Moderating Effect of Institutional Ownership on the Relationship between Intellectual Capital and Financial Performance of Licensed Commercial Banks in Sri Lanka

Dilaxshana, S.*

Department of Financial Management, University of Jaffna, Sri Lanka

Abstract

This study examines the effect of intellectual capital (IC) on the financial performance of licensed commercial banks in Sri Lanka between 2014 and 2024, and tests whether institutional ownership moderates that relationship. Intellectual capital is operationalized using the Value-Added Intellectual Coefficient (VAIC). Financial performance is measured through net interest margin (NIM), return on assets (ROA) and return on equity (ROE). Of the twenty-four licensed commercial banks operating in Sri Lanka, only 12 listed on the Colombo Stock Exchange publish the continuous ownership and financial disclosures the study requires, yielding a balanced panel of 132 bank-year observations. Six panel least squares regressions were estimated, comprising three direct-effects specifications and three moderating-effects specifications with model selection guided by the redundant fixed effects test, the Breusch–Pagan Lagrange Multiplier test and the Hausman test. The results show that CEE is positively and significantly associated with NIM, while SCE is negatively and significantly associated with both NIM and ROA; HCE is negatively and only marginally significantly associated with ROE. Institutional ownership has no significant direct effect on NIM or ROA and only a marginally significant negative effect on ROE. The moderating effect of institutional ownership was positive and highly significant for NIM, statistically insignificant for ROA, and negative and marginally significant for ROE. These findings indicate that the governance role of institutional shareholders in the Sri Lankan banking sector is neither uniformly beneficial nor uniformly detrimental but is instead contingent upon the dimension of performance considered.

***Keywords*:** intellectual capital; institutional ownership; financial performance; licensed commercial banks; Sri Lanka

1. Introduction

In the contemporary knowledge-based economy, a firm's sustainable competitive advantage is increasingly determined not merely by its physical and financial assets, but also by its ability to create value from intangible resources such as employee knowledge, organizational routines and customer relationships. This intangible resource base is commonly referred to as

* Corresponding author: s.mayu1999@gmail.com

Proceedings of the 6th Annual International Conference on Emerging Financial Markets and Policy (EFMP 2026)
© 2026 Sri Lanka Finance Association
ISSN 2792-1220, eISSN 2806-514X

intellectual capital (IC), and it has become a central concern for academic researchers and practitioners seeking to explain variations in corporate performance that traditional accounting-based measures fail to capture. In the banking industry, where the core business is built on trust, professional competence, information processing, and service delivery, intellectual capital is widely regarded as a fundamental driver of profitability and long-term value creation (Kibiya et al., 2019). Traditional accounting frameworks capture physical and financial capital but largely fail to recognize the value of embedded employee expertise, organizational systems, and institutional knowledge. This limitation has motivated the development of proxy measures such as the Value-Added Intellectual Coefficient (VAIC), which can be computed entirely from information disclosed in audited financial statements (Pulic, 2000).

The Sri Lankan banking sector has undergone considerable structural change over the past decade, driven by domestic economic volatility, the implementation of Basel III capital requirements, rapid digital transformation and, more recently, the macroeconomic crisis of 2019 - 2022 and the subsequent recovery period. Licensed commercial banks operate in an increasingly competitive and unpredictable environment in which the effective utilization of human capital, structural capital and capital employed is crucial for sustaining financial performance. As financial intermediaries that channel savings into productive lending while managing risk on behalf of depositors and shareholders, banks occupy a strategically important position in the Sri Lankan economy. Their capacity to transform intangible knowledge resources into measurable financial performance therefore has direct implications for the stability and resilience of the financial system. Despite this, empirical evidence on the effect of intellectual capital on the financial performance of Sri Lankan banks, and on the conditions under which this relationship is strengthened or weakened, remains limited when compared with the considerable body of research conducted in other emerging markets, including Indonesia, Malaysia, Nigeria and Turkey (Dewi, 2023; Kibiya et al., 2019; Pratiwi & Chariri, 2021).

A further strand of literature, grounded in agency theory (Jensen & Meckling, 1976), suggests that the relationship between intellectual capital and financial performance is neither necessarily direct nor uniform; rather, it is conditioned by the ownership and governance structure of the firm. Institutional investors, such as banks, insurance companies, pension funds, and other corporate entities that hold substantial blocks of shares, are considered to have both the incentive and the capacity to monitor management, thereby reducing the potential for the misallocation or underutilization of intellectual resources (Dewi, 2023). Institutional ownership is therefore theorized to play a moderating role, either strengthening or weakening the extent to which intellectual capital translates into superior financial outcomes.

However, the empirical evidence on this moderating role is far from definitive. While several studies report that institutional ownership strengthens the relationship between intellectual capital and financial performance (Dewi, 2023; Kibiya et al., 2019; Pratama & Innayah, 2019; Pratiwi & Chariri, 2021), other studies find a negative or statistically insignificant moderating effect (Purwaningsih, 2018). These divergent findings suggest that the moderating role of institutional ownership may be context-dependent, varying according to the regulatory environment, patterns of ownership concentration, and the stage of capital

market development in the country under study. The global economic disruption associated with the COVID-19 pandemic further reinforced the importance of intangible, knowledge-based strategies relative to reliance on physical asset accumulation, prompting banks in many emerging markets to increase investment in information technology, human resource development and organizational systems in order to manage risk and remain competitive. To date, however, limited research has examined the moderating role of institutional ownership in the relationship between intellectual capital and financial performance among Sri Lankan licensed commercial banks over an extended and economically turbulent period.

Against this background, the present study examines the effect of intellectual capital, measured using the VAIC methodology, on the financial performance of licensed commercial banks in Sri Lanka, and determines whether institutional ownership moderates that relationship. The study draws on panel data from twelve licensed commercial banks over the period 2014 to 2024, a timeframe that captures both a period of relative economic stability and the subsequent currency and debt crisis, thereby offering a rich empirical setting for the analysis.

The findings of this study are expected to make three contributions. First, the study extends the limited body of research on intellectual capital in the South Asian banking context, and particularly in Sri Lanka, a market that has received comparatively little attention despite its distinctive post-crisis operating environment. Second, by incorporating institutional ownership as a moderating variable, the study contributes to a more nuanced understanding of how corporate governance mechanisms interact with intangible resource management to influence financial performance. Third, the findings provide practical guidance to bank managers, to regulators such as the Central Bank of Sri Lanka, and to institutional investors regarding the strategic importance of intellectual capital and the governance mechanisms that can enhance its effective utilization.

2. Literature Review

Resource-Based Theory (RBT), initially introduced by Wernerfelt (1984) and subsequently developed by Barney (2001), serves as a key theoretical perspective for explaining the role of intellectual capital in organizational performance. RBT argues that firms can achieve and sustain competitive advantages by acquiring and effectively utilizing resources that are valuable, rare, difficult to imitate, and not readily substitutable. In contrast to tangible and financial assets, intangible resources such as employees' knowledge and skills, organizational processes, and customer relationships are often difficult for competing firms to replicate. Consequently, these resources can provide a significant foundation for sustained value creation (Zahra, 2021). In the banking sector, this perspective suggests that institutions capable of effectively developing, managing, and utilizing their intellectual capital, including human capital, structural capital, and capital employed, are more likely to achieve stronger financial performance and to maintain a competitive position within the industry (Mailani et al., 2024).

Agency Theory, proposed by Jensen and Meckling (1976), focuses on the conflicts that emerge from the separation of ownership and managerial control within an organization. In this principal–agent relationship, managers may pursue objectives that differ from those of

shareholders, creating agency problems and associated costs (Zajac & Goranova, 2026). Corporate governance mechanisms are therefore necessary to strengthen managerial accountability and to align managerial decisions with shareholders' interests. Within this framework, institutional investors can serve as an important monitoring mechanism, because their substantial shareholdings, financial resources and professional expertise may enable them to exercise greater oversight over managerial decisions than individual shareholders can. Such monitoring may extend to the way in which managers acquire, develop and utilize intellectual resources within the firm (Kibiya et al., 2019). Accordingly, Agency Theory supports the inclusion of institutional ownership as a moderating factor in the relationship between intellectual capital and financial performance, since stronger institutional monitoring may influence how effectively managers convert intellectual capital into improved financial outcomes.

Knowledge-Based Theory (KBT), developed by Grant (1996) from the foundations of the resource-based view, places organizational knowledge at the centre of value creation and competitive advantage. From this perspective, knowledge represents a particularly important strategic resource because its development, transfer and replication are constrained by its complexity and by the social interactions through which it is embedded. Cabrilo, Dahms and Tsai (2024) emphasize that sustained competitive advantage depends on an organization's ability to combine the specialized knowledge possessed by its employees and to embed that knowledge within organizational processes, routines and systems that remain within the firm even when individual employees leave. In the context of intellectual capital, KBT therefore provides a theoretical basis for distinguishing between human capital, which reflects the knowledge and competencies of employees, and structural capital, which represents the organizational infrastructure through which individual knowledge is retained, shared and transformed into firm-level value. This conceptual distinction provides an important foundation for the VAIC framework adopted in the present study.

Stakeholder Theory, introduced by Freeman (1984), broadens the traditional view of corporate responsibility by recognizing that firms have obligations to a diverse range of stakeholders rather than to shareholders alone. These stakeholders include employees, depositors, regulators, customers and the wider communities in which organizations operate. Mahajan et al. (2023) argue that the disclosure and effective management of intellectual capital extend beyond the objective of maximizing shareholder value, because they can also enhance organizational legitimacy and reduce information asymmetry among stakeholders who have limited ability to assess the quality of a firm's internal knowledge resources. This perspective is particularly relevant to the banking sector, where depositor confidence, stakeholder trust and regulatory credibility are essential for maintaining long-term stability. Accordingly, Stakeholder Theory supports the view that the effective management of intellectual capital, together with ownership structures that provide appropriate monitoring, can contribute to improved financial performance (Hamdoun et al., 2024).

2.1 Intellectual Capital and Financial Performance

A substantial body of empirical research has examined the relationship between intellectual capital and financial performance, predominantly using return on assets, return on equity or firm value as outcome measures. Several studies report a positive and significant association between VAIC and financial performance, particularly within the banking sector, consistent with the propositions of Resource-Based Theory. Nimtrakoon (2015), in an analysis of listed technology-intensive firms across five ASEAN countries, found that intellectual capital was positively associated with both market value and financial performance, although the magnitude of these relationships varied across countries and across individual intellectual capital components. Similarly, Mondal and Ghosh (2012), examining Indian banks, reported a positive and significant relationship between intellectual capital efficiency and profitability, with human capital efficiency emerging as the strongest contributor to bank performance. In a South Asian setting that is broadly comparable to Sri Lanka, Majumder et al. (2023) investigated Bangladeshi banks using a dynamic GMM estimator and found that capital employed efficiency was a more significant determinant of bank performance than either human capital efficiency or structural capital efficiency, highlighting the importance of capital employed in explaining bank performance within the regional context.

Nevertheless, the empirical evidence is not entirely consistent. Githaiga (2022), in an examination of East African banks, found that the individual components of intellectual capital did not exhibit uniform effects on financial performance, indicating that an aggregate VAIC measure may conceal offsetting effects across its constituent dimensions. Barak and Sharma (2024), comparing Indian public and private sector banks, similarly reported that the sub-elements of intellectual capital can exert either a positive or a negative influence depending on which specific financial performance indicator is examined. Buallay et al. (2019) documented that the contribution of intellectual capital to bank performance shifted markedly in the aftermath of a systemic financial crisis, suggesting that the relationship is sensitive to the prevailing macroeconomic environment. By contrast, Nurhayati et al. (2020), using 122 bank-year observations from banks listed on the Indonesia Stock Exchange over 2015–2017, reported that intellectual capital had a significant positive effect on return on assets. Collectively, these findings suggest that the influence of intellectual capital on financial performance is unlikely to be uniform across its components, since capital employed efficiency, human capital efficiency and structural capital efficiency may contribute differently to profitability depending on the institutional, economic and operating environment.

2.2 Institutional Ownership as a Moderator

The studies discussed above treat intellectual capital as a direct determinant of performance and, in doing so, implicitly assume that the conversion of intangible resources into financial outcomes is independent of who owns the firm. Agency Theory disputes this assumption, and a smaller but growing body of work has tested it empirically by interacting intellectual capital with ownership and governance variables. The evidence from this body of work is, however, sharply divided.

The strongest evidence for positive moderation comes from Kibiya et al. (2019), whose study of listed conglomerates in Nigeria over an eleven-year period employed both pooled ordinary least squares and fixed effects estimators. They found that VAIC had a positive and significant effect on return on assets and, critically, that the interaction between institutional ownership and intellectual capital was positive and significant, indicating that institutional monitoring helps firms to convert intellectual resources into profitability. Pratama and Innayah (2019), analyzing 144 firm-year observations from Indonesian high-technology firms using fixed and random effects panel regressions, reached a similar conclusion, reporting a positive moderating role for institutional ownership. Ahamad et al. (2023) extended this logic to financial institutions, finding that external governance mechanisms positively moderate the relationship between intellectual capital and the efficiency of microfinance institutions. Studies in the Indonesian setting, including Pratiwi and Chariri (2021) and Dewi (2023), likewise report that institutional shareholders reinforce the intellectual capital–performance link, on the reasoning that institutional investors possess both the information and the voting power to discipline discretionary spending on intangibles.

An opposing body of evidence reports negative or null moderation. Purwaningsih (2018), testing ownership structure as a moderator of the VAIC - performance relationship, found that ownership structure did not strengthen the relationship and in certain specifications weakened it. Nurhayati et al. (2020) found that institutional ownership exerted no significant independent effect on the financial performance of Indonesian listed banks, despite a significant joint effect alongside intellectual capital. Singh and Kansil (2018) reported that the institutional ownership–performance relationship in Indian listed firms is inconsistent and highly sensitive to model specification, while Ali et al. (2024) found that the moderating influence of institutional ownership on firm-level efficiency outcomes in an emerging market is not consistently positive and varies with the outcome being explained. Githaiga (2022) provides an important methodological caution for this literature: because the components of intellectual capital behave differently from one another, any moderator interacted with an aggregate VAIC score may produce divergent results depending on which performance measure is used as the dependent variable.

Three observations follow from this review and together define the empirical gap that the present study addresses. First, almost all of the moderation evidence originates from Indonesia, Nigeria and India; no published study, to the author's knowledge, has tested institutional ownership as a moderator of the intellectual capital–financial performance relationship in the Sri Lankan banking sector, despite the fact that Sri Lankan listed banks exhibit unusually high institutional shareholding and are therefore a particularly informative setting in which to test agency-theoretic predictions. Second, the existing moderation studies almost invariably adopt a single accounting measure of performance, most commonly return on assets, and therefore cannot determine whether the divergent findings reported across countries reflect genuine cross-country institutional differences or simply the choice of dependent variable. Third, none of these studies spans a systemic economic crisis of the severity experienced in Sri Lanka between 2019 and 2022, a period in which the monitoring incentives of institutional shareholders and the returns to intangible investment were both placed under acute pressure.

By testing the moderating effect simultaneously across three distinct performance measures within a single market and over a period encompassing both stability and crisis, this study directly addresses these three shortcomings and provides a stronger basis for adjudicating between the competing findings reported above.

2.3 Hypotheses

Resource-Based Theory predicts that the efficient deployment of valuable and inimitable resources improves firm performance, which implies a positive association between capital employed efficiency and bank profitability (Majumder et al., 2023). The evidence on human capital and structural capital efficiency is more mixed, with several studies reporting negative effects where investment in staff and organizational systems represents a cost commitment that has not yet been converted into revenue (Barak & Sharma, 2024; Buallay et al., 2019; Githaiga, 2022). Agency Theory predicts that institutional shareholders, as informed monitors, influence the extent to which managers convert intellectual capital into financial outcomes, although the reviewed evidence indicates that the direction of this moderation is not settled (Ali et al., 2024; Kibiya et al., 2019; Purwaningsih, 2018). Accordingly, the following hypotheses are proposed, with the expected direction stated in parentheses:

H_1: Intellectual capital (VAIC) has a significant effect on the financial performance of licensed commercial banks in Sri Lanka.

H_{1a}: Capital employed efficiency (CEE) has a significant effect on the financial performance of licensed commercial banks in Sri Lanka.

H_{1b}: Human capital efficiency (HCE) has a significant effect on the financial performance of licensed commercial banks in Sri Lanka.

H_{1c}: Structural capital efficiency (SCE) has a significant effect on the financial performance of licensed commercial banks in Sri Lanka.

H_2: Institutional ownership has a significant effect on the financial performance of licensed commercial banks in Sri Lanka.

H_3: Institutional ownership significantly moderates the relationship between intellectual capital and the financial performance of licensed commercial banks in Sri Lanka.

3. Methods

This study adopts a panel design because it captures both between-bank variation in the deployment of intellectual capital and within-bank variation over an eleven-year period that spans a relatively stable phase (2014 - 2018), the onset of macroeconomic stress (2019 - 2021), and the subsequent currency and debt crisis and recovery (2022 - 2024). Data were collected from the audited annual reports and financial statements of licensed commercial banks listed on the Colombo Stock Exchange, supplemented by the shareholding disclosures contained in those reports.

The population of the study comprises the twenty-four licensed commercial banks (LCBs) operating in Sri Lanka under the Banking Act No. 30 of 1988 and supervised by the Central

Bank of Sri Lanka. This population is not homogeneous with respect to public disclosure. It includes two state-owned banks that are not listed, a number of branches of foreign banks that do not publish separate Sri Lankan shareholding structures, and several unlisted domestic banks. Because the study requires two categories of data that only listed entities are obliged to disclose continuously, namely (i) the detailed income, employee cost and equity data required to compute the VAIC components and (ii) the annual shareholding composition required to compute institutional ownership, the sampling frame is necessarily restricted to those licensed commercial banks whose shares are listed on the Colombo Stock Exchange.

A purposive sampling technique was therefore applied, using three inclusion criteria: the bank must be a licensed commercial bank listed on the Colombo Stock Exchange throughout the study period; it must have published audited annual reports containing complete VAIC inputs for every year from 2014 to 2024; and it must have disclosed its institutional shareholding composition for every year of that period. Twelve banks satisfied all three criteria. Banks that were excluded were excluded for identifiable and non-discretionary reasons: unlisted state banks and foreign bank branches fall outside the sampling frame entirely; recently listed banks, including those that completed initial public offerings during the study period, do not have shareholding disclosures extending back to 2014; and a small number of listed banks had incomplete employee cost or ownership disclosure for one or more years. The twelve retained banks therefore constitute a census of the licensed commercial banks for which the required data exist continuously, rather than a discretionary subset, and they account for the substantial majority of the assets of the listed banking sector. The resulting balanced panel comprises 132 bank-year observations (12 cross-sections × 11 years). A balanced structure was preserved deliberately, since it is required by the fixed effects estimation strategy adopted in this study and avoids the selection bias that unbalanced attrition would introduce.

Intellectual capital is broadly understood as the collection of intangibles, knowledge-based resources that contribute to a firm's value creation. It is commonly represented through three dimensions: human capital, structural capital, and capital employed, the last of which encompasses the physical and financial resources utilized by the firm (Akkas & Asutay, 2023). Because intangible resources are difficult to measure directly, the Value-Added Intellectual Coefficient (VAIC) model introduced by Pulic (2000) has been widely adopted in accounting and finance research as a practical measure of intellectual capital, particularly because it can be derived from information contained in publicly available financial statements. The VAIC framework assesses three forms of capital efficiency. Capital Employed Efficiency (CEE) reflects the ability of physical and financial capital to generate value; Human Capital Efficiency (HCE) indicates the value-generating efficiency of employee-related expenditure; and Structural Capital Efficiency (SCE) represents the contribution of organizational systems, processes and structures to value creation (Hayaeian & Hesarzadeh, 2024). In the present study, the aggregate VAIC measure, calculated from these three efficiency components, is employed as the primary proxy for intellectual capital, consistent with previous research. In addition, CEE, HCE and SCE are analyzed separately in order to determine which dimensions of intellectual capital contribute most strongly to the overall relationship with financial performance.

Table 1: Operationalization of Variables

Concept	Variable	Code	Measurement	Source
Dependent variable (Financial performance)	Net Interest Margin	NIM	(Interest income − Interest expense) ÷ Average interest-earning assets	Majumder et al. (2023); Githaiga (2022)
	Return on Assets	ROA	Net income ÷ Total assets	Mondal & Ghosh (2012); Nurhayati et al. (2020)
	Return on Equity	ROE	Net income ÷ Total shareholders' equity	Nimtrakoon (2015); Buallay et al. (2019)
Independent variable (Intellectual capital)	Capital Employed Efficiency	CEE	Value Added (VA) ÷ Book value of net assets (capital employed, CE)	Pulic (2000); Majumder et al. (2023)
	Human Capital Efficiency	HCE	Value Added (VA) ÷ Total employee costs (human capital, HC)	Pulic (2000); Mondal & Ghosh (2012)
	Structural Capital Efficiency	SCE	(VA − HC) ÷ VA	Pulic (2000); Nimtrakoon (2015)
	Overall Intellectual Capital	VAIC	CEE + HCE + SCE	Pulic (2000); Barak & Sharma (2024)
Moderating variable	Institutional Ownership	IO	Percentage of total ordinary shares held by institutional shareholders	Kibiya et al. (2019); Pratama & Innayah (2019)
	Interaction term	IVAIC	VAIC × IO	Kibiya et al. (2019); Purwaningsih (2018)
Control variable	Bank Size	BS	Natural logarithms of total assets	Githaiga (2022); Buallay et al. (2019)

Note: VA = Operating profit + Employee costs + Depreciation + Amortization

Institutional ownership represents the proportion of a company's equity held by institutional investors, including banks, insurance companies, investment and pension funds and other corporate organizations, rather than by individual shareholders (Kibiya et al., 2019). These investors are generally considered sophisticated market participants because they possess substantial financial resources, investment expertise and information-processing capabilities that facilitate closer scrutiny of managerial decisions. From a corporate governance perspective, their involvement may strengthen managerial accountability, limit opportunistic behavior and encourage the more effective allocation of organizational resources, including intellectual capital. Consequently, institutional monitoring may influence the extent to which investments in intangible resources are converted into improved financial performance (Amoughin, 2025). However, the effectiveness of such monitoring may differ according to the characteristics and objectives of institutional investors. For example, passive or index-oriented investors and state-related institutions may have weaker incentives to engage actively in corporate oversight than institutional investors pursuing an activist approach. Differences in monitoring intensity may therefore help to explain the inconsistent empirical evidence concerning the role of institutional ownership across different institutional and country contexts.

Intellectual capital is disaggregated into three separate constructs, namely capital employed efficiency, human capital efficiency and structural capital efficiency, each of which is hypothesized to exert its own effect on financial performance under H_{1a}, H_{1b} and H_{1c} respectively. Financial performance is likewise disaggregated into net interest margin, return

on assets and return on equity. Institutional ownership enters the framework in two distinct roles. Under H_2 it is hypothesized to exert a direct effect on financial performance, shown as a dashed path leading to the dependent variable. Under H_3, and more importantly for the argument of this study, it is hypothesized to moderate the intellectual capital–financial performance relationship; this is represented by an arrow directed onto the main path linking the independent and dependent variables rather than onto either construct individually. Bank size, measured as the natural logarithm of total assets, is not a component of intellectual capital and is therefore positioned separately, below the main relationship, as a control variable that accounts for scale-related differences in financial performance not attributable to intellectual capital or ownership structure. The hypothesized direction of each path is indicated in parentheses in the figure.

Two sets of panel least squares models are estimated for each of the three performance measures in equations 1, 2, and 3. In the equations, *NIM* is net interest margin, *ROA* is return on assets, *ROE* is return on equity, *CEE* is capital employed efficiency, *HCE* is human capital efficiency, *SCE* is structural capital efficiency, *BS* is bank size, *IO* is institutional ownership, $IVAIC_{it}$ is $VAIC_{it} \times IO_{it}$ (interaction term), β_0 is the constant, β_1–β_5 are regression coefficients, and ε_{it} is the error term for bank in year *t*.

A. Direct-effects models (without moderation)

$$\mathrm{NIM}_{it} = \beta_0 + \beta_1 \mathrm{CEE}_{it} + \beta_2 \mathrm{HCE}_{it} + \beta_3 \mathrm{SCE}_{it} + \beta_4 \mathrm{BS}_{it} + \beta_5 \mathrm{IO}_{it} + \varepsilon_{it} \quad (1)$$

$$\mathrm{ROA}_{it} = \beta_0 + \beta_1 \mathrm{CEE}_{it} + \beta_2 \mathrm{HCE}_{it} + \beta_3 \mathrm{SCE}_{it} + \beta_4 \mathrm{BS}_{it} + \beta_5 \mathrm{IO}_{it} + \varepsilon_{it} \quad (2)$$

$$\mathrm{ROE}_{it} = \beta_0 + \beta_1 \mathrm{CEE}_{it} + \beta_2 \mathrm{HCE}_{it} + \beta_3 \mathrm{SCE}_{it} + \beta_4 \mathrm{BS}_{it} + \beta_5 \mathrm{IO}_{it} + \varepsilon_{it} \quad (3)$$

B. Moderating-effects models (institutional ownership as moderator)

$$\mathrm{NIM}_{it} = \beta_0 + \beta_1 \mathrm{IVAIC}_{it} + \beta_2 \mathrm{BS}_{it} + \varepsilon_{it} \quad (4)$$

$$\mathrm{ROA}_{it} = \beta_0 + \beta_1 \mathrm{IVAIC}_{it} + \beta_2 \mathrm{BS}_{it} + \varepsilon_{it} \quad (5)$$

$$\mathrm{ROE}_{it} = \beta_0 + \beta_1 \mathrm{IVAIC}_{it} + \beta_2 \mathrm{BS}_{it} + \varepsilon_{it} \quad (6)$$

Models (4) to (6) are estimated in reduced form, with the interaction term entered alongside the control variable. Because the bank-specific intercepts of the fixed effects estimator absorb the time-invariant component of institutional ownership, which is highly persistent within banks over the study period, the interaction coefficient is interpreted as the effect of ownership-weighted intellectual capital rather than as a conventional moderated-regression coefficient estimated net of both constituent main effects. This interpretive caveat is revisited in Section 5.

The data were analyzed using EViews. Descriptive statistics were computed first to establish the distributional properties of the variables, followed by a Pearson correlation analysis to assess bivariate associations and to screen for multicollinearity. Three diagnostic

procedures were then conducted: a Likelihood Ratio test for group-wise heteroskedasticity, an Augmented Dickey-Fuller (ADF- Fisher) panel unit root test, and a three-stage model selection procedure comprising the redundant fixed effects (*F*) test, the Breusch-Pagan Lagrange Multiplier test and the Hausman test. Panel least squares regressions were then estimated for each of the six models specified above.

4. Results and Findings

The descriptive statistics show that, human capital is by far the largest contributor to value added among the three intellectual capital components in the sampled banks, followed by structural capital, with capital employed contributing comparatively little. The sampled banks are predominantly held by institutional rather than retail shareholders, though with considerable variation across the panel. Bank size reflects a moderately homogeneous set of banks in terms of scale. The negative minimum values recorded for ROA (-0.0313) and ROE (-0.0714) confirm that at least one bank-year in the sample recorded a net loss, most plausibly reflecting the effects of the crisis period. Overall, the relatively low standard deviations for *CEE, SCE, NIM* and *ROA* suggest limited dispersion in these variables across banks and years, whereas *HCE, IO* and *ROE* display comparatively wider variation, indicating more substantial cross-bank and cross-time differences in human capital efficiency, ownership structure and equity returns.

Table 2: Descriptive Statistics

Statistic	CEE	HCE	SCE	IO	BS	NIM	ROA	ROE
Mean	0.0896	7.6150	0.8774	0.7363	19.4434	0.0434	0.0118	0.1023
Median	0.0878	7.2653	0.8642	0.7949	19.5741	0.0414	0.0114	0.1103
Maximum	0.1584	19.9172	3.7533	0.9327	21.7492	0.0772	0.0509	0.2422
Minimum	0.0074	0.3632	0.3242	0.3302	15.7252	0.0253	-0.0313	-0.0714
Std. Dev.	0.0245	3.2640	0.2796	0.1565	1.2175	0.0105	0.0111	0.0647

Note: n = 132 bank-year observations (12 banks × 11 years, 2014-2024)

Table 3 reports on the Pearson correlation coefficients, with the corresponding p-values shown in parentheses. The results are interpreted below in three groups: associations among the intellectual capital components, associations between the independent variables and each dependent variable, and associations involving institutional ownership.

Turning first to the associations among the intellectual capital components, capital employed efficiency and human capital efficiency are positively and significantly correlated at the 1 per cent level ($r = 0.6499$, $p = 0.0000$), which is the strong association in the matrix and indicates that banks generating high value added per unit of capital employed also tend to generate high value added per unit of employee cost. Structural capital efficiency is negatively and significantly correlated with capital employed efficiency at the 5 per cent level ($r = -0.2018$, $p = 0.0203$), but its correlation with human capital efficiency is negative, very weak and statistically insignificant ($r = -0.0399$, $p = 0.6494$). Taken together, these results indicate that the three components of VAIC are not interchangeable measures of a single underlying

construct, and that a mild trade-off exists between capital-employed efficiency and structural capital efficiency.

Table 3: Pearson Correlation Matrix

Variable	CEE	HCE	SCE	BS	NIM	ROA	ROE	IO
CEE	1.0000							
HCE	0.6499***	1.0000						
	(0.0000)							
SCE	-0.2018**	-0.0399	1.0000					
	(0.0203)	(0.6494)						
BS	0.2710***	0.6216***	-0.1346	1.0000				
	(0.0017)	(0.0000)	(0.1237)					
NIM	0.4146***	0.0049	-0.1648*	-0.1271	1.0000			
	(0.0000)	(0.9554)	(0.0590)	(0.1464)				
ROA	0.1401	0.2887***	-0.3045***	0.5054***	0.1272	1.0000		
	(0.1092)	(0.0008)	(0.0004)	(0.0000)	(0.1462)			
ROE	0.1348	0.3011***	-0.1381	0.5969***	0.1248	0.6643***	1.0000	
	(0.1232)	(0.0005)	(0.1143)	(0.0000)	(0.1538)	(0.0000)		
IO	-0.0879	-0.1183	0.0219	-0.1087	0.1084	-0.1793**	-0.2586***	1.0000
	(0.3164)	(0.1765)	(0.8031)	(0.2149)	(0.2160)	(0.0397)	(0.0028)	

*Note: p-values are reported *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$. $n = 132$*

Capital employed efficiency is positively and significantly correlated with net interest margin at the 1 per cent level ($r = 0.4146$, $p < 0.0001$), but its correlations with return on assets ($r = 0.1401$, $p = 0.1092$) and return on equity ($r = 0.1348$, $p = 0.1232$) are positive yet statistically insignificant at conventional levels. Human capital efficiency displays the reverse pattern: it is effectively uncorrelated with net interest margin ($r = 0.0049$, $p = 0.9554$), yet positively and significantly correlated with both return on assets ($r = 0.2887$, $p = 0.0008$) and return on equity ($r = 0.3011$, $p = 0.0005$) at the 1 per cent level. Structural capital efficiency is negatively correlated with all three performance measures, but the association is statistically significant at the 1 per cent level only for return on assets ($r = -0.3045$, $p = 0.0004$); its association with net interest margin is significant only at the 10 per cent level ($r = -0.1648$, $p = 0.0590$) and should therefore be regarded as weak, and its association with return on equity is not significant ($r = -0.1381$, $p = 0.1143$). Bank size, the control variable, is positively and significantly correlated with return on assets ($r = 0.5054$, $p < 0.0001$) and return on equity ($r = 0.5969$, $p < 0.0001$) at the 1 per cent level but is not significantly correlated with net interest margin ($r = -0.1271$, $p = 0.1464$), confirming its relevance as a control in the profitability models in particular.

Institutional ownership, the moderating variable, is not significantly correlated with any of the three intellectual capital components ($p = 0.1765$ to 0.8031) or with bank size ($r = -0.1087$, $p = 0.2149$), which indicates that ownership structure in this sample is broadly independent of the level of intellectual capital efficiency a bank achieves. Its correlation with net interest margin is positive but insignificant ($r = 0.1084$, $p = 0.2160$). By contrast, institutional ownership is negatively and significantly correlated with return on assets at the 5 per cent level ($r = -0.1793$, $p = 0.0397$) and with return on equity at the 1 per cent level ($r = -0.2586$, $p =$

0.0028). These two significant negative associations foreshadow the negative direct and moderating effects on equity-based performance reported in Sections 4.5 and 4.6.

Two qualifications apply to the interpretation of Table 3. First, the coefficients reported are simple bivariate associations estimated without controls and without bank-specific effects, and they therefore indicate direction and strength of association only; they do not establish causality and are not a substitute for the multivariate results reported below. Second, with respect to multicollinearity, none of the pairwise correlations approach the conventional threshold of 0.80. The highest coefficients, between capital employed efficiency and human capital efficiency (0.6499) and between human capital efficiency and bank size (0.6216), are moderate rather than severe, but they are sufficiently high to justify the study's decision to estimate the composite VAIC and IVAIC models separately from the disaggregated CEE, HCE and SCE models.

Table 4: Likelihood Ratio Test for Group-wise Heteroskedasticity

Model	Likelihood Ratio statistic	p-value	Decision (5% level)
Panel A – NIM model	31.1949	0.0018	Reject H_0: heteroskedasticity present
Panel B – ROA model	116.8700	0.0000	Reject H_0: heteroskedasticity present
Panel C – ROE model	31.8660	0.0015	Reject H_0: heteroskedasticity present

Note: H_0 = homoskedastic residual variance across cross-sections

Table 5: Augmented Dickey-Fuller (ADF-Fisher) Panel Unit Root Test

Variable	Level t-test	Level p-value	1st difference t-test	1st difference p-value	Stationarity status
CEE	30.9700	0.1545	46.2300	0.0041	Stationary at first difference - I (1)
HCE	33.0200	0.1036	36.7200	0.0467	Stationary at first difference - I (1)
SCE	37.6700	0.0374	-	-	Stationary at level – I (0)
IO	22.1230	0.5719	45.5097	0.0051	Stationary at first difference - I (1)
ROA	27.4645	0.2833	57.6300	0.0001	Stationary at first difference - I (1)
ROE	28.0460	0.2581	63.0773	0.0000	Stationary at first difference - I (1)
NIM	32.3440	0.1187	68.7875	0.0000	Stationary at first difference - I (1)

The Likelihood Ratio test for group-wise heteroskedasticity was conducted separately for the NIM, ROA and ROE panels prior to estimation. In all three cases the null hypothesis of homoskedasticity is strongly rejected, confirming that residual variance differs systematically across the twelve sampled banks. This is an expected feature of a panel of banks that differ substantially in size and business mix, and it supports the use of a cross-section fixed effects framework, which absorbs time-invariant bank-specific heterogeneity, in preference to a pooled ordinary least squares model that would otherwise produce biased standard errors.

The panel unit root test conducted using the Augmented Dickey- Fuller approach, examines whether each variable is stationary or contains a unit root, which is an important precondition for reliable panel regression estimation. At level, only structural capital efficiency is stationary. SCE is therefore integrated of order zero, I(0). All the remaining variables, namely capital employed efficiency, human capital efficiency, institutional ownership, return on assets, return on equity and net interest margin are non-stationary in their original form. Once first-differenced, however, all six become stationary, meaning that each is integrated of order one, I(1). This mixed order of integration, with one variable stationary at level and the remainder stationary only after first differencing, is a common feature of short bank-level panels and confirms that the data are neither purely I(0) nor purely I(1), which in turn rules out a cointegration-based estimation strategy in favour of the fixed effects approach adopted here.

Model selection between the pooled ordinary least squares, fixed effects and random effects specifications was carried out using a standard three-stage panel testing procedure. First, the redundant fixed effects (F) indicates that the fixed effects model is preferred over pooled OLS. Second, the Breusch–Pagan Lagrange Multiplier test indicates that the random effects model is preferred over pooled OLS. Having established that both fixed and random effects outperform pooled OLS, the Hausman test was applied to determine which of the two is the more appropriate and consistent estimator. In five of the six models the Hausman p-value was below 0.05, indicating that the random effects estimator is consistent and confirming the fixed effects specification; in the NIM moderating model. Accordingly, the fixed effects panel regression model was selected for the final estimation and interpretation of all six models.

4.1 Effect of Intellectual Capital on Financial Performance

Tables 6, 7 and 8 present the results for net interest margin, return on assets and return on equity respectively. For the net interest margin model reported in Table 6, the Hausman test (χ^2 = 21.344, p = 0.0007) rejects the null hypothesis that the random effects estimator is consistent, so the fixed effects specification is adopted. Capital employed efficiency has a positive and statistically significant coefficient at the 5 per cent level (β = 0.1266, p = 0.0106), indicating that banks generating more value added per unit of physical and financial capital achieve a materially higher net interest margin. Structural capital efficiency has a negative and significant coefficient at the 5 per cent level (β = -0.0056, p = 0.0238), suggesting that a higher proportional contribution of structural capital to value added is associated with a lower net interest margin. Human capital efficiency (p = 0.2685) and bank size (p = 0.2301) are not statistically significant in this specification. The model explains approximately 60 per cent of the variation in NIM (R^2 = 0.6035; adjusted R^2 = 0.5483) and is jointly significant (F = 10.94, p = 0.0000). H_{1a} is therefore supported for net interest margin and H_{1c} is supported in the negative direction, while H_{1b} is not supported.

For the return on assets model reported in Table 7, the Hausman test (χ^2 = 14.155, p = 0.0147) again supports the fixed effects specification. Among the intellectual capital components, only structural capital efficiency is statistically significant, and its coefficient is negative and significant at the 1 per cent level (β = -0.0098, p = 0.0009), indicating that a higher proportional reliance on structural capital in value creation is associated with lower asset

profitability, mirroring the pattern already observed for net interest margin. Capital employed efficiency (p = 0.3520), human capital efficiency (p = 0.5665) and bank size (p = 0.2535) are not statistically significant predictors of ROA, although the overall model remains jointly significant (F = 7.69, p = 0.0000) and explains approximately 52 per cent of the variation in ROA. H_{1c} is therefore supported for return on assets, while H_{1a} and H_{1b} are not.

Table 6: Panel 1 - Net Interest Margin: Direct-Effects Regression

Correlated Random Effects - Hausman Test		**Chi-Sq. statistic**		**Chi-Sq. d.f.**	**Prob.**
Cross-section random effects - fixed effects model selected		21.343689		5	**0.0007**
Variable	**Coefficient**	**Std. error**		**t-statistic**	**Prob.**
C	0.061251	0.033017		1.855117	0.0661
CEE	0.126596	0.048730		2.597899	0.0106
HCE	0.000512	0.000460		1.111832	0.2685
SCE	−0.005570	0.002431		-2.291448	0.0238
BS	−0.002006	0.001662		-1.206585	0.2301
IO	0.014609	0.015358		0.951233	0.3435
R-squared	0.6035	**Adj. R-squared**		0.5483	
F-statistic	10.9404	**Prob(F-stat)**		0.0000	
Durbin-Watson	1.1175	**Observations**		132	

Note: dependent variable = NIM. Estimated by panel least squares with cross-section fixed effects

Table 7: Panel 2 - Return on Assets: Direct-Effects Regression

Correlated Random Effects - Hausman Test		**Chi-Sq. statistic**		**Chi-Sq. d.f.**	**Prob.**
Cross-section random effects- fixed effects model selected		14.154918		5	**0.0147**
Variable	**Coefficient**	**Std. error**		**t-statistic**	**Prob.**
C	0.046147	0.038850		1.187823	0.2374
CEE	0.053579	0.057338		0.934434	0.3520
HCE	-0.000311	0.000542		-0.574939	0.5665
SCE	-0.009783	0.002860		-3.420364	0.0009
BS	-0.002245	0.001956		-1.147574	0.2535
IO	0.021006	0.018071		1.162415	0.2475
R-squared	0.5167	**Adj. R-squared**		0.4495	
F-statistic	7.6854	**Prob(F-stat)**		0.0000	
Durbin-Watson	1.0312	**Observations**		132	

Note: dependent variable = ROA. Estimated by panel least squares with cross-section fixed effects

For the return on equity model reported in Table 8, the Hausman test (χ^2 = 32.995, p < 0.0001) strongly supports the fixed effects specification. Human capital efficiency is negative and marginally significant at the 10 per cent level (β = -0.0046, p = 0.0585), suggesting that, at higher levels, human-capital-intensive value creation is not fully translated into equity returns, potentially reflecting the cost burden of staff-related expenditure during the crisis years. Capital employed efficiency (p = 0.4245), structural capital efficiency (p = 0.1078) and bank size (p = 0.9029) are not statistically significant. The model has strong explanatory power, with an R^2 of 0.7135 and a highly significant F-statistic (F = 17.90, p < 0.0001). H_{1b} therefore

receives marginal support for return on equity, while H_{1a} and H_{1c} are not supported for this measure.

Table 8: Panel 3 - Return on Equity: Direct-Effects Regression

Correlated Random Effects – Hausman Test	**Chi-Sq. statistic**	**Chi-Sq. d.f.**	**Prob.**
Cross-section random effects - fixed effects model selected	32.995207	5	**0.0000**
Variable	**Coefficient**	**Std. error**	**t-statistic**	**Prob.**
C	0.217642	0.173714	1.252874	0.2128
CEE	0.205481	0.256384	0.801461	0.4245
HCE	-0.004628	0.002422	-1.910853	0.0585
SCE	-0.020730	0.012790	-1.620776	0.1078
BS	0.001069	0.008747	0.122207	0.9029
IO	-0.137291	0.080804	-1.699067	0.0920
R-squared	0.7135	**Adj. R-squared**	0.6737	
F-statistic	17.9035	**Prob(F-stat)**	0.0000	
Durbin–Watson	1.1141	**Observations**	132	

Note: dependent variable = ROE. Estimated by panel least squares with cross-section fixed effects

Intellectual capital does affect the financial performance of Sri Lankan licensed commercial banks, but selectively rather than uniformly. Each of the three components attains significance for exactly one performance measure, and two of the three significant coefficients are negative. No single component of intellectual capital improves all three performance measures.

4.2 Direct Effect of Institutional Ownership on Financial Performance

In the net interest margin model, institutional ownership is positive but statistically insignificant (β = 0.0146, p = 0.3435). In the return on assets model, it is positive and insignificant (β = 0.0210, p = 0.2475). Only in the return on equity model does institutional ownership attain significance, and then only marginally and in the negative direction (β = -0.1373, p = 0.0920), indicating a weak dampening effect of institutional shareholding on equity returns. Therefore, institutional ownership has no significant direct effect on the profitability of Sri Lankan licensed commercial banks as measured by net interest margin or return on assets, and only a weak negative direct effect on return on equity. H_2 is accordingly not supported for NIM or ROA and is only marginally supported, in the negative direction, for ROE.

4.3 Moderating Effect of Institutional Ownership

The central concern of this study is addressed by the three moderating-effects models reported in Tables 9, 10 and 11, each of which introduces the interaction term IVAIC alongside the control variable. For net interest margin (Table 9), the Hausman statistic yields a p-value of 0.0517, which is marginally above the 5 per cent threshold and therefore does not decisively reject the random effects estimator. The fixed effects specification is retained for consistency with the other five models and because the difference is borderline; the implications of this choice are acknowledged in Section 8. The interaction term is positive and highly significant at the 1 per cent level (β = 0.001687, $p < 0.0001$), indicating that banks with higher institutional ownership convert intellectual capital into interest margin more effectively than banks with

lower institutional ownership. Bank size is insignificant (p = 0.8799). The model explains approximately 55 per cent of the variation in NIM (R^2 = 0.5493; adjusted R^2 = 0.4997), and the small gap between the two statistics suggests that the model is not over-fitted. The model is jointly significant (F = 11.064, p < 0.0001), and the Durbin–Watson statistic of 1.2502 indicates mild positive residual autocorrelation that is not severe enough to undermine the results.

Table 9: Panel 1 – Net Interest Margin: Moderating-Effects Regression

Correlated Random Effects - Hausman Test		**Chi-Sq. statistic**	**Chi-Sq. d.f.**	**Prob.**
Cross-section random effects - fixed effects model retained		5.926482	2	**0.0517**
Variable	**Coefficient**	**Std. error**	**t-statistic**	**Prob.**
C	0.028018	0.030519	0.918045	0.3605
IVAIC	0.001687	0.000386	4.366440	0.0000
BS	0.000246	0.001626	0.151372	0.8799
R-squared	0.5493	**Adj. R-squared**	0.4997	
F-statistic	11.0640	**Prob(F-stat)**	0.0000	
Durbin–Watson	1.2502	**Observations**	132	

Note: dependent variable = NIM. IVAIC = VAIC × institutional ownership

Table 10: Panel 2 – Return on Assets: Moderating-Effects Regression

Correlated Random Effects – Hausman Test		**Chi-Sq. statistic**	**Chi-Sq. d.f.**	**Prob.**
Cross-section random effects – fixed effects model selected		8.236166	2	**0.0163**
Variable	**Coefficient**	**Std. error**	**t-statistic**	**Prob.**
C	0.025618	0.036151	0.708655	0.4799
IVAIC	0.000219	0.000458	0.479220	0.6327
BS	-0.000781	0.001926	-0.405223	0.6860
R-squared	0.4433	**Adj. R-squared**	0.3820	
F-statistic	7.2287	**Prob(F-stat)**	0.0000	
Durbin–Watson	0.9585	**Observations**	132	

Note: dependent variable = ROA. IVAIC = VAIC × institutional ownership

For return on assets (Table 10), the Hausman test (χ^2 = 8.236, p = 0.0163) supports the fixed effects specification. The interaction term is positive but statistically insignificant (β = 0.000219, p = 0.6327), indicating that institutional ownership neither strengthens nor weakens the relationship between intellectual capital and asset profitability in this sample.

For return on equity (Table 11), the Hausman test (χ^2 = 10.204, p = 0.0061) confirms the fixed effects specification. The interaction term is negative and marginally significant at the 10 per cent level (β = −0.003645, p = 0.0653), indicating that higher institutional ownership weakens, rather than strengthens, the relationship between intellectual capital and equity returns. Combined with the negative direct effect reported in Section 4.5, this suggests a consistently dampening role for institutional shareholders where equity returns are concerned.

Institutional ownership does moderate the intellectual capital–financial performance relationship, but the direction of that moderation depends on the performance measure

examined: it is positive and highly significant for net interest margin, statistically insignificant for return on assets, and negative and marginally significant for return on equity. H_3 is therefore supported for NIM, not supported for ROA, and marginally supported in the opposite direction for ROE.

Table 11: Panel 3 – Return on Equity: Moderating-Effects Regression

Correlated Random Effects - Hausman Test		**Chi-Sq. statistic**	**Chi-Sq. d.f.**	**Prob.**
Cross-section random effects – fixed effects model selected		10.203724	2	**0.0061**
Variable	**Coefficient**	**Std. error**	**t-statistic**	**Prob.**
C	0.072701	0.154753	0.469789	0.6394
IVAIC	-0.003645	0.001959	-1.860606	0.0653
BS	0.002697	0.008246	0.327102	0.7442
R-squared	0.6976	**Adj. R-squared**	0.6642	
F-statistic	20.9360	**Prob(F-stat)**	0.0000	
Durbin–Watson	1.0591	**Observations**	132	

Note: dependent variable = ROE. IVAIC = VAIC × institutional ownership

Table 12: Summary of Hypothesis Testing

Hypothesis	**NIM**	**ROA**	**ROE**
H_1: VAIC - financial performance	Supported (via CEE and SCE)	Supported (via SCE)	Marginally supported (via HCE)
H_{1a}: CEE - financial performance	Supported (positive, p = 0.0106)	Not supported (p = 0.3520)	Not supported (p = 0.4245)
H_{1b}: HCE - financial performance	Not supported (p = 0.2685)	Not supported (p = 0.5665)	Marginally supported (negative, p = 0.0585)
H_{1c}: SCE - financial performance	Supported (negative, p = 0.0238)	Supported (negative, p = 0.0009)	Not supported (p = 0.1078)
H_2: Institutional ownership - financial performance	Not supported (p = 0.3435)	Not supported (p = 0.2475)	Marginally supported (negative, p = 0.0920)
H_3: Institutional ownership moderates IC - financial performance (IVAIC)	Supported (positive, p = 0.0000)	Not supported (p = 0.6327)	Marginally supported (negative, p = 0.0653)

4.4 Discussion of Findings

With respect to H_1 and its three sub-hypotheses, intellectual capital is confirmed to matter for bank financial performance, but not uniformly across its components or across performance measures. H_{1a} is supported only for net interest margin, where capital employed efficiency carries a positive and significant coefficient. This is consistent with the prediction of Resource-Based Theory that the effective deployment of physical and financial capital is a genuine source of competitive advantage (Barney, 2001; Wernerfelt, 1984), and it accords directly with Majumder et al. (2023), who found capital employed efficiency to be the dominant determinant of bank performance in Bangladesh, ahead of structural and human capital efficiency.

H_{1c} is supported for both net interest margin and return on assets, but in the negative direction, indicating that a higher proportional contribution of structural capital to value added is associated with lower profitability on both measures. This component-dependent and sometimes negative pattern is consistent with Barak and Sharma (2024), who found that the sub-elements of intellectual capital, including structural capital, can exert either a positive or a negative influence depending on which financial performance indicator is examined among Indian banks. A plausible explanation in the Sri Lankan context is that heavier investment in organizational systems, technology and structural processes represents a cost commitment that has not yet been converted into proportionate revenue gains, particularly during a period that included a severe currency and debt crisis. This interpretation is consistent with Buallay et al. (2019), who documented a marked shift in the contribution of intellectual capital to bank performance in the aftermath of a systemic financial crisis.

H_{1b} is the weakest of the three sub-hypotheses, receiving only marginal support and only for return on equity, where human capital efficiency carries a marginally significant negative coefficient. This may similarly reflect the post-crisis cost pressures documented by Buallay et al. (2019), whereby staff-related costs rose sharply without a commensurate increase in equity returns. Overall, the disaggregation of H_1 demonstrates that the composite VAIC relationship documented in prior studies conceals offsetting component-level effects, with capital employed efficiency and structural capital efficiency driving most of the significant results and human capital efficiency playing a comparatively minor role in this sample. This finding lends direct empirical support to the caution raised by Githaiga (2022) that an aggregate VAIC score may conceal divergent component effects.

With respect to H_2, institutional ownership shows no significant direct effect on either net interest margin or return on assets, and only a weak, marginally significant negative effect on return on equity. This is broadly consistent with Ahmed et al. (2022), who found that ownership structure does not uniformly enhance firm performance alongside intellectual capital; with Singh and Kansil (2018), whose Indian panel evidence likewise showed that the direct relationship between institutional ownership and firm performance is inconsistent and sensitive to model specification; and with Nurhayati et al. (2020), who found that institutional ownership had a non-significant effect on the financial performance of Indonesian listed banks despite a significant joint effect alongside intellectual capital. The implication is that, at least on average across the sample, the mere presence of institutional shareholders does not automatically translate into superior direct financial outcomes for Sri Lankan banks. One explanation, consistent with Agency Theory, is that a meaningful share of institutional ownership in Sri Lankan listed banks is concentrated among relatively passive or state-affiliated institutional holders, such as provident and pension funds, whose monitoring intensity may differ from that of the more activist institutional investors documented in the international evidence reviewed above.

With respect to H_3, the moderating role of institutional ownership is the study's most striking finding, precisely because it is not uniform. For net interest margin, institutional ownership moderates the intellectual capital relationship positively and very strongly, a result that aligns with Ahamad et al. (2023), who found that external governance mechanisms

positively moderate the relationship between intellectual capital and efficiency in financial institutions, and that supports the agency-theoretic argument that the monitoring function of institutional shareholders encourages managers to convert intellectual resources into performance more efficiently. This positive moderation is also consistent with Kibiya et al. (2019), whose fixed effects analysis of listed Nigerian conglomerates found that the interaction between institutional ownership and intellectual capital had a positive and significant effect on return on assets, and with Pratama and Innayah (2019), who reported positive moderation by institutional ownership among Indonesian high-technology firms.

For return on assets, by contrast, the moderating effect is statistically indistinguishable from zero, indicating that institutional ownership neither strengthens nor weakens the intellectual capital-ROA relationship in this sample. For return on equity, the moderating effect turns negative and marginally significant, a pattern echoed by Purwaningsih (2018), who reported that ownership structure failed to strengthen and in places weakened the VAIC-performance relationship, and by Ali et al. (2024), who found that the moderating influence of institutional ownership on firm-level efficiency outcomes in an emerging market is not consistently positive and varies with the specific outcome being explained.

Taken together, these three divergent results demonstrate that the moderating role of institutional ownership documented in the recent literature is not merely context-dependent between countries, as prior research has emphasized, but can also be dependent on which specific dimension of financial performance is being explained within a single market and a single sample. A plausible interpretation is that institutional monitoring is most effective in disciplining core intermediation activity, which is what the net interest margin captures, while its influence on equity returns is complicated by the capital structure preferences of institutional shareholders, who in a banking context may favor higher capitalization and therefore a larger equity denominator. This interpretation is speculative and warrants direct testing in future research.

Several methodological observations further contextualize these findings. The Likelihood Ratio tests confirm the presence of heteroskedasticity across all three performance panels, and the ADF–Fisher unit root tests reveal a mixed order of integration across the study variables; both justify the fixed effects panel approach adopted here in preference to pooled OLS or cointegration-based alternatives. The borderline Hausman result for the net interest margin moderating model ($p = 0.0517$) indicates that the choice between fixed and random effects in that specific model is not entirely clear-cut, and the strongly significant interaction coefficient in that model should therefore be interpreted with some caution and, ideally, corroborated using robust or clustered standard errors in future extensions of this analysis.

5. Conclusion

This study set out to achieve three objectives: to examine the effect of intellectual capital and its components on the financial performance of licensed commercial banks in Sri Lanka; to examine the direct effect of institutional ownership on that performance; and to determine whether institutional ownership moderates the intellectual capital–financial performance relationship.

Intellectual capital affects financial performance selectively rather than uniformly: capital employed efficiency raises net interest margin, structural capital efficiency depresses both net interest margin and return on assets, and human capital efficiency exerts only a marginal negative influence on return on equity. The practical conclusion for bank management is that intellectual capital cannot be managed as a single aggregate; investment in organizational systems in particular did not translate into profitability over the study period, and the components must be monitored and evaluated separately.

The mere presence of institutional shareholders has no significant direct bearing on the profitability of Sri Lankan licensed commercial banks, other than a weak negative association with return on equity. The conclusion is that ownership concentration, in itself, is not a performance lever in this market.

Institutional ownership does condition the relationship between intellectual capital and financial performance, and that it does so in a direction that depends on the performance dimension examined: positively and strongly for net interest margin, insignificantly for return on assets, and negatively and marginally for return on equity. This is the study's principal contribution. It demonstrates that the conflicting findings reported in the prior literature on moderation cannot be attributed to cross-country institutional differences alone, since divergent results of the same kind arise within a single market, a single sample and a single estimation framework once multiple performance measures are examined simultaneously.

Three implications follow. For bank managers, the findings indicate that the returns to intangible investment are realized first in core intermediation margins and only later, if at all, in equity returns, and that structural capital investment requires an explicit business case rather than an assumption of automatic benefit. For institutional investors, the findings indicate that an ownership stake alone does not improve outcomes; monitoring must be active and directed at how intangible resources are deployed. For regulators, including the Central Bank of Sri Lanka, the finding that the governance contribution of institutional shareholders is uneven suggests that disclosure requirements relating to the composition and activism of institutional holders would improve the market's ability to assess governance quality.

More broadly, this nuanced picture underscores the value of examining multiple performance outcomes simultaneously in future intellectual capital and corporate governance research, rather than relying on a single composite indicator of financial performance.

As with any empirical study, these findings should be interpreted in the light of several limitations. First, the sample is restricted to twelve licensed commercial banks, reflecting the full set of banks with complete disclosure over the study period; while this yields a reasonably sized panel of 132 observations, the small number of cross-sectional units limits generalizability and constrains the use of more data-intensive dynamic panel techniques. Second, the VAIC methodology, although widely used, has been criticized for conflating efficiency with scale and for relying on accounting-based rather than market-based value added; future studies could complement VAIC with market-based or modified VAIC measures. Third, institutional ownership is treated here as a single aggregate percentage; disaggregating institutional owners by type, whether foreign versus domestic, state-affiliated versus private,

or short-term versus long-term investors, may reveal more precise moderation mechanisms than the composite measure used here.

Fourth, the moderating models were estimated in reduced form, with the interaction term entered alongside the control variable rather than alongside both constituent main effects. While the fixed effects estimator absorbs much of the persistent between-bank variation in ownership, a fully specified moderated regression including VAIC and institutional ownership as separate terms would permit a cleaner decomposition of direct and interaction effects, and future work should adopt that specification. Fifth, the presence of heteroskedasticity and the marginal Hausman result in the net interest margin moderating model suggest that future work should employ robust or clustered standard errors, and ideally a dynamic panel GMM estimator, to address heteroskedasticity and potential endogeneity more fully. Finally, because this study is confined to a single country and industry, future research should extend the analysis to other South Asian banking markets, or to unlisted and specialized banks, in order to assess whether the performance-metric-dependent moderation pattern identified here generalizes beyond the Sri Lankan licensed commercial banking sector.

References

Ahamad, S., Al-Jaifi, H. A. A., & Ehigiamusoe, K. U. (2023). Impact of intellectual capital on microfinance institutions' efficiency: The moderating role of external governance. *Journal of the Knowledge Economy, 14*, 691–717. https://doi.org/10.1007/s13132-022-00937-8

Ahmed, Z., Hussin, M. R. A., & Pirzada, K. (2022). The impact of intellectual capital and ownership structure on firm performance. *Journal of risk and financial management, 15*(12), 553.

Akkas, E., & Asutay, M. (2023). The impact of intellectual capital formation and knowledge economy on banking performance: a case study of GCC's conventional and Islamic banks. *Journal of Financial Reporting and Accounting, 21*(5), 1149-1170.

Ali, A., Rasheed, S., Iqbal, S., Faiz, J., & Ahmad, T. (2024). Impact of Intellectual Capital on Organizational Performance: Mediating Role of Green Supply Chain Management Practices. *Pakistan Journal of Humanities and Social Sciences, 12*(3), 2313-2331.

Amoughin, A. (2025). Mediating role of financialization and intellectual capital in the relationship between ownership structure and firms' financial performance. *Journal of Corporate Accounting & Finance*. https://doi.org/10.1002/jcaf.22770

Barak, M., & Sharma, R. K. (2024). Analyzing the impact of intellectual capital on the financial performance: A comparative study of Indian public and private sector banks. *Journal of the Knowledge Economy.* https://doi.org/10.1007/s13132-024-01901-4

Barney, J. B. (2001). Is the resource-based "view" a useful perspective for strategic management research? Yes. *Academy of Management Review, 26*(1), 41–56. https://doi.org/10.5465/amr.2001.4011938

Buallay, A., Cummings, R., & Hamdan, A. (2019). Intellectual capital efficiency and bank's performance: A comparative study after the global financial crisis. *Pacific Accounting Review, 31*(4), 672–694. https://doi.org/10.1108/PAR-04-2019-0039

Cabrilo, S., Dahms, S., & Tsai, F. S. (2024). Synergy between multidimensional intellectual capital and digital knowledge management: Uncovering innovation performance complexities. *Journal of innovation & knowledge, 9*(4), 100568.

Dewi, M. A., Amanah, L., & Setyawardani, L. (2023). The effect of intellectual capital on earnings management and earnings quality of banking companies in Indonesia. *Global Scientific and Academic Research Journal of Economics, Business and Management, 2*(11), 01-10.

Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Pitman.

Githaiga, P. N. (2022). Intellectual capital and bank performance: The moderating role of income diversification. *Asia-Pacific Journal of Business Administration*. https://doi.org/10.1108/APJBA-06-2021-0259

Grant, R. M. (1996). Toward a knowledge-based theory of the firm. *Strategic Management Journal, 17*(S2), 109–122. https://doi.org/10.1002/smj.4250171110

Hamdoun, M., Pérez-Cornejo, C., & Touazni, D. (2024). Corporate social responsibility and innovation: understanding the role of intellectual capital. *Journal of Intellectual Capital, 25*(5-6), 963-983.

Hayaeian, S., & Hesarzadeh, R. (2024). Knowledge management strategies, intellectual capital, and ambidextrous innovation capability in SMEs: Are they relevant? *Journal of the Knowledge Economy, 15*(2), 6832-6859.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics, 3*(4), 305–360. https://doi.org/10.1016/0304-405X(76)90026-X

Kansil, R., & Singh, A. (2018). Institutional ownership and firm performance: evidence from Indian panel data. *International Journal of Business and Emerging Markets, 10*(3), 250-269.

Kibiya, I. U., Aminu, B. S., & Abubakar, K. S. (2019). The moderating effect of institutional ownership on intellectual capital and financial performance of listed conglomerates. SEISENSE *Journal of Management, 2*(5), 20–28. https://doi.org/10.33215/sjom.v2i5.151

Mahajan, R., Lim, W. M., Sareen, M., Kumar, S., & Panwar, R. (2023). Stakeholder theory. *Journal of Business Research, 166*, 114104.

Mailani, D., Hulu, M. Z. T., Simamora, M. R., & Kesuma, S. A. (2024). Resource-based view theory to achieve a sustainable competitive advantage of the firm: Systematic literature review. *International Journal of Entrepreneurship and Sustainability Studies, 4*(1), 1.

Majumder, M. T. H., Ruma, I. J., & Akter, A. (2023). Does intellectual capital affect bank performance? Evidence from Bangladesh. *LBS Journal of Management & Research, 21*(2), 171–185. https://doi.org/10.1108/LBSJMR-05-2022-0016

Mondal, A., & Ghosh, S. K. (2012). Intellectual capital and financial performance of Indian banks. *Journal of Intellectual Capital, 13*(4), 515–530. https://doi.org/10.1108/14691931211276115

Nimtrakoon, S. (2015). The relationship between intellectual capital, firms' market value and financial performance: Empirical evidence from the ASEAN. *Journal of Intellectual Capital, 16*(3), 587–618. https://doi.org/10.1108/JIC-09-2014-0104

Nurhayati, Hidayah, N. A., Nurcholisah, K., & Fitriah, E. (2020). The effects of intellectual capital and institutional ownerships on the financial performance (empirical study on the listed of banking companies, the Indonesia Stock Exchange periods of 2015–2017). Research *Journal of Finance and Accounting, 11*(10), 82–85. https://doi.org/10.7176/RJFA/11-10-09

Pratama, B. C., & Innayah, M. N. (2019). Intellectual capital and firm performance: The role of institutional and family ownership. Benefit: *Jurnal Manajemen dan Bisnis, 4*(2).

Pratiwi, R. D., & Chariri, A. (2021). The Role of Corporate Governance in Influencing the Relationship Between Intellectual Capital and Financial Performance in the VUCA Era. *International Journal of Science and Applied Science: Conference Series, 5*(1), pp. 49-63).

Pulic, A. (2000). VAIC™ – An accounting tool for IC management. *International Journal of Technology Management, 20*(5–8), 702–714. https://doi.org/10.1504/IJTM.2000.002891

Purwaningsih, E. (2018). The influence of value added intellectual capital to financial performance with ownership structure as moderating variable. *International Journal of Academic Research in Accounting, Finance and Management Sciences, 8*(3), 277–290. https://doi.org/10.6007/IJARAFMS/v8-i3/4836

Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal, 5*(2), 171–180. https://doi.org/10.1002/smj.4250050207

Zahra, S. A. (2021). The resource-based view, resourcefulness, and resource management in startup firms: A proposed research agenda. *Journal of Management, 47*(7), 1841-1860.

Zajac, E. J., & Goranova, M. (2026). When the principal is the firm's problem: principal costs and their corporate governance implications. *Academy of Management Review, 51*(1), 25-56.