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INTELLECTUAL CAPITAL, INCOME DIVERSIFICATION AND BANK PERFORMANCE IN INDONESIA'S REGIONAL DEVELOPMENT BANKS

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ABSTRACT

Indonesia's economic growth has demonstrated quite impressive achievements in recent years due to the support from the banking sector in stimulating the economy. However, the high performance of the national banking has not been aligned by the Regional Development Banks' (BPD) performances. Thus, this study was conducted to investigate variables that affect BPD performance, such as intellectual capital and income diversification. This study also tested the moderating effect of income diversification between intellectual capital on bank performance. This study used panel data containing financial reports for 23 BPDs in Indonesia. We took annual data from the Financial Services Authority of the Republic of Indonesia with an observation period for the last 16 years (2008-2023). The results of this study show that intellectual capital & income diversification have a positive and significant effect on bank performance. Finally, for testing the moderation effect, this study shows that income diversification provides a moderation effect that can significantly weaken the influence of intellectual capital on bank performance.

Keywords: Bank performance, Intellectual capital, Income diversification.

INTRODUCTION

Indonesia's economic growth has demonstrated quite impressive achievements in recent years, according to the Central Statistics Agency (2024), Indonesia's GDP (Gross Domestic Product) reached IDR 20,894 trillion in 2023, or the highest GDP contributor in the ASEAN region (ASEAN, 2023). Indonesia is also one of the few countries that has a GDP above $1 trillion and has been trusted to become the president of the G-20 countries, the group of countries that have the highest share (90%) of the world's total GDP. (Taylan et al, 2022; Umar & Indriyani, 2022; Saputra & Ali, 2021). The Indonesia's economic growth is supported by a healthy banking system as the main pillar of national economic (Husodo & Wojtyla, 2018; Alkhouri & Arouri, 2019), and several studies have also shown that the strong performance of the banking sector has a positive impact for a country's economic development (Maji & Hussain, 2021; Ahamed et al, 2021; Akomea-Frimpong et al, 2022).

The hope for contributing positively to the economy has also motivated the Government of the Republic of Indonesia has issued Law Number 13 of 1962 to establish Regional Development Banks (BPD). However, based on data from the Financial Services Authority of the Republic of Indonesia (2024), BPD performance is still not optimal compared to the total national banking. BPD assets in 2023 were only IDR 910 trillion and are still far behind the total national banking assets of IDR 11,765 trillion (OJK, 2024). This figure shows that BPD only contributes 7.73% in proportion to the market share of national banking assets. Meanwhile, based on profitability comparisons, BPD's ROA (Return on Assets) in 2023 was still relatively small (only 1.98%) and still lagged behind the national banking ROA of 2.78% (OJK, 2024).

Based on the data above, a study conducted to examine BPD performance and variables that affect it is urgent. Previous studies stated that an important variable in improving organizational performance is intellectual capital

(Chinnasamy et al, 2024; Tjahjadi et al, 2024; Rahman & Liu, 2023, Gogan et al, 2016). In the banking context, intellectual capital becomes very relevant and needed for conducting operational activities (Mollah & Rouf, 2022; Alhassan & Asare, 2016; Mention & Bontis, 2013). However, although many previous studies stated that intellectual capital has a positive effect on improving firm performance, the other studies stated this variable does not have a significant effect and even has a negative effect on firm performance (Dzenopoljac, 2016; Makmur et. al, 2022; Halim & Wijaya, 2020).

Furthermore, previous studies also showed that maximizing intellectual capital on firm performance can be utilized through strategic actions, such as income diversification (Ramanathan et al, 2016). Income diversification based on the previous studies will enable banks to use all potential resources including their knowledge to improve their performances (Merino et al, 2014; Ramanathan et al, 2016). However, studied by Githaiga (2023) to test the moderating effect of income diversification between intellectual capital and firm performance showed negative results.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Intellectual Capital and Bank Performance

By definition, intellectual capital is a component of knowledge that has economic value and capitalizes it to an organization (Bansal et al, 2023, Al-Rowwad et al, 2020; Andreeva & Garanina, 2016; Zahedi & Khanachah, 2021; Soewarno & Tjahjadi, 2020). This ability to capitalize on value has also scholars placed intellectual capital as an intangible asset in the company's asset structure, Therefore the investment in intellectual capital is considered more promising for firm sustainability rather than in other assets such as land and machinery (Aslam & Haron, 2021; Shahwan & Fathalla, 2020; Akkas & Asutay, 2022).

In examining its role in improving organizational performance, scholars have also conducted many tests on the relationship between these two variables. The general results concluded that intellectual capital has a positive and significant effect on organizational performance (Chinnasamy et al, 2024; Tjahjadi et al, 2024; Rahman & Liu, 2023; Isola et al, 2020). However, other studies also showed that intellectual capital has not a significant effect on organizational performance (Dzenopoljac, 2016).

In several cases, the results even show that intellectual capital has a significant and negative effect on organizational performance (Makmur et al, 2022; Halim & Wijaya, 2020). However, although the results of previous studies showed differences between each other, for examining the effect of intellectual capital on the BPD's performance, we followed the opinion of the majority so the formulation of the first hypothesis of this study is:

H1: Intellectual capital has a significant positive effect on bank performance.

Income Diversification and Bank Performance

As a firm that carries out an intermediation function, interest income is the main income for banks (Asif & Akhter, 2019). However, the effect of banking deregulations, the massive flow of technology, and globalization have encouraged banks to find other sources of income besides interest income (Githaiga, 2021, Thakur & Arora, 2024). Income diversification is motivated by the bank's efforts to optimize its income structure so that the bank can maintain its competitive advantage (Anggaredho & Rokhim, 2017; Githaiga, 2023).

Moreover, from the perspective of shareholders and investors, diversified income is also able to increase added value in their eyes (Asif & Akhter, 2019). The role of income diversification is also confirmed by previous studies that this variable has a positive effect on the bank performance (Uddin et al 2022; Ashraf & Nazir, 2023; Luu et al, 2020; Sharma & Anand 2018). Meanwhile, from a risk management perspective, diversification is also part of the bank's strategic steps so that the bank's income is not only concentrated in one place, so that if one particular income fails, another income contributes to the company's profitability (Sharma & Anand, 2018; Ashraf et al, 2016). For that reason, previous studies also confirmed that diversified banks tend to be more stable than diversified banks (Anggaredho & Rokhim, 2017; Kohler, 2015).

Furthermore, if we review the relationship between these two variables, previous studies also showed ambiguous each other. Mamun et al (2023) stated that income diversification does not affect bank performance, Meanwhile, Duho et al (2020) & Alkhouri & Arouri (2019) stated that banks that diversified their income showed negative results on bank performance. This negative performance could be due to banks' losing focus if they have to supervise various businesses (Alhassan, 2015). Moreover, the lack of expertise in new business, high monitoring costs, asymmetric information, and fluctuating non-interest income are also the

reasons why this variable has a negative effect on the bank performance (Alkhouri & Arori, 2019; Mamun et al 2023; Vidyarthi, 2020).

Based on the results of previous studies, we put the hypothesis that more diversified bank incomes tend to have better performance. This reason is based on previous studies that all banks in Indonesia are commercial banks so increasing non-interest income (fee-based income) is associated with better performance (Anggaredho & Rokhim, 2017), hence the second hypothesis of this study is:

H2: Income diversification has a significant positive effect on bank performance.

Income Diversification as Moderating Variable Between Intellectual Capital and Bank Performance

Although previous studies showed intellectual capital positively affects firm performance (Chinnasamy et al, 2024; Tjahjadi et al, 2024; Rahman & Liu, 2023; Isola et al, 2020), However, scholars who support the dynamic capability theory stated intellectual capital can be further optimized if there are tools to support it (Githaiga, 2023). This tool is needed as a booster of intellectual capital for consolidating all the knowledge resources it has to achieve a competitive advantage (Githaiga, 2021).

Various previous literature stated income diversification is a bank's effort to understand its income structure and to mobilize all the resources for improving its performance (Luu et al, 2020; Anggaredho & Rokhim, 2017; Kohler, 2015). The mobilization of all these resources can be a strategic effort for banks to strengthen their intellectual capital so it will have a positive impact on improving bank performance (Merino et al, 2014; Ramanathan et al, 2016). Although, a previous study by Githaiga (2023) tested the moderating effect of income diversification between intellectual capital and firm performance showed negative results, For proposing the hypothesis in this study, we assume that income diversification can positively moderate intellectual capital on bank performance. Therefore, the development of the third hypothesis in this study is:

H3: Income diversification positively moderating the relationship between intellectual capital and bank performance.

METHODOLOGY

This study has a total population of 27 BPD. Of the total BPDs, we excluded 4 banks (Bank Aceh, Bank NTB Syariah, Bank Riau Kepri Syariah, and Bank Banten) so the total sample taken was 23 BPDs. The exclusion of Bank Aceh, Bank NTB Syariah, and Bank Riau Kepri Syariah due to their operations based on Sharia principles so the business model is completely different from the 23 BPDs. Meanwhile, The exclusion of Bank Banten due to this bank has just become a regional bank/BPD on December 27/2023 based on Banten Province Regional Regulation Number 5/2023. The BPD data was annual secondary data and was processed using the Eviews 10 application. We took data from the Financial Services Authority of the Republic of Indonesia over the last 16 years (2008-2023).

For measuring bank performance, we used ROA (Return on Assets) based on previous studies (Chouaibi et al, 2022; Ledhem, 2022; Gafrej & Boujelbéne, 2022). The high ROA reflects the high performance, so it means the bank can optimize all its assets to generate profitability.

Meanwhile, we used VAIC (Value-Added Intellectual Coefficient) formulated by Pulic (2000, 2004) for measuring intellectual capital. VAIC is a combination of 3 components, such as HCE (Human Capital Efficiency), SCE (Structural Capital Efficiency), and CEE (Capital Employed). Efficiency). The formulation of VAIC is:

VAIC = HCE + SCE + CEE

HCE was obtained from VA (Value Added) / Total Employee Costs, VA itself was obtained from Total Income - Operational Expenses. SCE was obtained from SC (Structure Capital) / VA, SC itself was obtained from VA – Total Employee Salary. Meanwhile, CEE was obtained from VA / Total Bank Assets.

The use of VAIC for measuring intellectual capital has also been widely used by other scholars (Githaiga, 2023; Ocak et al, 2023; Shahzad et al, 2022; Isola et al, 2020). The high VAIC indicates the high efficiency of the bank in capitalizing its intellectual capital.

Income diversification was measured by the HHI (Herfindahl-Hirschman Index) and also widely used by various scholars (Thakur & Arora, 2024; Githaiga, 2023, Githaiga, 2021; Vidyarthi, 2020). The high HHI reflects high bank concentration, thus indicating a lack of diversification of bank income. HHI was obtained from:

$$HHI = 1 - \left(\left(\frac{\text{Non-Interest Income}}{\text{Total Income}} \right)^2 + \left(\frac{\text{Interest Income}}{\text{Total Income}} \right)^2 \right)$$

This study also includes control variables for estimating the data. The first variable is asset quality as proxied by NPL (Non-Performing Loans), following previous studies that high NPLs are associated with low performance (Githaiga, 2023, Githaiga, 2021; Tran et al, 2016).The second control variable is liquidity was measured by total deposits / total assets (Rokhim & Min, 2020; Khan et al, 2017), high liquidity indicates the bank's ability to collect funds from the public so the bank can choose the cheaper funding in its liability structure. Therefore, we follow the assumptions of previous studies and assume that good liquidity is associated with better performance (Rokhim & Min, 2020; Athanasoglou et al, 2008). The third control variable is the ratio of equity to total assets, we assume the high equity is directly proportional to its performance (Githaiga, 2021). The fourth variable is bank size is proxied by the natural logarithm of total assets. Large bank size allows banks to enjoy economies of scale so we assume that large banks are associated with better performance (Githaiga, 2023).

Table 1. Operational Variables

Variables	*Decriptions*	*Notations*
Bank Performance	ROA (Return on assets)	ROA
Intellecctual Capital	VAIC (Value-Added Intellectual Coefficient)	IC
Income Diversification	Herfindahl-Hirschman Index	HHI
Asset Quality	NPL (Non-Performing Loans)	NPL
Liquidity	Total deposits to total assets	Liquidity
Equity Ratio	Total equity to total assets	ETA
Bank Size	Natural logarithm of total assets	SIZE

This study has several research models as a reference for carrying out the following testing stages:

Panel A, tested the effect of control variables on bank performance:

$$ROA_{it} = \beta_{0it} + \beta_1 NPL_{it} + \beta_2 LIQUIDITY_{it} + \beta_3 ETA_{it} + \beta_4 SIZE_{it} + \varepsilon_{it}$$

Panel B, includes intellectual capital to test its effect on bank performance along with control variables:

$$ROA_{it} = \beta_{0it} + \beta_1 NPL_{it} + \beta_2 LIQUIDITY_{it} + \beta_3 ETA_{it} + \beta_4 SIZE_{it} + \beta_5 IC_{it} + \varepsilon_{it}$$

Panel C, includes revenue diversification to test its effect on bank performance along with intellectual capital and control variables:

$$ROA_{it} = \beta_{0it} + \beta_1 NPL_{it} + \beta_2 LIQUIDITY_{it} + \beta_3 ETA_{it} + \beta_4 SIZE_{it} + \beta_5 IC_{it} + \beta_6 HHI_{it} + \varepsilon_{it}$$

Panel D, tested the moderating effect of income diversification between intellectual capital and bank performance:

$$ROA_{it} = \beta_{0it} + \beta_1 NPL_{it} + \beta_2 LIQUIDITY_{it} + \beta_3 ETA_{it} + \beta_4 SIZE_{it} + \beta_5 IC_{it} + \beta_6 HHI_{it} + \beta_7 IC \times HHI + \varepsilon_{it}$$

RESULTS AND DISCUSSION

Table 2 presents the BPD profile over the 2008-2023 period. The average ROA for BPD was 0.029 (2.9%), the highest ROA was 0.122 (12.2%) namely Bank Southeast Sulawesi in 2008, while the lowest ROA was -0.006 (-0.6%) namely Bank Papua in 2016. In the intellectual capital (IC) variable, the average BPD had a score of 1,254, the highest score was booked by Bank Kaltimtara (5.23) in 2010, and the lowest score was booked by Bank Maluku North Maluku (-43.57) in 2014. Meanwhile, for the income diversification (HHI) variable, the average HHI score was 0.622, and the highest score was Bank Bengkulu (0.882) in 2021, a high score indicates that Bank Bengkulu's income was highly concentrated in interest income in that year. The lowest HHI score was Bank Central Sulawesi (0.344) in 2010, this indicates that in that year Bank Central Sulawesi's income was relatively diversified.

In the first control variable, asset quality is proxied by NPL, the average was 0.025 (2.5%), the highest NPL was 0.192 (19.2%) by Bank Central Sulawesi in 2008 while the lowest NPL was Bank Kalbar, 0.001 (0.1%) in 2009. For liquidity (LIQUIDITY), the average BPD in Indonesia had a ratio score of 0.738, the highest liquidity was Bank Kalsel (0.882) in 2008 while the lowest liquidity was Bank Lampung (0.464) in 2009. For the equity-to-assets ratio (ETA) the average was 0.127, the highest capital ratio was Bank Central Kalimantan in 2015, while the lowest capital ratio

was Bank North Sulawesi in 2008. Then for the bank size (SIZE) variable, the average BPD asset was 16.36, the largest asset was Bank BJB in 2023 (18.99) while the lowest asset was Bank Central Sulawesi (13.59) in 2009.

Table 2. Descriptive Statistics

	Mean	*Median*	*Max*	*Min*	*St. Dev*
ROA	0.029	0.028	0.122	-0.006	0.012
IC	1.254	1.320	5.230	-43.57	2.525
HHI	0.622	0.619	0.882	0.344	0.108
NPL	0.025	0.019	0.192	0.001	0.023
LIQUIDITY	0.738	0.748	0.882	0.464	0.075
ETA	0.127	0.126	0.206	0.040	0.029
SIZE	16.36	16.40	18.99	13.59	1.020

Based on correlation tests (table 3), the indicators for all variables (except the dependent variable / ROA) have coefficient values below 0.80. These results confirm that the BPD data does not show multicollinearity.

Table 3. Correlation Matrix

	NPL	LIKUID	ETA	SIZE	IC	HHI
NPL	1.000					
LIKUID	-0.090	1.000				
ETA	0.106	-0.284	1.000			
SIZE	0.086	0.326	-0.151	1.000		
IC	-0.044	-0.066	0.148	-0.007	1.000	
HHI	-0.143	-0.050	-0.382	0.243	-0.012	1.000

The regression results for the entire panel are presented in Table 4. Panel A tested the control variables for the ROA variable and showed significance for all variables. The effect of NPL on ROA showed a negative coefficient with a significance of <1% (ρ = 0.000). This was as expected, that high NPL indicates poor performance for BPD (Githaiga, 2023, Githaiga, 2021; Tran et al, 2016). High liquidity (LIQUIDITY) in Panel A showed a negative effect on ROA (ρ = 0.072 < 0.010). This finding, based on previous studies, could be due to excessive liquidity stimulating banks' aggressive behavior by investing in risky portfolios (Khan et al, 2017). Meanwhile, for the equity to assets ratio (ETA), the findings in Panel A were as expected (ρ = 0.000 < 1%) that high bank equity is directly proportional to its performance (Githaiga, 2021).

Furthermore, bank size (SIZE) showed that larger bank was associated with poor performance (ρ = 0.000 < 1%), this could be due to large banks tending to have a fat bureaucracy and hinder their operations rather than small banks. This finding is also aligned with previous studies (Dao & Nguyen, 2020).

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Table 4. Regression Results

	Panel A		Panel B		Panel C		Panel D	
	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic
NPL	-0.125	-7.134*** (0.000)	-0.115	-6.813*** (0.000)	-0.111	-7.426*** (0.000)	-0.107	-7.145*** (0.000)
Likuid	-0.008	-1.799* (0.072)	-0.006	-1.493 (0.1362)	-0.010	-2.378** (0.0179)	-0.010	-2.472** (0.013)
ETA	0.703	5.442*** (0.000)	0.059	4.826*** (0.000)	0.034	2.926*** (0.003)	0.024	2.083** (0.037)
Size	-0.010	-22.196*** (0.000)	-0.009	-22.082*** (0.000)	-0.009	-24.974*** (0.000)	-0.008	-22.431*** (0.000)
IC			0.000	7.959*** (0.000)	0.000	8.862*** (0.000)	-0.040	-9.654*** (0.000)
HHI					-0.027	-8.672*** (0.000)	-0.0040	-9.654*** (0.000)
IC X HHI							0.009	4.294*** (0.000)
Obs.	368		368		368		368	
Adj. R-Squared	0.7742		0.7911		0.8372		0.8316	
Prob (F-Statistic)	0.000		0.000		0.000		0.000	

****, **, * shows the level of significance 1%, 5%, 10%*

In Panel B, the regression results showed that intellectual capital has a significant effect on ROA ($\rho = 0.000 < 1\%$), the regression coefficient showed positive results and confirmed previous studies that intellectual capital can increase bank performance (Chinnasamy et al, 2024; Tjahjadi et al, 2024; Rahman & Liu, 2023; Isola et al, 2020). Based on this result, we confirmed the first hypothesis (H1) can be accepted. Furthermore, for Panel C, the regression results showed that HHI has a significant and negative effect on ROA ($\rho = 0.000 < 1\%$), the high HHI reflects the high dependence of banks on interest income and affects the decline in bank performance significantly or if bank income is increasingly diversified it will have a significant positively effect on bank performance. Thus, we confirmed the second hypothesis (H2) is acceptable and in line with previous studies (Uddin et al 2022; Ashraf & Nazir, 2023; Luu et al, 2020; Sharma & Anand 2018).

The final test that examined the moderating effect of income diversification (IC x HHI) between intellectual capital (IC) and bank performance (ROA), Panel D showed income diversification has a significant moderating effect

between two variables (ρ = 0.000 < 1%). However, to find out whether the moderating effect strengthens or weakens, we compared the Adjusted R-squared value between Panel C and Panel D. The Adjusted R-squared in Panel C showed 0.8372 (83.72%), while the Adjusted R-squared in

Panel D showed 0.8316 (83.16%). These results showed the Adjusted R-squared in Panel D becomes weaker if there is an interaction between income diversification and intellectual capital (83.16% < 83.72%). Based on these results, we confirmed the third hypothesis (H3) was rejected. This result is also in line with findings from previous studies that the existing intellectual capital in BPD is more suitable if the bank's business focuses more on interest income, so if the bank does diversify its income it can reduce the impact of intellectual capital on the bank performance (Githaiga, 2023).

CONCLUSIONS

Indonesia's economic growth has demonstrated quite impressive achievements in recent years. The data from the Central Statistics Agency showed that Indonesia's GDP (Gross Domestic Product) has exceeded IDR 20 thousand trillion and is the highest in ASEAN. One of the achievements of Indonesia's economic growth is due to the vital role of the banking sector in driving the wheels of the economy. The high expectations for the banking sector have encouraged the Government of the Republic of Indonesia to establish Regional Development Banks (BPD) through Law Number 13 of 1962. Unfortunately, based on data from the Financial Services Authority of the Republic of Indonesia, the performance of BPD is still not optimal compared to total national banking as a whole. BPD assets at the end of 2023 of Rp910 trillion, and are still far behind the total national banking assets of Rp11,765 trillion. Thus, this study was conducted to investigate variables that affect BPD performance (as measured by ROA), such as intellectual capital (as measured by VAIC) and income diversification (as measured by HHI). This study also tested the moderating effect of income diversification between intellectual capital on bank performance.

The total population in this study was 27 BPD. Of the total BPDs, we excluded 4 banks so the final sample for this study was 23 BPDs. The data in this study was taken from the Financial Services Authority of the Republic of Indonesia over the last 16 years (2008-2023). This data was annual secondary data and processed using the Eviews 10 application. This study showed that intellectual capital has a positive and significant effect on bank performance. These results have confirmed previous studies that intellectual capital can increase the added value and performance of the organization. Then income diversification also showed a significant positive effect on bank performance. These results confirmed that income diversification tends to have good sustainability. Finally, in testing the moderation effect, this study showed that income diversification can significantly weaken the influence of intellectual capital on bank performance. This could mean that the existing intellectual capital in BPD at this time is more compatible if the bank's business focuses on interest income only.

IMPLICATIONS

This study has two implications, first implication, practically the findings can be of concern to practitioners to emphasize the importance of the existence of intellectual capital to improve bank performance. These findings can also be a reference for BPDs to start more attention to non-interest income (fee-based income). It can be conducted by strengthening banking digitalization and improving services to encourage people to use non-credit services. Regarding the role of income diversification in weakening banks' intellectual capital, we encourage BPDs to start adapting their intellectual capital components (human capital, structural capital & relational capital) so it is hoped, in the future the interaction of intellectual capital and income diversification can strengthen each other to improve bank performance. Second, theoretically, this study also confirmed previous studies that stated there are a significant relationship between intellectual capital, income diversification, and bank performance. In addition, very few tests of the moderating effect of income diversification between intellectual capital and bank performance have been carried out so this study enriches the existing of literature.

LIMITATIONS & FUTURE STUDY

This study has several limitations, the data taken were only BPD in Indonesia, and we expect future studies to compare various BPD in other countries. Comparative studies can also be conducted by comparing BPDs with other types of banks in Indonesia such as state banks, private banks, and foreign banks. Another limitation of this study was using secondary data from bank financial reports. We expect future studies to include qualitative data (such as direct interviews

with BPD leaders) to enrich the results of the study.

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