to total asset, CAP denotes equity to total asset, LnTA denotes natural logarithm of total asset, GrGdp denotes growth of gross domestic product, and INF denotes inflation rate. Asterisk (\*\*\*), (\*\*) and (\*) indicate statistically significant at 1%, 5%, and 10% significance level. Figures in round (.) brackets are standard error while the value above it is coefficient value

1. **Discussion**

Based on table 3 and 4, using VAIC as intellectual capital measurement, our results show that intellectual capital has positive significant effect on bank profitability. However, this effect is mostly enjoyed by conventional banks. It indicates in split sample regression result based on bank type. This result indicates that islamic banks have little capability to synergy their intellectual capital and physical asset to create profit effectively.

Based on table 5 and 6, using its component, HCE has essential role in both conventional and islamic banks. It means that HCE is the most important intellectual capital component in creating profit. But, LLP give significant relationship ROA only in Islamic banks. Based on this method, the differences of VAIC and its component between conventional and islamic banks is quiet significant.

1. **Conclusion, Limitations, and Suggestions**

**Conclusion**

In this study, we have provided empirical evidence of the contribution of intellectual capital and its component on bank performance by considering the differences type of bank. Our sample cover all banks operated in Indonesia from 2010 to 2016. Using panel data, intellectual capital plays pivotal role in creating bank profitability only in conventional banks. In contrast, intellectual capital has no significant effect on islamic banks profitability. When intellectual capital is decomposed into sub-component, human capital has major positive effect on bank profitability, both in islamic and conventional banks. Another finding, CEE is only positive significant on islamic bank profitability.

Our analysis may have important implications for managers. Our study can be a critique for Indonesia banking industry, especially islamic banks. The performance of islamic banks is less than conventional banks. Thus, compared to conventional banks, the level of intellectual capital in islamic bank is severe. Besides considering its level, our result indicates conventional banks have better ability in managing its intellectual capital to create profit. In this paper, we suggest that Islamic banks should learn how managing its intellectual capital. They could learn to its counterpart, conventional banks. Another solution, they can hire experienced employee from former conventional banks to introduce the culture and method of how intellectual capital is organized.

**Limitation and suggestions**

We are aware that our study could be bias since we only conduct empirical test in Indonesia. This weakness would raise a question about whether other countries experiences similar condition. Thus, further research should be conducted in other countries. For the next study, this research can also be focused on the application of intellectual capital. Culture and knowledge accumulation should be investigated, especially in islamic banks. Future studies could analyze whether banks in Indonesia, especially islamic banks have openness to new culture. Thus, the approach should not only limited to quantitative, but also qualitative. In addition, other financial institution such as insurance companies and investment trusts should be included. Indeed, comparing to other financial institution, banking industry is still the most essential in Indonesia. However, they have similar characteristic in using intangible assets for its operation. Thus, future studies may cover all companies operating in finance sector

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