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Research Article

INTELLECTUAL CAPITAL AND RISK - ADJUSTED BANK PERFORMANCE: NEW EVIDENCE FROM NEPAL

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ABSTRACT

This paper examines the impact of intellectual capital on risk-adjusted returns of the Nepalese commercial banks during 2011-2020 using fixed-effects (FE) and random-effects (RE) along with system generalized method of moments (Sys-GMM) estimators. The findings show significant positive impacts of value-added intellectual coefficient (VAIC) on bank profitability. Bank profitability is driven mainly by human capital efficiency (HCE) followed by structural capital efficiency (SCE). The results also show significant positive impact of capital employed efficiency (CEE) on risk-adjusted return on equity, but the coefficients are insignificant positive with risk-adjusted return on asset. The dynamic panel estimation also confirms the persistence of bank profitability. Along with managing physical and financial capital, banks should enhance their competitive advantage by improving employee efficiency and organizational efficiency to attain higher future profitability.

1. Introduction

In the modern knowledge-driven economy, firms' competitiveness increasingly depends on **intellectual capital (IC)** rather than traditional inputs like labor and capital (Tran & Vo, 2018; Gogan et al., 2016). IC, encompassing knowledge, experience, intellectual property, and innovation, is recognized as a major driver of productivity and national development (Stewart, 1997; Lev, 2003). From a resource-based perspective, IC represents a strategic asset that enables firms to achieve sustainable competitive advantage (Barney, 1991; Zack, 1999). Research on IC spans two dimensions: theoretical definitions (Bontis, 1998; Wu & Tsai, 2005) and empirical evaluations of its impact on firm performance (Pulic, 2000; Liang et al., 2011). However, evidence from the **banking sector**, a highly knowledge-intensive industry (Firer & Williams, 2003), remains limited. Since banks rely heavily on human capital, innovation, and

customer relationships, efficient IC management is vital for their growth and competitiveness (Le & Nguyen, 2020).

In Nepal, few studies have examined IC's effect on bank performance, and most rely on perception-based surveys (Dhungana et al., 2017; Gautam, 2015). Given Nepal's post-liberalization banking expansion since the 1990s, the need for empirical inquiry into IC efficiency is significant. This study addresses this gap by analyzing the impact of the **Value-Added Intellectual Coefficient (VAIC)** and its components on **risk-adjusted returns** of Nepalese commercial banks using fixed effects, random effects, and system GMM models.

The remainder of the paper is organized as follows: literature review on the relationship between IC and bank performance is presented in Section 2 followed by methodology and data in Section 3. Empirical findings are reported in Section 4 and conclusion in Section 5.

2. Theoretical basis and intellectual capital

The relationship between intellectual capital (IC) and organizational performance is rooted in the resource-based view (RBV), which emphasizes intangible assets as sources of competitive advantage (Marti, 2007). Early notions of intangibles trace back to Lawrence R. Dick (1896, cited in Kristandl & Bontis, 2007), later evolving into the knowledge-based view, where knowledge is treated as a strategic organizational resource (Grant, 1996).

Contemporary literature defines IC as a firm's knowledge-based resources and capabilities (Bontis, 2001; Lonnqvist, 2004). Owing to the lack of a universal measurement model, several approaches have emerged. Chan (2009) classified 34 IC measurement methods into five groups, among which the Value-Added Intellectual Coefficient (VAIC) model is widely applied. VAIC offers a standardized framework and is particularly suitable for assessing IC efficiency in financial institutions (Pulic, 2004; Joshi et al., 2010).

VAIC integrates human capital, structural capital, and capital employed, recognizing both intellectual and physical resources in value creation (Tseng & Goo, 2005). Human capital reflects employees' knowledge and skills, structural capital comprises organizational systems and processes, and capital employed represents financial and physical assets (Ozkan et al., 2016). While individual components may not generate value independently, their combined efficiency drives organizational performance (Inkinen, 2015). Recent empirical studies confirm VAIC as a robust framework for examining IC–performance relationships in knowledge-intensive sectors such as banking (Nazir et al., 2020; Le & Nguyen, 2020; Tran & Vo, 2018).

2. Review of literature

Most studies document a positive relationship between VAIC and financial performance. Ting and Lean (2009) found that VAIC significantly improves ROA in Malaysian financial institutions, while Chu et al. (2011) reported similar evidence for Hong Kong listed firms. In India, Ghosh and Maji (2015) confirmed positive effects of VAIC and its components-except SCE-on firm performance, and Tandon et al. (2016) showed that VAIC enhances productivity, profitability, and market value, with CEE as the dominant factor. Meles et al. (2016) identified a strong positive impact of VAIC on U.S. bank profitability, driven mainly by HCE. Likewise, Alhassan and Asare (2016) and Le and Nguyen (2020) found that VAIC and its components

significantly improve bank performance in Ghana and Vietnam, respectively, with evidence of nonlinear effects.

However, empirical findings are not unanimous. Mondal and Ghosh (2012) observed that HCE positively affects profitability in Indian banks, while SCE remains insignificant. Shaban and Kavida (2013) reported that IC improves profitability but not market valuation in Indian IT firms. Tran and Vo (2018) found no direct effect of VAIC on Thai bank profitability, although CEE played a significant role. Similarly, Haris et al. (2019) documented an inverted U-shaped relationship between VAIC and profitability in Pakistan, with HCE and CEE contributing positively and SCE exerting a negative effect.

In Nepal, Gautam (2015) found that **human, structural, and relational capital** were positively associated with performance in pharmaceutical companies. Dhungana et al. (2017) reported that IC variables strongly influenced the **organizational performance of commercial banks**, reinforcing the global evidence that intellectual capital efficiency plays a vital role in driving firm success.

In the backdrop of literature review, it can be expected that investment in IC will have positive effect on profitability of banks. Based on this expectation, this study will test the following four hypotheses:

H_1: Overall intellectual capital (VAIC) positively impacts bank returns in Nepal.

H_2: Capital employed efficiency (CEE) positively impacts bank returns in Nepal.

H_3: Human capital efficiency (HCE) positively impacts bank returns in Nepal.

H_4: Structural capital efficiency (SCE) positively impacts bank returns in Nepal.

2. Methodology

3.1 Data

As of mid-July 2020, there were 27 commercial banks in Nepal. The sample banks are chosen with paid up capital between 800 and 1050 crorein Nepalese rupees and all other banks above the threshold are excluded to minimize size distortion. The banks with unavailable data for the study period are also excluded to assure balanced panel. Finally, the sample consisted of 17 commercial banks covering the study period 2011-2020 and include eight banks with joint operation after merger during the study period. To avoid data insufficiency, joint operation commencement period of merged banks is not taken into consideration and as such this arrives at a balanced panel data with 170 observations. Bank specific data was obtained from annual reports of the sample banks posted in their websites. The data from mid-July 2017 are taken from financial statements prepared on the basis of Nepal Financial Reporting Standards (NFRS), a Nepali version of IFRS. Prior to 2017 adjustments are made to extract the required data.

Table 1: List of sample commercial banks

SN	Commercial Banks	Paid-up capital till mid-July 2020 (In crore)	Data period	Observation
1	Himalayan Bank Ltd.	937.23	2010/11-2019/20	10
2	Laxmi Bank Ltd.	981.26	2010/11-2019/20	10
3	Citizens Bank International Ltd.	908.98	2010/11-2019/20	10
4	Sunrise Bank Ltd.	896.78	2010/11-2019/20	10
5	Century Commercial Bank Ltd.	841.55	2010/11-2019/20	10
6	Sanima Bank Ltd.	880.14	2010/11-2019/20	10
7	Machhapuchhre Bank Ltd.	845.85	2010/11-2019/20	10
8	NIC Asia Bank Ltd.	971.77	2010/11-2019/20	10
9	Siddhartha Bank Ltd.	978.78	2010/11-2019/20	10
10	Standard Chartered Bank Nepal Ltd.	801.14	2010/11-2019/20	10
11	Civil Bank Ltd.	800.34	2010/11-2019/20	10
12	Nepal Credit and Commerce Bank Ltd.	935.39	2010/11-2019/20	10
13	Nepal Bangaladesh Bank Ltd.	849.58	2010/11-2019/20	10
14	Everest Bank Ltd.	851.02	2010/11-2019/20	10
15	Nepal SBI Bank Ltd.	895.62	2010/11-2019/20	10
16	Rastriya Banijya Bank Ltd.	900.48	2010/11-2019/20	10
17	Nabil Bank Ltd.	1009.75	2010/11-2019/20	10
			Total	**170**

Source: Nepal Rastra Bank

3.2 Econometric methodology

3.2.1 VAIC and its components

This study employed VAIC approach proposed by Pulic (2004) to measure IC. This method is found not to modify or contradict fundamental accounting principles while using accounting data and thus is theoretically and methodologically sound (Iazzolino & Laise, 2013). In terms of performance measurement, higher the VAIC, better the efficiency level indicating more value-added created by overall resources of the firm (Pulic, 2004). Following Pulic (2004), IC efficiency is obtained by summing up efficiencies of human and structural capital.

$$ICE_{i,t} = HCE_{i,t} + SCE_{i,t} \quad (1)$$

Considering that IC cannot create its own value, Pulic (2004) took physical and financial capital into account by incorporating the efficiency of capital employed to determine the overall value creation efficiency as:

$$VAIC_{i,t} = CEE_{i,t} + HCE_{i,t} + SCE_{i,t} \quad (2)$$

where $VAIC_{i,t}$is the value-added intellectual coefficient of bank i at year t.$CEE_{i,t}$ is the capital employed efficiency component that indicates marginal contribution of each unit of physical and financial capital to value added. $HCE_{i,t}$is the human capital efficiency that shows marginal contribution of each unit investment on human capital to value added and $SCE_{i,t}$ is the structural capital efficiency that measures the contribution of structural capital to value added. In general, this method assumes the contribution of physical and financial, human and structural resources of a bank to create value. Total value added is required to define the components of *VAIC* and is calculated as:

$$VA_{i,t} = OP_{i,t} + PE_{i,t} + AD_{i,t} \quad (3)$$

Where *OP* is the operating profit; *PE* represents personnel expenses (salaries, wages and other benefits); *AD* refers to amortization of intangible assets and depreciation. Upon

calculating *VA*, the components of *VAIC* can be calculated with much ease. $CEE_{i,t} = VA_{i,t}/CE_{i,t}$where*CE* is the capital employed by bank and is measured as book value of net assets. $HCE_{i,t} = VA_{i,t}/HC_{i,t}$where*HC* is the human capital or the capital invested in knowledge workers such as salaries, wages and training (Pulic, 2004). The study used personnel expenses as HC (Meles et al. 2016; Tran &Vo, 2018) that also include trainings and personal development programs. $SCE_{i,t} = SC_{i,t}/VA_{i,t}$where*SC* is the structural capital measured as $SC_{i,t} = VA_{i,t} - HC_{i,t}$ which means structural capital is the part of added value not generated by human capital. Structural capital is the knowledge at organizational level, and its value denotes the additional amount required to acquire value added over the use of human capital (individual knowledge) (Ordonez de Pablos, 2004).

3.2.2 Models specification

The linear relationship between VAIC performance and financial performance of banks is tested using the following general model:

$$\pi_{i,t} = \alpha_{i,t} + \beta_i X_{i,t} + \gamma_i Z_{i,t} + \varepsilon_{it} \qquad (4)$$

Applying OLS estimator to panel data may result spurious regression because unobserved bank specific effects may correlate with other independent variables (Antoniou et al., 2008). Thus, to account for differences across banks, random-effects and fixed-effects models are employed based on Hausman test of model retention (Tran &Vo, 2018; Ozkam et al., 2016).

Financial performance is a basis for determining investments in IC resources (Murthy &Mouritsen, 2011) which in turn may contribute to the financial performance. Thus, the return in the previous period have potential to influence the return in the current period. Thus, to examine the dynamic relationships that exist between IC and banks returns, this study also employed dynamic panel model estimation (system-GMM) proposed by by Arellano and Bover (1995). The issue of endogeneity has been raised in the recent studies on relationship of IC and organization performance (Le & Nguyen, 2020; Tran &Vo, 2018; Anifowose et al., 2018). The GMM estimator technique uses internal instruments thus controlling for the potential endogeneity. The study follows Bond (2002) using lagged values of endogenous variables as instruments. The GMM results are valid if there exist no second-order autocorrelation in the model and the instruments used are exogenous (Tran &Vo, 2018). The dynamic model of bank returns takes the following form:

$$\pi_{i,t} = \alpha_{i,t} + \theta_i \pi_{i,t-1} + \phi_i X_{i,t} + \varphi_i Z_{i,t} + \omega_{it} \qquad (5)$$

where, $\pi_{i,t}$ is vector of dependent variables (RAR_{ROA} and RAR_{ROE}) of bank *i* at time *t* and following Le et al. (2019) and Le & Nguyen (2020) they are measured as $RAR_{ROA} = \frac{ROA_{it}}{\sigma_{ROA_i}}$and $RAR_{ROE} = \frac{ROE_{it}}{\sigma_{ROE_i}}$. *ROE* is the return (profit before tax) on total assets and *ROE* is return (profit before tax) on equity. σ_{ROA} is standard deviation of return on assets over the study period for bank *i* and σ_{ROE} is standard deviation of return on equity over the study period for bank *i*. π_{t-1} measures banks' persistence of profits indicating its dynamic feature. *LOAN* is the ratio of total

loan to total assets incorporated to control for the liquidity risk effect; *LNTA* is natural logarithm of the total asset used to control size effect (Le & Nguyen, 2020). ε_{it} and $\omega_{it}$are composite error terms. Further description of variables are presented in Table 2.

Table 2: Variables description

Variables	Description
Dependent	
RAR_{ROA}	Risk-adjusted return on asset (ROA adjusted by periodic risk of individual banks). ROA measures how the bank performs in terms of assets utilization.
RAR_{ROE}	Risk-adjusted return on equity (ROE adjusted by periodic risk of individual bank)s. ROE measures how the bank serves its shareholders' at the expense of utilizing their fund.
Independent	
VAIC	Value-added intellectual capital that measures the overall IC efficiency derived as a sum of SCE, CEE and HCE
SCE	Structural capital efficiency that measures per unit marginal contribution of structural capital to value added, calculated by dividing difference of value added and human capital by value added
CEE	Capital employed efficiency that measures per unit marginal contribution of physical and financial capital to value added, calculated by value added/book value of net asset
HCE	Human capital efficiency that measures per unit marginal contribution of employee expenses to value added, calculated by value added/staff expenses
Control	
LOAN	The ratio of total loan to total assets of the bank to measure liquidity risk.
LNTA	The natural logarithm of the total assets of the bank to measure bank size.

4. Empirical results

4.1 Descriptive statistics and correlation of variables

The descriptive statistics in Table 3 shows that average VAIC of the sampled commercial banks is 4.130 for the study period which is greater than 0.683 in Thailand (Tran & Vo, 2018), 3.886 in Turkey (Ozkan et al., 2016), 3.646 in Saudi Arabia (Al-Musali& Ismail, 2014) and less than 4.783 in Vietnam (Le & Nguyen, 2020). The most important component of VAIC is HCE. The average risk-adjusted returns on assets and equity are 3.9 and 3.3 percent respectively for the sampled commercial banks over the study period. The correlation analysis shows significant positive relationship of all independent variables with both the returns. Among the three components of VAIC, HCE has the highest positive correlation with return on assets (0.652) and SCE has the highest with return on equity (0.480). VAIC is correlated more with return on assets (0.656) than with return on equity (0.485). There is strong correlation of HCE (0.976) and SCE(0.899) with VAIC but these variables are not used jointly in a single model. The table also show strong positive correlation (0.917) between HCE and SCE and to avoid the issue of multicollinearity, these variables are summed up to create ICE (Pulic, 2004).

Table 3: Descriptives and correlation

	RAR_{ROA}	RAR_{ROE}	VAIC	CEE	HCE	SCE	ICE	LOAN	LNTA
Descriptives									
Mean	3.902	3.313	4.130	0.328	3.152	0.650	3.801	0.690	24.771
Min	0.028	-0.857	0.496	-0.607	1.053	0.050	1.103	0.292	21.696
Max	8.268	7.180	6.195	2.434	4.959	0.798	5.757	6.719	26.310
Std.	2.128	1.674	1.051	0.237	0.862	0.132	0.984	0.474	0.775
Obs.	170	170	170	170	170	170	170	170	170
Correlations									
RAR_{ROA}	1								
RAR_{ROE}		1							
VAIC	0.656***	0.485***	1						
CEE	0.214***	0.305***	0.388***	1					
HCE	0.652***	0.434***	0.976***	0.183**	1				
SCE	0.584***	0.480***	0.899***	0.101	0.917***	1			
ICE	0.649***	0.444***	0.975***	0.174**	0.999***	0.937***	1		
LOAN	0.009	0.094	0.022	-0.043	0.027	0.071	0.033	1	
LNTA	0.230***	0.133	0.173**	0.269***	0.118	0.124	0.120	-0.110	1

****, *** Significant at 5 and 1 per cent levels, respectively.**

4.2 Unit root test

Time series is a part of panel data and unit root if any in the time series may show a systematic unpredictable pattern which lowers the strength of regression results if untreated. In addition, prior to moving on for empirical estimation by system GMM, it is necessary to confirm that the variables under investigation are at stationarity in their level forms (Bayar, 2019; Jung & Kwon, 2007).

Table 4: Panel unit root test

Test		RAR_{ROA}	RAR_{ROE}	HCE	SCE
Levin-Lin-Chu (at level)		-4.870***	-6.907***	-1.910**	-3.797***
p-values		0.000	0.000	0.028	0.000
Test	**VAIC**	**CEE**	**ICE**	**LOAN**	**LNTA**
Levin-Lin-Chu (at level)	-3.551***	-5.822***	-2.027**	-2.952***	-4.312***
p-values	0.000	0.000	0.021	0.002	0.000

**, ***Significant at 5, and 1 per cent levels, respectively.

This study performed Levin, Lin & Chu (2002) panel unit root test in all variables with null hypothesis that all panels contain unit roots. The results in Table 4 show that all the variables are at stationarity in their level forms.

4.3 Fixed effects and random effects models

In Panel A of Table 5, the results in models 1 and 2 reveal strong positive relationship between VAIC and risk-adjusted return on assets inferring VAIC's influence on bank profitability in terms of assets utilization. The VAIC components in models 3 through 8 illustrate that there exist highly positive and significant relationships of HCE and SCE with risk-adjusted return on assets. CEE however showed statistically insignificant positive relationship with the return. t-statistics in parentheses reveal that HCE has higher statistical explanatory power. Control variables loan and size variables are statistically and positively significant with loan be more statistically significant in determining return on assets in commercial banks.

Table 5: Regression results of fixed effects and random effects models

	VAIC	CEE	ICE	HCE	SCE	LOAN	LNTA	Reg.	Adj. R^2	F	p-value
Panel A: Risk adjusted return on assets (RAR_{ROA}) as dependent variable											
1	0.80***							FE	0.84	54.19	0.00
	(5.66)										
2	0.76***					0.59***	0.26**	FE	0.86	56.40	0.00
	(4.90)					(8.80)	(2.49)				
3		0.38	0.91***					RE	0.31	38.75	0.00
		(0.94)	(8.29)								
4		0.41	0.87***			0.55***	0.27**	RE	0.38	26.82	0.00
		(0.94)	(8.29)			(8.35)	(2.52)				
5		0.37		1.05***				RE	0.31	38.48	0.00
		(0.92)		(7.93)							
6		0.39		1.01***		0.56***	0.29***	RE	0.38	27.13	0.00
		(0.92)		(7.14)		(8.32)	(2.71)				
7		0.46			5.23***			FE	0.83	48.13	0.00
		(0.94)			(6.47)						
8		0.51			4.79***	0.57***	0.18	FE	0.86	56.40	0.00
		(0.94)			(5.53)	(8.65)	(1.48)				
Panel B: Risk adjusted return on equity (RAR_{ROE}) as dependent variable											
1	0.84***							RE	0.33	82.61	0.00
	(8.07)										
2	0.86***					-0.29***	0.05	FE	0.76	30.42	0.00
	(7.59)					(-5.24)	(0.28)				
3		2.08***	0.65***					RE	0.40	57.40	0.00
		(2.63)	(6.42)								
4		2.08***	0.66***			-0.25***	0.05	FE	0.79	22.31	0.00
		(2.73)	(6.46)			(-4.81)	(0.35)				
5		2.08***		0.75***				RE	0.40	57.35	0.00
		(2.62)		(6.12)							
6		2.08***		0.77***		-0.25***	0.06	FE	0.79	33.78	0.00
		(2.72)		(6.37)		(-4.76)	(0.45)				
7		2.17**			3.94***			RE	0.37	50.52	0.00
		(2.52)			(5.30)						
8		2.17**			3.91***	-0.25***	-0.01	FE	0.78	31.23	0.00
		(2.60)			(4.68)	(-4.89)	(-0.08)				

The models are selected based on Hausman test. For risk-adjusted return on assets as dependent variable (Panel A), models 1, 2, 7, 8 are estimated using fixed effects and models 3,4,5,6 using random effects. For risk-adjusted return on equity (Panel B), models 1,3,5,7 are estimated using random effects and models 2,4,6,8 using fixed effects. Heteroscedasticity for all selected models are dealt by using White (1980) heteroscedasticity-consistent standard errors. t-statistics are in parentheses. **, *** indicate significance at 5, and 1 per cent levels, respectively.

Panel B also reveal that VAIC coefficients are statistically significant with positive relationship with risk-adjusted returns on equity. The VAIC components in models 3 through

8 illustrate that there exist highly positive and significant relationships of all three efficiency components with risk-adjusted return on assets. HCE again has stronger statistical explanatory power in determining return on equity. With respect to control variables, loan is observed to have statistically significant but negative relationship with returns on equity and bank size is insignificant. The variance in dependent variables is satisfactorily explained by the regressors in all the models and significant F-statistics show that regression models fit the data.

4.4 Dynamic panel data estimation: system GMM

Four models each for risk-adjusted return on assets and risk-adjusted return on equity as dependent variables are estimated using system-GMM approach.

Table 6: Regression results of two-step system GMM method

π	RAR_{ROA}				RAR_{ROE}			
π_{t-1}	0.456*	0.399***	0.420***	0.271	0.374***	0.231	0.259*	0.249**
	(0.248)	(0.126)	(0.121)	(0.168)	(0.090)	(0.136)	(0.146)	(0.105)
VAIC	1.191***				0.800***			
	(0.331)				(0.073)			
CEE		1.315	1.238	1.65		3.222	2.878**	3.224**
		(0.820)	(0.821)	(1.00)		(1.991)	(1.255)	(1.149)
HCE			1.064***				0.514***	
			(0.277)				(0.171)	
SCE				5.908***				3.517***
				(1.630)				(1.039)
ICE		0.926***				0.484		
		(0.241)				(0.411)		
LOAN	-0.016	-0.219	-0.35	0.495	-0.752	-0.829**	-0.601**	-0.584**
	(1.085)	(1.353)	(1.457)	(0.549)	(0.492)	(0.288)	(0.215)	(0.204)
LNTA	-0.103	-0.051	-0.043	-0.079	-0.029	0.013	0.021	-0.010
	(0.047)	(0.033)	(0.033)	(0.056)	(0.017)	(0.053)	(0.028)	(0.030)
No. of observations	153	153	153	153	153	153	153	153
No. of instruments	8	15	15	15	16	10	15	15
No. of groups	17	17	17	17	17	17	17	17
AR1 (p-value)	0.046	0.061	0.058	0.07	0.037	0.028	0.027	0.068
AR2 (p-value)	0.376	0.334	0.372	0.238	0.529	0.090	0.117	0.346
Hansen test (p-value)	0.100	0.341	0.356	0.258	0.368	0.424	0.827	0.130

Results estimated using twostep system GMM estimator. Variables in italics are instrumented through the GMM procedure following Arellano and Bover (1995). Robust standard errors are in parentheses. *, **, ***Significant at 10, 5, and 1 per cent levels, respectively.

In system GMM endogeneity problem is addressed by using lagged values of the dependent variable (in levels and differences) and lagged values of other regressors with potential endogeneity problem as instruments. This study used lagged values of possible endogenous variables as instruments (Bond, 2002) shown in italics in the Table 6. The table shows that in all models, p-value of Hansen test exceed 5 per cent threshold sufficient to not reject the null hypothesis suggesting that there is no evidence of over-identifying restrictions and instruments used are exogenous and accepted. Further p-values of AR(2) in all the models are statistically not significant leading to failure to reject the null hypothesis of 'no autocorrelation of second order' This suggests that the instruments (moment conditions) of the model are met (Le & Nguyen, 2020). The number of instruments in all the models are less than the number of groups.

The overall results of system GMM are in line with the results in Table 5. VAIC is statistically and positively significant to determine both bank returns. CEE's relationship with return on assets and return on equity shows a similar conclusion as with fixed and random effects models. HCE component is statistically and positively significant in determining the returns. SCE also shows statistically significant and positive impact on the bank returns. Most of the models show that one-year lagged returns have significant positive relationship with current returns confirming the dynamic nature of bank profitability. The statistical negative coefficients of loan variable with return on equity is also consistent to the results in Table 5.

5. Discussion

The findings provide strong evidence that **VAIC positively influences bank financial performance**, supporting the **resource-based theory** that emphasizes productivity derived from both tangible and intangible assets (Barney, 1991). The positive and significant VAIC coefficient aligns with prior research (Le & Nguyen, 2020; Nazir et al., 2020; Oppong et al., 2019; Tandon et al., 2016), indicating that effective IC management enhances sustainability and profitability of commercial banks. **Capital Employed Efficiency (CEE)** shows a positive and significant relationship only with risk-adjusted return on equity, consistent with Le & Nguyen (2020), but insignificant with return on assets, contradicting findings from Oppong et al. (2019), Tran & Vo (2018), Ozkam et al. (2016), Tandon et al. (2016), and Al-Musali & Ismail (2014). This suggests that physical and financial capital contribute less to profitability through asset utilization, yet significantly benefit shareholders' returns. **Human Capital Efficiency (HCE)** is positive and significant for both returns, highlighting that skilled, competent, and technologically equipped employees drive profitability through innovation and creativity. Panel regression results confirm HCE as a major determinant of bank performance, consistent with Le & Nguyen (2020), Oppong et al. (2019), Asare et al. (2017), and Tandon et al. (2016).

Structural Capital Efficiency (SCE) also exhibits a significant positive association with both returns-contrary to many studies that found it insignificant (Le & Nguyen, 2020; Oppong et al., 2019; Ozkam et al., 2016; Al-Musali & Ismail, 2014). The result opposes findings by Nazir et al. (2020) and Tran & Vo (2018), who reported a negative effect. However, structural capital facilitates knowledge creation through systems, relationships, and organizational processes (Asare et al., 2017; Chen et al., 2014), explaining its significant role in Nepalese banks. System-GMM results show that $\boldsymbol{\pi}$**_(t-1)** is positive and significant in most models, confirming profit persistence over time, consistent with Le & Nguyen (2020) and Le & Ngo (2020), but contrary to Tran & Vo (2018). This supports the view that past performance influences current profitability (Le & Nguyen, 2020; Sinha & Sharma, 2015). Among control variables, **LOAN** has a negative significant relationship with risk-adjusted return on equity, contradicting Le & Nguyen (2020), implying that higher liquidity risk reduces shareholder returns. However, its positive relationship with RARROA in random and fixed effects models suggests economies of scale through efficient asset utilization, differing from Tran & Vo (2018). **Bank size** positively affects ROA but not ROE; GMM results show a negative, insignificant effect consistent with Le & Nguyen (2020) and Nazir et al. (2020) implying that larger banks tend to be less profitable than smaller ones (Le, 2020b).

6. Conclusion

This study examined the impact of VAIC and its components on risk-adjusted returns of Nepalese commercial banks (2011–2020) using fixed-effects, random-effects, and system-GMM models. Results show that VAIC, particularly HCE and SCE, positively influences profitability, while CEE has inconsistent effects, reflecting limited reliance on physical capital. Human capital contributes most to returns, followed by structural capital, underscoring the need for banks to strengthen knowledge retention and organizational systems. IC thus plays a more vital role than physical capital in driving competitiveness. Profitability is also linked to

effective liquidity risk management. Future studies should include broader datasets and market-based performance measures for robustness.

7. Shortcomings and Challenges of the Study

This study relies on the VAIC methodology, which measures intellectual capital using accounting-based proxies and does not fully capture relational capital, innovation, or qualitative knowledge dimensions. The sample is limited to Nepalese commercial banks during 2011–2020, restricting generalizability to other financial institutions and regulatory contexts. Risk-adjusted ROA and ROE, though superior to conventional measures, may not fully reflect market-based or long-term value creation. Despite using system-GMM to address endogeneity, results may remain sensitive to instrument selection and small sample size. Macroeconomic, regulatory, and institutional factors were not explicitly modeled and may jointly influence bank profitability.

8. Recommendations for Further Research

Future studies may employ alternative IC frameworks such as MVAIC, disclosure indices, or survey-based measures. Expanding coverage to development banks, microfinance institutions, or insurance companies would improve external validity. Incorporating market-based performance indicators and macro-institutional variables could enhance robustness. Qualitative or mixed-method approaches may further explain how intellectual capital is transformed into sustained competitive advantage.

References

Alhassan, A. L., &Asare, N. (2016). Intellectual capital and bank productivity in emerging markets: Evidence from Ghana. *Management Decision*, *54*(3), 589–609.

Al-Musali, M. A. K., & Ku Ismail, K. N .I. (2014). Intellectual capital and its effect on financial performance of banks: evidence from Saudi Arabia. *Procedia: Social and Behavioral Sciences, 164,* 201-207.

Amit, R. &Schoemaker, P. J. (1993). Strategic assets and organizational rent. *Strategic Management Journal, 14*(1), 3-46.

Anifowose, M., Rashid, H. M., Annuar, H. A. & Ibrahim, H. (2018). Intellectual capital efficiency and corporate book value: evidence from Nigerian economy. *Journal of Intellectual Capital, 19*(3), 644-668.

Antoniou, A., Guney, Y., &Paudyal, K. (2008). The determinants of capital structure: capital market-oriented versus bank-oriented institutions. *Journal of Financial and Quantitative Analysis, 43*(1), 59-92.

Arellano, M., &Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics*, *68*(1), 29–51.

Asare, N., Alhassan, A. L., Asamoah, M. E., &Ntow-Gyamfi, M. (2017). Intellectual capital and profitability in an emerging insurance market, *Journal of Economic and Administrative Sciences, 33*(1), 2-19.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management, 17*(1), 99-120.

Bayar, Y. (2019). Macroeconomic, institutional and bank-specific determinants of non-performing loans in emerging market economies: A dynamic panel regression. *Journal of Central Banking Theory and Practice. 3*, 95-110.

Bond, S. R. (2002). Dynamic panel data models: A guide to micro data methods and practice. *Portuguese Economic Journal*, *1*(2), 141–162.

Bontis, N. (1998). Intellectual capital: An exploratory study that develops measures and models. *Management Decision*, *36*(2), 63–76.

Bontis, N. (2001). Assessing knowledge assets: a review of the models used to measure intellectual capital. *International Journal of Management Reviews, 3*(1), 41-60.

Chan, K. H. (2009). Impact of intellectual capital on organisational performance: an empirical study of companies in the Hang Seng Index (Part 1). *The Learning Organization, 16*(1), 4-21.

Chen, F. C., Liu, Z. J., &Kweh, Q. L. (2014). Intellectual capital and productivity of Malaysian general insurers. *Economic Modelling, 36*(1), 413-420.

Chu, S. K. W., Chan, K. H., & Wu, W. W. Y. (2011). Charting intellectual capital performance of the gateway to China. *Journal of Intellectual Capital*, 12(2), 249-276.

Dhungana, D., Phuyal, R. K., &Regmi, R. R. (2017). Intellectual capital and organizational performance on commercial banks of Nepal. *Advances in Economics and Business Management, 4*(8), 525-529.

El-Bannany, M. (2008). A study of determinants of intellectual capital performance in banks: The UK case. *Journal of Intellectual Capital*, *9*(3), 487–498.

Firer, S. & Williams, S. M. (2003). Intellectual capital and traditional measures of corporate performance. *Journal of Intellectual Capital, 4*(3), 348-360.

Gautam, P. K. (2015). Intellectual capital and organizational performance: An evidence from Nepalese Pharmaceutical Industries. *Journal of Management, 7*(1), 233-242.

Ghosh, S. K., &Maji, S. G. (2015). Empirical validity of value added intellectual coefficient model in Indian knowledge-based sector. *Global Business Review*, *16*(6), 947–962.

Gogan, L. M., Artene, A., Sarca, I., &Draghici, A. (2016). The impact of intellectual capital on organizational performance. *Procedia: Social and Behavioral Sciences, 221*, 194-202,

Grant, R. M. (1996). Toward a knowledge-based theory of the firm. *Strategic Management Journal, 17*(S2), 109-122.

Hansen, L. P. (1982). Large sample properties of generalized method of moments estimators. *Econometrica*, *50*(4), 1029–1054.

Haris, M., Yao, H., Tariq, G., Malik, A., &Javaid, H. M. (2019). Intellectual capital performance and profitability of banks: Evidence from Pakistan. *Journal of Risk and Financial Management*, *12*(2), 56

Iazzolino, G., &Laise, D. (2013). Value added intellectual coefficient (VAIC): A methodological and critical review. *Journal of Intellectual Capital*, *14*(4), 547–563.

Inkinen, H. (2015). Review of empirical research on intellectual capital and firm performance. *Journal of Intellectual Capital, 16*(3), 518-565.

Joshi, M., Cahill, D., & Sidhu, J. (2010). Intellectual capital performance in the banking sector: An assessment of Australian owned banks. *Journal of Human Resource Costing & Accounting*, *14*(2), 151–170

Jung, H., & Kwon, H. (2007). An alternative system GMM estimation in dynamic panel models, *Hi Stat Discussion Paper* No. 217, Hitotsubashi University.

Kristandl, G., &Bontis, N. (2007). Constructing a definition for intangibles using the resource based view of the firm. *Management Decision, 45*(9), 1510-1524.

Kujansivu, P. (2005). Intellectual capital performance in Finnish companies. paper presented at 3rd Conference on Performance Measurement and Management Control, Nice, pp. 1-14.

Le, T. D. (2020b). Multimarket contacts and bank profitability: Do diversification and bank ownership matter? *Cogent Economics & Finance*, *8*(1), 1–21.

Le, T. D., & Ngo, T. (2020). The determinants of bank profitability: A cross-country analysis. *Central Bank Review*, *20* (2), 65–73.

Le, T. D., Tran, S. H., & Nguyen, L. T. (2019). The impact of multimarket contacts on bank stability in Vietnam. *Pacific Accounting Review*, *31*(3), 336–357.

Le, Tu D. Q., & Nguyen, Dat T. (2020). Intellectual capital and bank profitability: New evidence from Vietnam. *Cogent Business & Management, 7*(1), 1-19.

Lev, B. (2003). Intangibles: Gestione, valutazione e reporting dellerisorseintangibilidelleAziende. *Economia& Management (Etas)*.

Levin, A., Lin, C.F., & Chu, C.S.J. (2002). Unit root tests in panel data: Asymptotic and finite sample properties. *Journal of Econometric, 108*, 1-22.

Liang, C. J., Huang, T. T., & Lin, W. C. (2011). Does ownership structure affect firm value? Intellectual capital across industries perspective. *Journal of Intellectual Capital*, *12*(4), 552–570.

Lonnqvist, A. (2004). Measurement of intangible success factors: case studies on the design, implementation and use of measures. Publication 475, doctoral dissertation, Tampere University of Technology, Tampere.

Marr, B. G., Gray, D., & Neely, A. (2003). Why do firms measure their intellectual capital? *Journal of Intellectual Capital*, *4*(4), 441–464.

Martí, J. (2007). In search of an intellectual capital comprehensive theory. Electronic *Journal of Knowledge Management, 5*(2), 245-256.

Mavridis, D. G., &Kyrmizoglou, P. (2005). Intellectual capital performance drivers in the Greek banking sector. *Management Research News*, *28*(5), 43–62.

Meles, A., Porzio, C., Sampagnaro, G., &Verdoliva, V. (2016). The impact of the intellectual capital efficiency on commercial banks performance: Evidence from the US. *Journal of Multinational Financial Management*, *36*, 64–74.

Mondal, A., & Ghosh, S. K. (2012). Intellectual capital and financial performance of Indian banks. *Journal of Intellectual Capital*, *13*(4), 515–530.

Murthy, V., &Mouritsen, J. (2011). The performance of intellectual capital: mobilising relationships between intellectual and financial capital in a bank. *Accounting, Auditing & Accountability Journal, 24*(5), 622-646.

Nazir, M. I., Tan, Y., &Nazir, M. R. (2020). Intellectual capital performance in the financial sector: Evidence fro China, Hong Kong, and Taiwan. *International Journal of Finance & Economics, 26*(1), 1-28.

Oppong, G. K., Irfan, M., &Pattanayak, J. K. (2019). Impact of intellectual capital on financial performance of firms: a study on tourism and hospitality firms in India. *Indian Journal of Finance, 13*(2), 7-21.

Ordóñez de Pablos, P. (2004). Measuring and reporting structural capital: Lessons from European learning firms, *Journal of Intellectual Capital, 5*(4), 629 - 647.

Ozkan, N., Cakan, S. and Kayacan, M. (2016). Intellectual capital and financial performance: a study of the Turkish banking sector. *Borsa Istanbul Review, 17*(3), 190-198.

Pulic, A. (2000). VAIC™–an accounting tool for IC management. *International Journal of Technology Management*, *20*(5–8), 702–714.

Pulic, A. (2004). Intellectual capital – Does it create or destroy value? *Measuring Business Excellence*, *8*(1), 62–68.

Shaban, M., &Kavida, V. (2013). Intellectual capital, financial performance and market valuation: An empirical investigation of information technology industry in India. *Asia-Pacific Journal of Management Research andInnovation*, *9*(1), 55–62.

Sinha, P., & Sharma, S. (2015). Determinants of bank profits and its persistence in Indian banks: a study in a dynamic panel data framework. *International Journal of System Assurance Engineering and Management, 7*(1), 35-46.

Stewart, T. A. (1997). Intellectual Capital: The New Wealth of Organizations, Doubleday, New York, NY.

Tandon, K., Purohit, H., &Tandon, D. (2016). Measuring intellectual capital and its impact on financial performance: Empirical evidence from CNX Nifty companies. *Global Business Review, 17*(4), 1-18.

Ting, W. K. I., & Lean, H. H. (2009). Intellectual capital performance of financial institutions in Malaysia. *Journal of Intellectual Capital*, *10*(4), 588–599.

Tran, D. B., &Vo, D. H. (2018). Should bankers be concerned with Intellectual capital? A study of the Thai banking sector. *Journal of Intellectual Capital*, *19*(5), 897–914.

Tseng, C. Y., & Goo, Y. J. J. (2005). Intellectual capital and corporate value in an emerging economy: Empirical study of Taiwanese manufacturers. *R and D Management, 35*, 187–201.

Wu, W.-Y., & Tsai, H.-J. (2005). Impact of social capital and business operation mode on intellectual capital and knowledge management. *International Journal of Technology Management*, *30*(1–2), 147–171.

Zack, M. H. (1999). Developing a knowledge strategy. *California Management Review, 41*(3), 125-145.

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