Intellectual Capital and Financial Performance: Does Board Size and Independent Directors Matter? An Empirical Enquiry

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Abstract

Purpose- Intellectual capital (IC) is a paramount resource for competitiveness in the knowledge-based financial sectors of the economy. As financial technology advances, specifically in the banking industry, it is vital to understand the effect of IC on financial performance. This study investigates the effect of IC on return on equity (ROE), with a unique emphasis on the moderating role of board attributes. Previous studies have overlooked this moderating role.

Methodology- The study sample consists of 17 banks and a panel data set spanning 2016 to 2021 extracted from annual reports. Antel Pulic's VAIC model is employed to compute IC. To analyze the data, a generalized least squares analysis is conducted. The robustness of the analysis is tested using a two-stage least squares (2SLS) econometric technique.

Findings- The findings indicate that both the VAIC and human capital efficiency (HCE) have a significant impact on the ROE of banks. In terms of moderation, it is observed that board size (BS) exerts a negative effect on the association between VAIC, HCE, structural capital efficiency (SCE), and ROE. Additionally, BS positively compounds the connection between capital employed efficiency (CEE) and ROE. Similarly, the presence of independent directors (IND) significantly moderates the effects of VAIC and its components on the ROE of banks in Pakistan.

Practical Implications- Banks should focus on the HCE for higher ROE. Moreover, banks ought to prioritize appointing more independent directors in the boardroom for effective utilization of IC and greater ROE.

Originality/value- The findings of the study, which analyzed data from Pakistan's banking sector, are original and provide additional insights into the literature on IC and board attributes.

Keywords Intangible assets, return on equity, board size, independent directors.

1. Introduction

Communities have gone through four socio-economic stages: primitive, agricultural, industrial, and information. In each phase, organizations have relied on different factors for success. In the first three stages, businesses considered land, infrastructure, and equipment to be essential for success (Nuryaman, 2015). However, in the fourth phase, the success of enterprises centered on modern strategies and policies related to intangible assets rather than physical resources (Hejazi *et al.*, 2016). In today's knowledge-based economy, corporations have focused on intellectual capital (IC) since it has become a primary factor of competition and wealth creation compared to physical capital (Bayraktaroglu *et al.*, 2019). According to Sardo and Serrasqueiro (2017), IC grants a competitive edge and aids organizations in understanding the value creation mechanism. In today's increasingly digital world, scholars have underscored IC as a critical factor for economic performance vis-à-vis the fundamental basis of competition (Kianto *et al.*, 2013). For two decades, IC in the banking industry has been unavoidable.

Banks are knowledge-based financial institutions that play a fundamental part in the economy (Hamad *et al.*, 2023b). However, banking firms are also the riskiest, as evident by the financial crisis of 2008 (Shah *et al.*, 2022b). This underscores the necessity to ensure the trust and confidence of customers for the success of banks. Financial institutions can differentiate themselves from competitors by making use of intangible resources which also strengthen their position in the market. Tahir *et al.* (2018) argue that competitiveness is determined more by the strategic management of resources than by allocating tangible and financial resources. In this purview, IC is a pivotal resource essential for the viability of banks (Buallay *et al.*, 2019). Banks, as intermediaries, accept funds in the form of deposits and lend them to borrowers on interest. Therefore, the proper management of IC is vital for their intermediatory role. Moreover, banks can perform well in terms of competitiveness and financial sustainability by acknowledging IC (Rehman *et al.*, 2022).

Previous research articles have demonstrated the essential role of IC in driving business performance. Tahir *et al.* (2018) specifically discovered that IC has a positive impact on banks' profitability. Furthermore, a multitude of research investigations have subsequently validated the positive role of IC in financial performance (Ren *et al.*, 2021). However, Mehralian *et al.* (2012) found mixed results, concluding that IC enhances profitability but does not explain an organization's market value and productivity. Buallay *et al.* (2019) found that IC influences ROA, ROE, and Tobin's Q in both Islamic and conventional banks. Ferraro and Veltri (2011) did not observe a statistically significant effect on market value, while Vaisanen *et al.* (2007) noted a delayed association between IC and investment returns. Despite empirical investigations' extensive and in-depth discussion, the varied outcomes spark a debate regarding the effect of IC on financial performance and hint at further examination for a more profound understanding of IC and the firm's bottom line.

The nexus of IC with corporate performance is not straightforward. It is important to analyze whether other factors could influence this relationship. Based on the organization's governance structure, a corporation strategizes numerous board characteristics to meet the organization's goals and objectives (Shah *et al.*, 2021). Hence, it can be argued that the nexus of IC with financial performance is complicated and might depend on governance factors. Thus, this paper extends the literature by posing a query: Do board size (BS) and independent directors (IND) moderate the nexus between IC and ROE? The rationale for choosing BS and IND is that both might assist corporations in effectively utilizing IC (Buallay and Hamdan, 2019). As per our best knowledge, there is a dearth of research that has examined the effect of governance attributes as moderating variables with IC (Hamdan *et al.*, 2017). Therefore, the current paper documents the impact of key governance attributes, BS and IND. In this regard, the study has the following research objectives: 1) To examine the effect of IC on the ROE of banks operating in Pakistan. 2) To validate the moderating effect of BS and IND on the relation between IC and ROE of Pakistani banks.

The subsequent sections of the study are organized as follows: Section 2 presents a literature review and hypotheses development. Section 3 provides a concise overview of the methodology. Section 4 presents and deliberates on the findings. The last section concludes this study.

2. Literature Review and Hypothesis Development

2.1 Intellectual Capital

Academicians have different views regarding IC and its composition. Therefore, researchers have provided various definitions and there is no consensus on its exact definition (Bayraktaroglu *et al.*, 2019). Kianto *et al.* (2013) state that "IC is a broad concept that encompasses a variety of disciplines, including management accounting, financing, leadership, and philosophy." Edvinsson (1997b) defines IC as an asset that contributes to corporate value but is not reported on the entity's balance sheet. Another definition suggests that IC is a knowledge-based resource used by companies for reporting purposes, facilitating competitive advantage, and converting knowledge into profits (Ozkan *et al.*, 2017). Recognizing its crucial role, Roos *et al.* (2005) define IC as an off-balance sheet resource under management's control, utilized for value creation. Similarly, Mavridis and Kyrmizoglou (2005) explain that IC refers to a resource that is intangible but enhances the company's profit-generating capacity, benefiting both the company and society. In a related study, Cabrita *et al.* (2017) describe IC as a company's predominant resource whose value is partially recognized in traditional accounting practices. Scholars argue that organizations should not rely solely on financial and physical resources but also recognize the significance of dominant intangible resources like IC (Bharathi Kamath, 2008).

The literature reveals that there is no unanimous consensus among researchers regarding the components of IC (Ozkan *et al.*, 2017). Nevertheless, prior research extensively discusses two crucial components "human capital (HC) and structural capital (SC)." HC encompasses employees' education, skills, knowledge, expertise, and wisdom (Shahzad *et al.*, 2023). Since it is rooted in personal qualities such as "leadership, education, creativity, expertise, motivation, entrepreneurship, risk awareness, and problem-solving abilities", HC embodies a form of knowledge that is inherently implicit. It is considered "the most valued IC component" (Bayraktaroglu *et al.*, 2019). Organizations consistently prioritize investing in HC to effectively respond to consumer needs, market challenges, and operational issues. SC stays in the company even when employees leave. According to Vo and Tran (2021), SC is comprised of internal organizational capital. It includes corporate systems, processes, structures, and innovation required to sustain the firm's capabilities. It enables the organization to generate long-term intellectual properties and facilitates employees in creating wealth (Phusavat *et al.*, 2012). SC is highly required by HC to use, share, and transfer the knowledge that currently exists within the company to produce value (Bayraktaroglu *et al.*, 2019).

When it was discovered that IC impacts business performance and bestows organizations with a competitive advantage, numerous methods were introduced for its computation. These methods include: "Skandia IC Navigator (Edvinsson, 1997a), IC index (Roos *et al.*, 1997), EVA by Steward in 1991 (Ozkan *et al.*, 2017), Tobin's Q (Steward, 1997), and Value Added Intellectual Coefficient (VAIC) model (Pulic, 1998, Pulic, 2004)." The VAIC model is frequently employed to gauge IC performance. Accordingly, the current study intends to employ the VAIC developed by Ante Pulic (Pulic, 1998) to demonstrate how organizations maximize the utilization of their resources. Table I presents studies that have employed the VAIC to assess IC performance.

Insert Table I

Empirical papers examining the impact of VAIC on profitability indicators within the context of Pakistan's banking industry are scarce. Hussain *et al.* (2023) highlighted the importance of VAIC in banks' operations. Although the relationship is not linear, Haris *et al.* (2019) found a positive effect of VAIC on profitability. Gul *et al.* (2022) utilized data from 11 banks to explore the effect of VAIC on profitability proxies. They stated that VAIC had a significant impact on ROA, but not on ROE. CEE, on the other hand, had a positive influence on ROA and ROE. Muhammad *et al.* (2021) conducted a study on the IC of Islamic banks in several countries, including Pakistan. They found that IC had a positive impact on ROA. Similarly, Asutay and Ubaidillah (2023) examined the IC in Islamic countries. They reported low VAIC values for some countries, including Pakistan. Their findings revealed that VAIC is not impactful on ROE. In addition, Tahir *et al.* (2018) also reported mixed findings for the components of VAIC in relation to ROA. Several studies have explored IC within the banking sector of Pakistan, some have focused exclusively on Islamic financial institutions. Furthermore, the results of these studies have not conclusively established a clear causal impact of IC on financial performance. The present study posits that the inconclusive nature of previous findings may be attributed to the improper utilization of IC resources. In this regard, literature highlights the crucial role of corporate governance (CG) in establishing a connection between IC and financial performance. CG attributes can significantly enhance the bond between IC and financial performance. In other words, integration of governance components may compound the nexus amid IC and firm's profitability. Building upon the aforementioned discussion, our study fills the research gap by inspecting the nexus between IC and financial performance of banks operating in Pakistan. Additionally, this document adds to body of knowledge by introducing the moderating effect of CG attributes between IC and financial performance.

2.2 IC and Business Performance

Penrose (1959) introduced "resource-based view theory (RBV)" and Wernerfelt (1984) further extended the RBV concept, which states that firms can gain a competitive edge from several tangible and intangible resources. In a modern economy, firms are expected to pay attention to nonphysical resources. Prioritizing these intangible resources results in business success (Ousama *et al.*, 2020). Shah *et al.* (2023) contend that organizational competitiveness centers on the

management of resources that are precious, rare, and difficult to imitate. These resources work as a main ingredient in the company's activities for quality product development and stakeholders' satisfaction (Shah *et al.*, 2021).

In the esteem of utilizing resources, IC is rapidly gaining prominence as a significant intangible resource of the firm. Soewarno and Tjahjadi (2020) accounted IC as a vibrant strategic asset that makes employees more creative and drives organizations ahead of competitors. Therefore, knowledge-based firms, which rely more on knowledge and human skills, pay more attention to the efficient utilization of IC (Xu and Li, 2022). Given that IC is required in the sustainable development of organizations and innovation process, which are both essential for smooth financial growth (Chowdhury *et al.*, 2019). Ali *et al.* (2022) argued that managers can enhance financial performance by focusing on IC and its elements. The role of IC components in financial institutions has been widely emphasized in numerous studies (Rehman *et al.*, 2022). Empirical evidence from Ozkan *et al.* (2017) and Tahir *et al.* (2018) demonstrates that human capital (HC) enhances the financial performance of banks. Similarly, Buallay *et al.* (2020) underscored the significance of HC in the profitability of financial institutions.

In a given study, Rehman *et al.* (2022) contend that structural capital (SC) helps banks achieve their financial goals. They mentioned that SC not only provides value-creation opportunities but also provides support to HC of banks. Earlier research has reported a positive aspect of SC in financial performance. For instance, Vo and Tran (2021) demonstrated a positive correlation between SC and bank performance. Similarly, Nadeem *et al.* (2018) investigated a significant impact of SC on financial performance. Soewarno and Tjahjadi (2020) argue that enterprises neglecting SC can have a detrimental effect on revenue, profitability, and a firm's value. Capital employed (CE) is an established component of VAIC. Notably, Ozkan *et al.* (2017) reveal that CE significantly uplifts the profitability of banks. Shah *et al.* (2023) argue that organizations with CE achieve high financial performance. Thus, VAIC and its components are crucial and cannot be disregarded. Banks require substantial IC to enhance competitiveness and foster financial performance. Based on the aforementioned arguments and empirical evidence, the study hypothesized a positive nexus between VAIC and ROE. This study also postulates that CEE, SCE, and HCE positively influence ROE. Figure 1 presents a graphical representation of the hypotheses.

Insert Figure I

H1A: There is a positive nexus between VAIC and ROE in Pakistan banks.

H1B: There is a positive nexus between CEE and ROE in Pakistan banks.

H1C: There is a positive nexus between HCE and ROE in Pakistan banks.

H1D: There is a positive nexus between SCE and ROE in Pakistan banks.

2.3 Moderating Role of Board Size and Independent Directors

Jensen and Meckling (1976) proposed agency theory, for understanding and analyzing the relationship between principals and agents in situations where there is information asymmetry, uncertainty, and risk. Agency theory propagates how to overcome the disputed connection between principals (shareholders) and agents (management). Agents are hired to work for principals, but due to opportunistic behavior, their interests may deviate from those of shareholders. An inherent conflict always exists between managers and shareholders (Lew *et al.*, 2018). In such circumstances, agency theory claims that CG plays an essential role in reducing conflict of interest and motivating managers to work for shareholders (Hamad *et al.*, 2020). Organizations that exhibit weak CG, as exemplified by cases like Enron, WorldCom, Lehman Brothers, and General Motors, are subjected to significant consequences. Therefore, effective monitoring and control mechanisms through CG are important to safeguard the interests of shareholders. As a result, agency theory indicates that a board size and independent directors in the boardroom are crucial for the management of IC (Shahzad *et al.*, 2023).

The link between IC and creating value for businesses is crucial. To make the most of it, organizations need to manage and control IC effectively. If they don't, they risk not fully using their resources, missing out on opportunities, and not leveraging their value addition capacities (Nejjari and Aamoum, 2023). Figuring out how to manage IC effectively is a challenge for researchers, and that's where corporate governance (CG) comes into play (Kamath, 2019). This study looks into how CG attributes can moderate the relationship between IC and how well a company performs. Makki and Lodhi (2014) stress the need to combine IC with governance attributes to prevent agency costs from undermining its role (Ranjith and Bhuyan, 2015). Integrating CG and IC is crucial for boosting firm performance, ensuring that IC is used optimally in line with what shareholders interest (Buallay and Hamdan, 2019).

The effectiveness of IC in influencing firm performance is subject to moderation by CG, particularly through the pivotal factor of board size (BS). BS assumes significance due to its role in diversifying experiences, perspectives, and opinions within larger boards, coupled with a more extensive pool of resources and skills. Larger boards, in contrast to smaller ones, enhance transparency and facilitate more effective monitoring of managers. As a result, organizations with larger BS are less susceptible to mismanaging IC and are more likely to capitalize on the efficacy of IC in driving economic performance (Vitolla *et al.*, 2020). While some studies have explored the influence of BS on financial performance, limited attention has been directed toward its role in the context of IC (Kamath, 2019). Meyer and De Wet (2013) underscored the positive impact of BS on economic and market performance. Numerous studies have suggested positive associations between BS and firm performance, notwithstanding certain exceptions to this pattern (Nomran and Haron, 2020, Veltri, 2020, Kismawadi, 2023). Furthermore, Asare *et al.* (2023) and Nejjari and Aamoum (2023) have postulated a positive influence of IC on financial performance. Therefore, the argument posits that the interaction of BS and IC is anticipated to enhance the profitability of business organizations, laying the foundation for our hypothesis.

Similarly, the role of independent directors (IND) is paramount in influencing the nexus between IC and financial performance. IND are instrumental in strengthening the board of directors' ability to mitigate agency costs. Their detached stance from day-to-day business operations enables them to adopt an impartial viewpoint, concentrating on overseeing management activities while prioritizing shareholders' best interests. As asserted by Vitolla *et al.* (2020), INDs act in the best interest of shareholders and emphasize the effective management of IC for enhanced firm performance. They also offer guidance to management regarding IC investments, covering areas such as human resources, research and development, and information technology, contributing to the sustained performance of organizations. Notably, Asare *et al.* (2023) found that banks with governance structures featuring a higher proportion of IND experience exhibited improved firm performance due to enhanced board monitoring. Furthermore, the research by Khan and Ali (2018) demonstrates that the combined impact of IND and IC can reduce agency costs by controlling managers' opportunistic behavior, ultimately enhancing shareholder value. Therefore, the argument lays the groundwork for our hypothesis.

The present study examines BS and IND on the nexus between IC and financial performance. An increase in BS allows organizations to better employ IC since board members will have more control and monitoring capacity (Vitolla *et al.*, 2020). Dalwai and Salehi (2021) argue that larger boards due to their vast external connections have access to valuable resources ultimately increasing firm value. Moreover, Farooq and Ahmad (2023) demonstrate that the interaction between IND and IC can improve financial performance. The bank's investment in IC provides a competitive edge and paves the way for long-term growth (Nawaz, 2019). While CG ensures the effectiveness of IC to generate value not just for shareholders but for a broader range of stakeholders (Nawaz and Haniffa, 2017). The knowledge-driven nature of today's economy necessitates banks to maintain IC and strengthen CG. A substantial body of literature underscores the ability of CG (BS and IND) and IC to enhance the financial performance (Nawaz and Ohlrogge, 2023, Shahzad *et al.*, 2023). Based on these arguments, supported by agency theory, the present study anticipates a positive moderating influence of BS and IND on the nexus between IC and financial performance. With this view, subsequent hypotheses are put forward.

H2$_A$: BS will positively moderate the nexus between VAIC and ROE in Pakistan banks.

H2$_B$: BS will positively moderate the nexus between CEE and ROE in Pakistan banks.

H2$_C$: BS will positively moderate the nexus between HCE and ROE in Pakistan banks.

H2$_D$: BS will positively moderate the nexus between SCE and ROE in Pakistan banks.

H3$_A$: IND will positively moderate the nexus between VAIC and ROE in Pakistan banks.

H3$_B$: IND will positively moderate the nexus between CEE and ROE in Pakistan banks.

H3$_C$: IND will positively moderate the nexus between HCE and ROE in Pakistan banks.

H3$_D$: IND will positively moderate the nexus between SCE and ROE in Pakistan banks.

3. Methodology, Sample and Data Sources

The study's population consists of the whole banking sector of Pakistan. Applying random sampling, the current research uses 17 banks with data spanning six years from 2016-2021. The required data is tracked manually using annual reports and directors' reports of Pakistan banks.

3.1 Estimating Methodology

Current research on panel data poses challenges for academicians, such as selecting the appropriate econometric model (Shah *et al.*, 2022a). Several well-known econometric models are available for analyzing panel data, such as "GLS fixed-effect model (FEM), GLS random effect model (REM), and 2SLS." When the predictor variables serially correlate with the residuals, FEM is explicitly reliable for analysis. REM applies when no correlation between explanatory variables and the error term (Tahir *et al.*, 2023). Hausman (1978) decides the fitness between REM and FEM for analysis (Shah *et al.*, 2018, Hamad *et al.*, 2023a).

Heteroscedasticity and endogeneity are two underlying issues in panel data analysis. Heteroscedasticity arises due to non-constant variance (Wang and Akabay, 1994). In other words, if residuals have no standard distribution, it will affect the significance level and might give misleading conclusions. We overcome the issue of heteroscedasticity using White (1980) robust estimators, which is in line with prior studies (Tahir and Azid, 2015, Hamdan *et al.*, 2017). Concurrently, endogeneity issues arise from the correlation of predictor variables and error terms. The current study applied 2SLS to deal with endogeneity issues. The instrument development is a prerequisite for applying 2SLS, therefore, we used lagged predictor variables consistent with past studies (Liang *et al.*, 2011).

Four types of variables are employed in this study. Return on equity (ROE) is used as a dependent variable. The exclusive focus on ROE is justified by its direct relevance to equity investors and shareholders (Hassan and Marimuthu, 2018). ROE provides valuable insights regarding the company's efficiency in utilizing its resources, including IC, to generate profits for its shareholders. Additionally, ROE is emphasized to show how effective governance mechanisms can enhance the value derived from IC and benefit shareholders. Explanatory variables include IC and its components. Board size (BS) and independent directors (IND) are used as moderating variables. Control variables include total assets, leverage, and bank age. The measurement of variables is provided in Table II.

Insert Table II

3.2 Measurement of Intellectual Capital: Pulic's model

Ante Pulic (Pulic, 1998, Pulic, 2004) developed a quantitative measurement scale, "value-added intellectual coefficient (VAIC)", to compute IC. It is determined as,

$$VAIC = CEE + HCE + SCE \qquad (1)$$

In equation (1), CEE refers to "capital employed efficiency coefficient", HCE refers to "human capital efficiency coefficient", and SCE refers to "structural capital efficiency coefficient". To obtain the value of VAIC, it is prerequisite to first compute banks' total value-added (VA). VA is calculated as done by Chowdhury *et al.* (2019):

$$VA = OP + EC + A + D \qquad (2)$$

Equation (2) signifies the VA, which is the sum of a bank's operating profit (OP), employment cost (EC), and the amortization (A) and depreciation (D) of the banks. Once VA is computed, the elements of VAIC can be assessed as follows:

$$CEE = VA / CE \qquad (3)$$

$$HCE = VA/HC \qquad (4)$$

$$SC = VA - HC \qquad (5)$$

$$SCE = SC/VA \qquad (6)$$

In the above equations, CE refers to capital employed by banks, HC is personnel expenses.

3.3   Model Specification

The present study developed six models, which are shown in Table III. Model 1 and Model 2 estimate the nexus between VAIC and its components with ROE. Models 3 and 4 evaluate the moderating effect of BS on the nexus of VAIC and its components with ROE. Models 5 and 6 evaluate the moderating effect of IND on the nexus of VAIC and its components with ROE. In the models, *i* stand for the cross-sectional dimension, *t* denotes the time series, β_0 is constant, $\beta_1\ldots\ldots$ β_{10} are the coefficients of predictor variables, and ε is residual.

Insert Table III

4. **Empirical Results and Discussion**

4.1   Descriptive Statistics

In Table IV, the mean value of ROE is 0.0327 with a standard deviation of 0.3124. The lower value of ROE, -1.4068, is of NIB bank. Few other banks have a negative ROE, which shows that their ROE is inadequate. The explanatory variable, VAIC, CEE, HCE, and SCE, has positive mean values. It implies that on average banking sector of Pakistan has positive IC efficiency. The negative values show that some banks have poor IC efficiency. Compared to HCE and SCE, CEE has a lower standard deviation. BS has a minimum value of 7 and a maximum value is 13. Similarly, IND has a minimum value of 5 and a maximum value of 11. The average BS and IND are above 8 and 6, respectively. Agency theory claims that a larger BS and more IND in the board room are significant for shareholder performance (Jensen and Meckling, 1976, Fama, 1980). In this regard, the mean values of both moderators look adequate. The mean values of control

variables seem reasonable. It is expected that control variables will control the variations during regression analysis.

Insert Table IV

4.2   Correlation Analysis

The results reported in Table V reveal a significant correlation between all variables with ROE except for SCE, which is not found to be significantly related to ROE. Notably, leverage demonstrates a negative association with ROE at a significant level of 10 percent.

Insert Table V

4.3   Preliminary Checks

Before conducting a regression analysis on panel data, it is crucial to verify certain assumptions. One of these assumptions is the stationarity of the data. To assess stationarity, the study utilized the "Panel Unit Root Test" in EViews. Various tests are available for testing stationarity, but in this study, the Hadri Z-stat and PP-Fisher tests were employed. Factually, both methods confirm that the data is stationary at a level.

The second assumption pertains to multicollinearity issue in the data. This study assessed multicollinearity using the correlation matrix presented in Table V and the variance inflation factor (VIF) displayed in Table VI. Despite the highest correlation observed between two explanatory variables, namely HCE and VAIC (0.90), as well as IND and BS (0.99), there are no concerns regarding multicollinearity for two reasons. Firstly, HCE is a component of VAIC, leading to the specification of different regression models for each variable. Similarly, IND and BS serve as moderating variables and are not employed in a single regression model. Secondly, Table VI exhibits VIF values ranging from 1 to 6.47 for the proposed models. According to Gujarati (2003) and Bayraktaroglu *et al.* (2019), VIF values lower than 10 indicate the nonexistence of multicollinearity issues within the dataset. Hence, our dataset is devoid of multicollinearity.

Insert Table VI

In regression analysis, if the p-value of the Hausman test exceeds 5 percent, it indicates that the REM is suitable for analysis, otherwise, FEM applies. The results of the Hausman test, stated in Table VII, indicate that all regression models, except for model 1, support the FEM.

Insert Table VII

4.4   Regression Analysis and Discussion

Does investing in IC significantly enhance shareholder value in the banking sector? Table VIII displays the results of the generalized least squares regression model. Model 1 shows that VAIC is a significant influencer of ROE in banks. As expected, VAIC has positively influenced ROE at the standard level. It implies that a 1 unit increase in VAIC leads to a 0.0932 percent increase in

ROE. Nawaz and Haniffa (2017) also established a significant impact of VAIC on accounting performance. Additionally, the outcome is consistent with the results of Tahir *et al.* (2018) in the context of the Pakistan banking sector, but it contradicts the findings of Ozkan *et al.* (2017), who found no significant effect of VAIC on the performance indicators of banks in Turkey. Thus, the current findings support H1A.

Model 2 analyzes the impact of the dimensions of IC, labeled as CEE, HCE, and SCE, on ROE. As shown in Table VIII, solely, HCE has a positive impact on ROE at the standard level. However, CEE and SCE demonstrate no significant association with ROE. Specifically, a 1 unit increase in HCE is associated with a 0.0661 percent increase in ROE, respectively. The findings are aligned with Ozkan et al. (2017) and Bataineh *et al.* (2022), which revealed a significant impact of HCE on profitability. These findings support hypotheses 1C but do not support hypotheses 1B and 1D. The results of Models 1 and 2 persuade the shareholders of the banks that investment in IC adds value to their portfolios. In agreement with Ante Pulic, banks should invest more in the components of IC due to its primary role in wealth creation, rather than considering it an additional cost to shareholders. It is therefore suggested that banking firms in Pakistan can improve their ROE by properly managing VAIC in general and HCE in particular.

Do board size (BS) and independent directors (IND) moderate the nexus between IC and banks' ROE? To answer this, the concept of Baron and Kenny (1986) suggests that explanatory variable (A) and moderating variable (B) can be significant individually. However, it is not mandatory to determine the significance of the individual variables in order to validate the moderating hypothesis. Instead, to confirm the moderating hypothesis, it is essential that the product of the explanatory and moderating variables (AB), known as the interaction variable, demonstrates significance. The findings of interaction terms are reported in Table VIII. The results of model 3 indicate that the interaction term (VAIC*BS) significantly influences the ROE of banks in a negative way when BS integrates with IC. The coefficient of VAIC significantly decreased from 0.0932 (without moderation) to - 0.0713 (with moderation of BS), which means that the interaction term (VAIC*BS) decreases the ROE of Pakistani banks by 0.0713 percent. Therefore, hypothesis H2A is not supported. Regarding the moderating role of BS with components of IC, the results of model 4 indicate that the interaction term (CEE*BS) positively influences ROE, while interaction terms (HCE*BS, SCE*BS) exhibit a significant negative effect on ROE. The integration of BS yields an intriguing outcome, as it transforms the previously insignificant impact of CEE in Model 2 into a significant one (CEE*BS). Similarly, the previously insignificant impact of SCE is now found to be significant, albeit with a negative coefficient (-0.2798). Conversely, the initially positive coefficient of HCE (0.0661) transforms into a negative coefficient (-0.0044) when considering the interaction effect of the moderating variable BS. Thus, the findings support hypotheses H2B but do not support H2C, and H2D.

Model 5 shows that the moderating effect of IND has influenced the nexus between IC and the ROE of banks. Specifically, the interaction term (VAIC*IND) has a positive effect on ROE at a standard level with a coefficient value of 0.3338. This implies that the presence of IND in the

boardroom strengthens the nexus between IC and ROE of Pakistani banks. Thus, the findings support H3A. Regarding the moderating role of IND with components of IC, the results of model 6 indicate that the interaction terms (CEE*IND, HCE*IND, SCE*IND) have a significant positive effect on the ROE of banks. It was evident that the effect of CEE and SCE on ROE was insignificant in Model 2. However, the inclusion of IND as a moderator has made CEE and SCE impactful for ROE. Thus, the findings support H3B, H3C, and H3D.

The analysis of control variables proves that leverage has a significant negative impact on ROE in model 1 and a positive in models 4 and 6. LNTA has adverse effects on ROE in models 1, 2, 3, and 5, while positive impacts are observed in model 6. Lastly, LNBA negatively influences ROE at the standard level only in model 6.

Based on the empirical evidence of Models 1 and 2, this study concludes that VAIC and its sole component HCE play a vital role in generating shareholder value for banks operating in Pakistan. This implies that VAIC vis-à-vis HCE are crucial determinants of generating shareholder value. IC as a whole enables the development of new products and services, enhances customer service, and reduces costs. In contemporary economies, human capital is expected to drive the development of efficient processes and the creation of novel products or services. Thus, the presence of HCE directly leads to a reduction in operational expenses, thereby increasing profitability. Banks that effectively leverage their human capital can attract and retain top talent, further contributing to increased shareholder value. Moreover, banks' investment in human capital can improve their performance by raising innovation, revenue, and profits, which in turn leads to higher ROE. These findings support RBV theory, which posits that a firm's competitive advantage and financial performance are derived from its unique resources and capabilities. The findings align with prior studies conducted by Gul *et al.* (2022), Haris *et al.* (2019), and Tahir *et al.* (2018), all of which observed a positive impact of VAIC and HCE on financial performance.

Models 3 and 4 show that BS positively moderates the effect of CEE on ROE. Besides, BS negatively moderates the effects of VAIC, HCE, and SCE on ROE, contrary to the study's expectations. This implies that BS weakens the association between IC, its two components (HCE and SCE), and profitability. While BS strengthens the relationship between CEE and ROE. It suggests that banks efficiently utilizing capital is positively associated with shareholder value under the moderation effect of BS. Factually, BS can assist banks to borrow funds at lower interest rates resulting in higher ROE. Nonetheless, the negative moderating impact of BS between HCE and ROE may be attributed to challenges with larger BS. An increase in BS could create difficulties in effective communication among board members and can hinder the decision-making process ultimately negatively affecting ROE. Moreover, the difference in opinion of board members due to larger BS can sabotage the human capital strategies aligned with company goals. Consequently, the skewed opinion of the board weakens the relationship between HCE and ROE. Similarly, the negative effect of the interaction term (SCE*BS) on ROE suggests the negative moderating role of BS between SCE and ROE. This might be due to inefficient utilization of structural capital including processes, systems, and non-human assets which negatively affect shareholder value.

Moreover, the increase in BS leading to slower decision-making and an elevated likelihood of conflicts can be a reason for weakening the relationship between HCE, SCE, and ROE. These findings support Nawaz and Ohlrogge (2023) that larger BS reduces the effect of nonphysical capital on financial performance. Our finding that BS strengthens the relationship between CEE and financial performance is coherent with Adegbayibi (2022). However, in contrast to our findings, Adegbayibi found that BS positively moderates the nexus between HCE, SCE, and financial performance. Similarly, Farooq and Ahmad (2023) report in contrast to our findings that BS has an insignificant moderating between VAIC and profitability.

Findings of Models 5 and 6 show that IND significantly moderates the effect of VAIC, CEE, HCE, and SCE on the ROE of banks. In other words, the nexus of VAIC, CEE, HCE, and SCE with ROE strengthens in the presence of IND. The existence of IND brings skills and expertise to the boardroom and monitors managers to prevent them from making suboptimal decisions. They actively leverage their independent perspective and expertise to assess and endorse banks' long-term strategies focused on maximizing shareholder value. In this vein, IND overcomes agency costs leading to higher shareholder value for banks. Alongside this, the impact of VAIC and its components on ROE improves by bringing IND into the boardroom. As such IND provides significant insights and makes informed decisions about IC management. Thus, banks better utilize IC in the presence of IND and prevent the misallocation of IC resources to enhance ROE. Kweh *et al.* (2022) support our findings that IND plays a crucial role in safeguarding shareholders' interests and enabling managers to concentrate on company development while effectively utilizing IC to leverage competitive advantages. The findings support agency theory and align with Farooq and Ahmad (2023), who identified that IND significantly moderates the nexus between IC and ROE.

Insert Table VIII

4.5 R-Squared Trend

Table IX shows the variation in R-squared values that occurred during the research process. Model 1 had an R-squared value of 28.03, while Model 2 had an R-squared value of 93.84., respectively. The value of the R-squared relies on the number of variables utilized in the model, whereas the adjusted R-squared considers the significance of those variables. Consequently, Model 2 incorporates a greater number of variables compared to Model 1, increasing both the R-squared and adjusted R-squared values. This increase confirms additional variables in Model 2 are indeed relevant factors in determining the ROE. On the other hand, the introduction of BS and IND as moderating variables has significantly elevated the R-squared value in models 3 and 4, reaching 96.75 and 97.96, respectively. Likewise, in models 5 and 6, the R-squared value experiences a noticeable increase, reaching 96.88 and 98.40, respectively. These findings suggest that the inclusion of moderating variables enhances the R-squared value and improves the overall fit of the model. It can be argued that the collective influence of IC, BS, and IND effectively explains the variation observed in the ROE.

Insert Table IX

4.6 Robustness Testing

In this section, our objective is to examine the robustness of the findings presented in Table VIII. To achieve this, we have utilized a 2SLS estimator to assess specific models, which provide reliable and robust results even by overcoming endogeneity issues. The outcomes obtained from the 2SLS estimator are outlined in Table X. We find that variables such as VAIC and HCE exert a substantial influence on the ROE of banks, consistent with the findings presented in Table VIII. While the impact of SCE on ROE appeared insignificant in Table VIII, its significance is amplified by employing the 2SLS method. Furthermore, the analysis presented in Table X demonstrates significant moderating effects of BS and IND on the nexus between VAIC, CEE, HCE, SCE, and ROE, thus providing support for the findings reported in Table VIII. Notably, the coefficients display consistent signs and levels of significance, indicating the robustness of the results. As 2SLS estimator eliminates the potential inflated influence of endogeneity from the coefficients. Consequently, it is plausible to observe variations in the coefficient values between the 2SLS approach and the fixed effect (FE) or random effect (RE) approach, which lack the ability to address endogeneity concerns. The distinction between the two approaches lies in their mechanisms, as the 2SLS approach incorporates lagged values while the FE approach employs level values. Therefore, it is reasonable to expect slight differences in the coefficient values, considering the differing approaches and their respective ability to control endogeneity. In a nutshell, the overall stability of the findings is well-established.

Insert Table X

5. Conclusion

In an increasingly interconnected world, the banking sector has undergone a transformative shift into the knowledge industry. This has led to heightened competition among banks on a global scale. Within this context, the efficient utilization of resources, particularly IC, performs a pivotal role in fostering shareholder value. Therefore, this study examined the impact of IC on ROE. Furthermore, the moderating effect of BS and IND is examined on the nexus of IC and ROE. The study computed the IC for 17 banks operating in Pakistan over six years from 2016 to 2021, utilizing Ante Pulic's VAIC model. Using regression models, the study has uncovered a significant positive nexus between VAIC and ROE in the banks of Pakistan. Furthermore, it has been observed that only HCE exhibited a significant influence on ROE. However, it is worth noting that 2SLS has highlighted the relevance of SCE towards ROE when endogeneity concerns are addressed. In analysis, the results of the moderating variables exhibit variation. Interestingly, findings indicate that BS has negatively influenced the nexus between VAIC, HCE, SCE, and ROE. This suggests that as the BS increases, the impact of these variables on ROE becomes less pronounced. However, it is worth noting that BS has positively moderated the relationship between CEE and ROE. Furthermore, the findings discovered that IND has positively moderated the impact of VAIC, CEE, HCE, and SCE on ROE in the banks of Pakistan.

The findings offer some realistic implications for policymakers and practitioners. Managers should focus on their intellectual capabilities, which play a vital role in shareholder value. VAIC and HCE in particular need to be strengthened to improve ROE. Policymakers and managers should evaluate the composition of the board and consider adjusting the size to ensure it aligns with the organization's strategic goals. This may involve reducing the board size to a more optimal level that allows for effective decision-making and resource allocation. If banks have larger boards, they should provide training on the importance of IC. This would help board members to better understand the value of intellectual capital and how it can be used to improve a company's performance. Based on the findings of the study, it appears that independent directors enhance the nexus between intellectual capital and ROE. Thus, the Security and Exchange Commission of Pakistan should mandate the hiring of independent directors on the board of banks. They will help banks to better utilize IC for improved ROE.

This study of the baking sector in Pakistan offers significant future directions. It is recognized that COVID-19 has had a significant impact on economies around the world. Our study does not consider the impact of the pandemic on bank performance. Therefore, future researchers are encouraged to include the impact of COVID-19 in their analysis.

Table I Articles using the VAIC model for IC.

Author(s)	Independent Variable(s)	Dependent Variable(s)	Findings	Country
Asif *et al.* (2020)	VAIC, CEE, HCE, SCE	ROA	Significant (+)	Malaysia
Xu and Liu (2020)	VAIC, CEE, HCE, SCE	ROA, ROE, ATO, market value (market to book ratio)	Significant (+)	Korea
Buallay *et al.* (2019)	VAIC, CEE, HCE, SCE, RC	ROA, ROE, Tobin's Q	Significant (+)	Gulf Cooperation Council (GCC)
Xu and Li (2019)	VAIC, CEE, HCE, CEE	Economic performance	Significant (+)	China

Mohapatra *et al.* (2019)	VAIC, HCE, CEE, SCE	Operating efficiency	Significant (+)	India
Hamdan (2018)	VAIC, HCE, CEE, HCE	ROA, Tobin's Q	Significant (+)	Gulf Countries
Tahir *et al.* (2018)	VAIC, HCE, CEE, SCE	ROA, ROE	Significant (+)	Pakistan
Ozkan *et al.* (2017)	VAIC, HCE, CEE, SCE	ROA, ROE	Significant (+)	Turkey
Pitelli Britto *et al.* (2014)	VAIC, CEE, HCE, SCE	Tobin's Q, ROIC	Significant (-)	Brazil
Celenza and Rossi (2014)	VAIC, HCE, CEE, SCE	ROA, ROI, ROE, Market value, book value	Insignificant	Italy
Clarke *et al.* (2011)	VAIC, CEE, HCE, SCE	ROE, ROA, Revenue growth (RG), Employee productivity (EP)	Significant (+)	Australia

Table by authors

Table II Measurement of Variables			
Type	**Variables**	**Symbol**	**Formula**
Dependent	Return of Equity	ROE	$\dfrac{Net\ Income}{Shareholder's\ Equity}$
Explanatory	Intellectual capital	IC	VAIC = CEE + HCE + SCE (Pulic's Model)
Moderator	Board Size	BS	Natural log of total directors in board room
Moderator	Independent directors	IND	$\dfrac{Independent\ directors}{Total\ number\ of\ directors}$
Control	Leverage	Leverage	$\dfrac{Long\ term\ debt}{Total\ assets}$
Control	Total assets	LNTA	Natural log of total assets
Control	Bank age	LNBA	Natural log of bank age

Table by authors

Table III Regression Models	
Model	**Regression Equation**
1	$ROE_{it} = \beta_0 + \beta_1\,VAIC_{it} + \beta_2\,Leverage_{it} + \beta_3\,LNTA_{it} + \beta_4\,LNBA_{it} + \varepsilon_{it}$
2	$ROE_{it} = \beta_0 + \beta_1\,CEE_{it} + \beta_2\,HCE_{it} + \beta_3\,SCE_{it} + \beta_4\,Leverage_{it} + \beta_5\,LNTA_{it} + \beta_6\,LNBA_{it} + \varepsilon_{it}$
3	$ROE_{it} = \beta_0 + \beta_1\,VAIC_{it} + \beta_2\,BS_{it} + \beta_3\,VAIC{*}BS_{it} + \beta_4\,Leverage_{it} + \beta_5\,LNTA_{it} + \beta_6\,LNBA_{it} + \varepsilon_{it}$
4	$ROE_{it} = \beta_0 + \beta_1\,CEE_{it} + \beta_2\,HCE_{it} + \beta_3\,SCE_{it} + \beta_4\,BS_{it} + \beta_5\,CEE{*}BS_{it} + \beta_6\,HCE{*}BS_{it} + \beta_7\,SCE{*}BS_{it} + \beta_8\,Leverage_{it} + \beta_9\,LNTA_{it} + \beta_{10}\,LNBA_{it} + \varepsilon_{it}$
5	$ROE_{it} = \beta_0 + \beta_1\,VAIC_{it} + \beta_2\,IND_{it} + \beta_3\,VAIC{*}IND_{it} + \beta_4\,Leverage_{it} + \beta_5\,LNTA_{it} + \beta_6\,LNBA_{it} + \varepsilon_{it}$
6	$ROE_{it} = \beta_0 + \beta_1\,CEE_{it} + \beta_2\,HCE_{it} + \beta_3\,SCE_{it} + \beta_4\,IND_{it} + \beta_5\,CEE{*}IND_{it} + \beta_6\,HCE{*}IND_{it} + \beta_7\,SCE{*}IND_{it} + \beta_8\,Leverage_{it} + \beta_9\,LNTA_{it} + \beta_{10}\,LNBA_{it} + \varepsilon_{it}$

Table by authors

Table IV Descriptive Statistics.					
Variable(s)	**N**	**Min**	**Max**	**Mean**	**Std. Dev.**
Return on Equity (ROE)	102	-1.4068	0.2562	0.0327	0.3124
Value Added Intellectual Capital Coefficient (VAIC)	102	-1.4665	6.4821	2.9967	1.7754
Capital Employed Efficiency (CEE)	102	-0.4723	0.5224	0.1987	0.1528
Human Capital Efficiency (HCE)	102	-2.2388	5.3886	2.2852	1.4313
Structural Capital Efficiency (SCE)	102	-1.8489	4.3529	0.5127	0.7642
Board Size (BS)	102	7	13	8.79	1.607
Independent Directors (IND)	102	5	11	6.79	1.6063
Leverage	102	0.5567	0.9913	0.7354	0.6223
Total Assets (TA) (PKR in millions)	102	30511	2124898	426103.2	405319.3
Bank Age (LNBA)	102	8	72	32.26	23.32

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Table V Correlation Matrix										
	1	2	3	4	5	6	7	8	9	10
ROE (1)	1									
VAIC (2)	0.625[a]	1								

CEE (3)	0.580^a	0.577^a	1							
HCE (4)	0.680^a	0.908^a	0.659^a	1						
SCE (5)	0.038	0.507^a	-0.092	0.104	1					
BS (6)	0.320^a	0.290^a	0.134	0.348^a	-0.005	1				
IND (7)	0.309^a	0.314^a	0.151	0.369^a	0.008	0.995^a	1			
Lev (8)	-0.174^b	-0.08^a	0.392^a	-0.131	-0.030	-0.218^b	-0.195^b	1		
LNTA (9)	0.362^a	0.618^a	0.404^a	0.627^a	0.180^c	-0.052	-0.024	0.008	1	
LNBA (10)	0.484^a	0.708^a	0.517^a	0.773^a	0.095	-0.007	0.016	0.002	0.711^a	1
a, b and c show significance levels at 1%, 5% and 10%.										

Table VI. Variance Inflation Factor (VIF)									
Models	**VAIC**	**CEE**	**HCE**	**SCE**	**BS**	**IND**	**Leverage**	**LNTA**	**LNBA**
1	1.19						1.00	2.59	2.59
2	1.21				1.04		1.02	2.59	2.59
3	2.88					1.34	1.08	3.08	2.99
4		3.31	4.86	1.18			1.88	2.90	3.67
5		3.34	6.47	1.18	1.57		1.88	3.05	4.04
6		3.33	6.37	1.18		1.57	1.89	3.09	4.02

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Table VII. Hausman Test (Fixed Vs. Random Effects)				
	Cross-section Random			Decision
	Chi-Sq statistics	d.f	Prob.	
Model 1	4.13	4	0.38	Random Effect
Model 4	23.98	6	0.005	Fixed Effect
Model 2	12.83	6	0.048	Fixed Effect
Model 5	96.03	10	0.000	Fixed Effect
Model 3	13.13	6	0.031	Fixed Effect
Model 6	81.87	10	0.000	Fixed Effect

Table by authors

Table VIII. Generalized Least Square (Dependent variable: ROE)						
Independent variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
VAIC	0.0932[a] (0.0253)		0.1978[a] (0.0204)		0.2985[a] (0.0597)	
CEE		0.0664 (0.3987)		- 1.9403[a] (0.2613)		3.6352[a] (0.9883)
HCE		0.0661[a] (0.0098)		0.0390[a] (0.0058)		0.3113[a] (0.0778)
SCE		0.0069 (0.0175)		0.6215[a] (0.1643)		0.0074 (0.0062)
BS			0.2392[a] (0.0451)	- 0.1413[a] (0.0274)		
IND					1.0852[a] (0.3496)	0.4004 (0.3455)
VAIC*BS			- 0.0713[a] (0.0510)			
VAIC*IND					0.3338[a] (0.0806)	
CEE*BS				0.9538[a] (0.1194)		
HCE*BS				- 0.0044[a] (0.0012)		

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
SCE*BS				- 0.2798^a (0.0753)		
CEE*IND						4.7663^a (1.2111)
HCE*IND						0.3646^a (0.1055)
SCE*IND						0.0154^c (0.0078)
Leverage	-0.1499^b (0.0528)	-0.1476 (0.0914)	0.0078 (0.0141)	0.0236^a (0.0037)	0.0100 (0.0236)	0.0339^a (0.0057)
LNTA	-0.0949^c (0.0523)	-0.0354^a (0.0113)	-0.0592^a (0.0184)	0.0332 (0.0257)	-0.0609^a (0.0171)	0.0551^b (0.0273)
LNBA	0.1216 (0.0989)	0.0531 (0.0324)	0.0253 (0.0387)	-0.1270 (0.0770)	0.0307 (0.0428)	-0.2147^a (0.0773)
C	0.6885 (0.4131)	0.2234 (0.0934)	0.0539 (0.1696)	0.1929 (0.1570)	-0.2554 (0.2793)	0.2123 (0.2425)
R squared	0.2803	0.9384	0.9675	0.9796	0.9688	0.9840
Adjusted R^2	0.2507	0.9212	0.9560	0.9705	0.9578	0.9769
F-statistics	9.44	54.72	84.14	107.39	87.74	137.64
p-value	0.000	0.000	0.000	0.000	0.000	0.000

Note: a, b and c show significance level at 1%, 5% and 10%. The values in the parenthesis are standard errors.

Table by authors

Table IX R-Squared Trend						
R-Squared Trend	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Without moderation	28.03	93.84				
board size (moderation)			96.75	97.96		
Independent Directors (moderation)					96.88	98.40

Table by authors

Table X. Two Stages Least Square (Dependent variable: ROE)						
Independent variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
VAIC	0.0691^b (0.0322)		0.2490^a (0.0648)		0.2694^a (0.0572)	
CEE		0.8691 (0.7806)		- 1.5523^a (0.4703)		3.6146^b (1.3465)
HCE		0.0983^b (0.0470)		0.0522^a (0.0073)		0.2889^a (0.0498)
SCE		0.0594^c (0.0346)		0.5101^a (0.1717)		0.0206^c (0.0108)
BS			0.3366^b (0.1435)	- 0.1081^a (0.0246)		

IND					0.9871^a (0.2820)	0.8560^c (0.4628)
VAIC*BS			- 0.0865^a (0.0329)			
VAIC*IND					0.2933^a (0.0784)	
CEE*BS				0.7520^a (0.1971)		
HCE*BS				- 0.0091^a (0.0014)		
SCE*BS				- 0.2281^a (0.0790)		
CEE*IND						4.5685^a (1.6597)
HCE*IND						0.2715^a (0.0741)
SCE*IND						0.0218^b (0.0096)
Leverage	-0.1062^a (0.0375)	-0.1667^b (0.0638)	-1.2618 (0.8651)	0.0188^a (0.0051)	-0.0101 (0.0183)	0.0177 (0.0118)
LNTA	-0.0291 (0.0347)	-0.0756^c (0.0417)	-0.1034^a (0.0274)	-0.0644^a (0.0140)	-0.0989^a (0.0254)	-0.1650^a (0.0260)
LNBA	0.0653 (0.0946)	0.0358 (0.0595)	0.1693 (0.1165)	0.0800^c (0.0411)	0.1517^b (0.0584)	0.3768^a (0.0682)
C	0.0786 (0.2328)	0.05302 (0.4359)	0.8319 (0.6983)	0.7315 (0.0909)	0.0633 (0.2571)	1.4325 (0.4635)
R squared	21.55	45.17	84.91	97.55	96.88	98.15
Adjusted R^2	17.63	40.95	79.56	96.45	96.71	96.98
F-statistics	5.85	11.81	498.89	88.12	90.55	73.25
p-value	0.000	0.000	0.000	0.000	0.000	0.000

Note: a, b and c show significance level at 1%, 5% and 10%. The values in the parenthesis are standard errors.
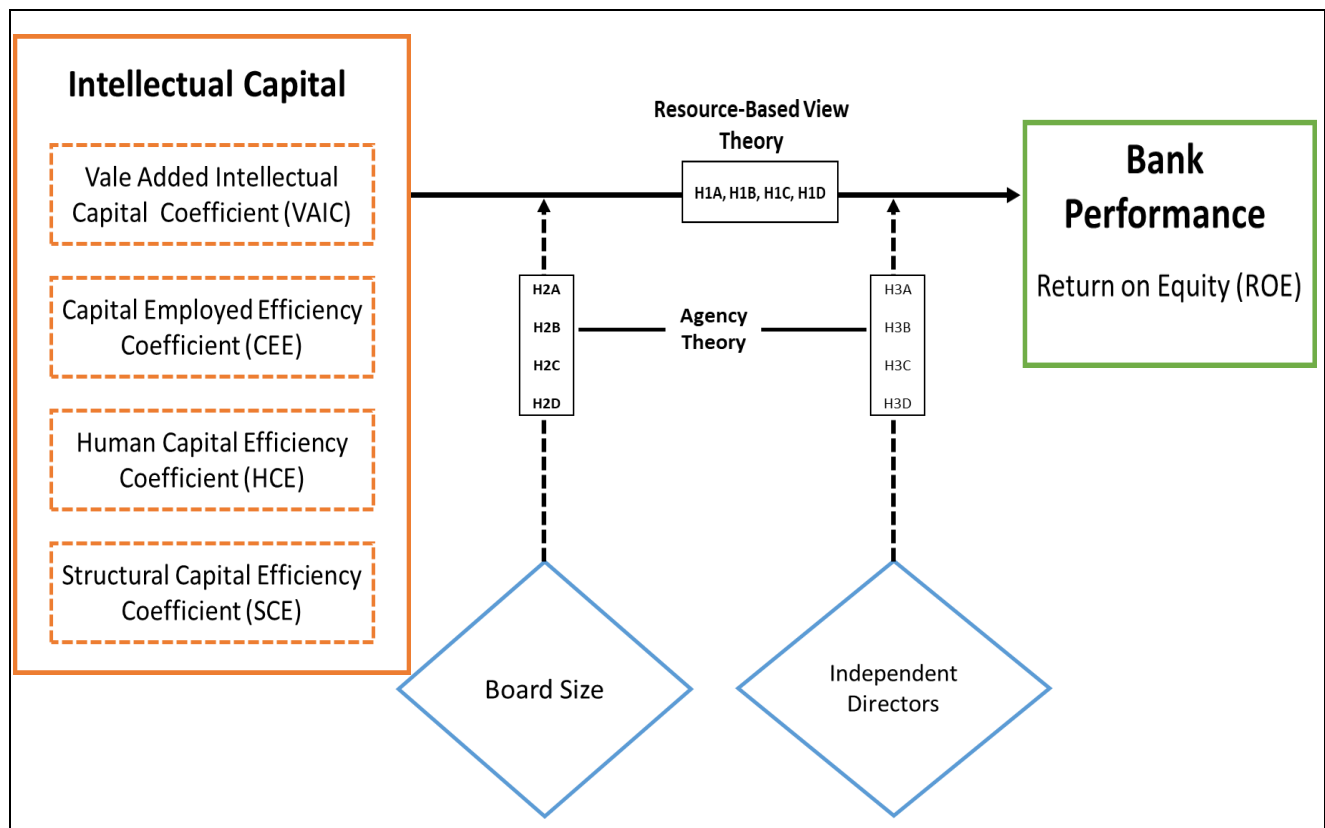
Table by authors

Figure I. Conceptual Framework of the Study (Figure by authors)

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