

Impact of Intellectual Capital on Financial Performance: Evidence from Banking Sector of Pakistan

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ABSTRACT

Keywords:

*Intellectual capital,
Firm Performance,
Value Added
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Coefficient (VAIC),
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In knowledge economy, intellectual capital (IC) is widely recognized as a key factor in boosting corporate competitiveness and creating value. This study used the Extended Value Added Intellectual Coefficient model to assess the impact of Intellectual Capital (IC) efficiency on financial performance of banks operating within the boundaries of Pakistan. To fulfill this purpose, study used panel data over the period 2015-2022. Return on asset and Return on equity, two financial measures are used as proxy for dependant variable. Independent variables include VAIC and its components. Data has been collected from financial statements available at State Bank of Pakistan's website. Our regression study revealed that human capital and innovation capital had the greatest impact on a firm's performance. Capital employed, structural capital and relational capital do not show statistically significant positive relationship with the financial performance as measured by ROA. Study has found no significant relationship between ROE and VAIC. Regression analysis shows that VAIC is not suitable to measure financial performance of banks in case of ROE. Furthermore, it is clear that Pulic (1998)'s initial VAIC model is outperformed by the expanded and updated VAIC model. According to the results, it is advised that bank executives set up a separate division for keeping accurate records of all IC components and that policymaker's account for structural and relational capital when establishing policies and procedures to avoid having an adverse effect on the financial performance.

INTRODUCTION

In this era of knowledge based economy, physical assets that were being considered the vital source of value creation for the success of any business, are being replaced by knowledge, ideas, and creativity (Soewarno & Tjahjadi, 2020; Sooria & Saravanan , 2002). In terms of a country's development and the effectiveness of economic activity, banks are crucial. Through

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the application of diverse financial methodologies, the financial sector plays a pivotal role in capital formation. Effective intellectual capitalization is more important and crucial to the performance of the banks when compared to other financial system enterprises (Budiyono & Arum, 2020). According to several academics, intellectual capital is a crucial intangible asset to organizations since it helps boost financial performance and gives them a competitive edge.

The concept of intellectual capital involves assessing and conveying knowledge in terms of value addition (Kianto et al. 2013; Khan et al. 2019; Raushan & Khan 2017; Khan 2018). Intellectual Capital (IC) refers to intellectual assets that cannot be tracked in a firm's financial reports (Bayraktaroglu et al., 2019). It is the method through which intangible assets are evaluated and measured (Xu & Wang, 2018) and firm can achieve competitive advantage (Obeidat et al., 2017). Intangible assets such as employees experience, intellectual property, patents, trademarks, brand name, and human resource have a significant impact on company's overall worth (Achmad, 2022).

Organizational and governmental executives have mostly concentrated on intangible assets to produce sustained competitive advantage. According to Gupta et al. (2020), inventions and other intangible assets account for more than 80% of business value. According to Hamilton (2006), total global wealth contains 77% of intangible assets. As a result, corporate decision-makers, and policymakers are concerned about changing these intangible resources into a value-creation. The main reason that most researchers are interested in IC is its relationship with financial performance (Xu & Liu, 2020).

The use of IC should be a priority for all organizations because it has been observed that it improves an organization's financial performance (FP), adds value, and creates a sustainable environment for competitive advantage in developed economies (Cohen & Kaimenakis, 2007). The problem is that inefficient usage of IC might end up costing companies millions of dollars per year (Sudarsanam et al., 2006). It's almost certain that organizations in knowledge – driven economies are still concentrated on acquiring physical assets in order to grow to be enormous entities, but this condition may only last a short while. Bharathi (2010) claims that the banking industry specifically isn't using and managing IC and is instead concentrating on creating and controlling tangible assets.

Just because of having an intangible nature, it is difficult to measure intellectual capital (Chang & Hsieh, 2011). To investigate and understand the importance and benefits of IC, firm needs methodologies in order to measure the intellectual capital (Bayraktaroglu et al.,

2019). Many studies have used the VAIC method to evaluate intellectual capital (Bayraktaroglu et al., 2019; Nadeem et al., 2017). Finding of these studies have shown a link between IC & firm performance.

To address the classification and measurement of IC problems, numerous researchers have made major contributions (Dzenopoljac et al., 2017). The VAIC model was used in many studies to assess intellectual capital (Nadeem et al., 2017; Bayraktaroglu et al., 2019). These research conclusions revealed a connection between corporate performance and intellectual capital. When Discussing VAIC model in performance “VAIC have ignored some important components, due to which the performance of firms have not measured accurately, as argued by. Another objection claims that when assessing social and human capital, Pulic's methodology misinterpreted a few accounting terminology, such as flow and stock entities (Danila et al., 2021).

This study undertakes an alternate methodology to examine the influence of intellectual capital on financial performance, utilizing Pulic's (1998) value added intellectual coefficient (VAIC) model. In the pursuit of evaluating the influence of intellectual capital (IC) on the financial performance of banking sectors and optimizing outcomes, the extended Value Added Intellectual Coefficient (VAIC) model introduced by Bayraktaroglu et al. (2019) integrates innovation capital and relational capital as additional coefficients. Chen et al. (2005) supported the preceding argument that the Structural Capital measurement in the original VAIC model may be insufficient, as he used the two variables as control variable, and argued that some important information regarding SC is missing in the model. For measuring the variable, similar evaluation has done like Chang and Hsieh (2011).

The study aims to empirically explore the impact of value added intellectual coefficient (VAIC) on the performance of banks in Pakistan. Additionally, it seeks to evaluate the connection between the efficiency of intellectual capital, assessed through its components and the financial performance of Pakistani banks, gauged using conventional accounting metrics (ROA & ROE). By adding two new elements, this research seeks to expand and modify the Value Added Intellectual Coefficient (VAIC) model.

Objectives of the study

Principal objectives of the study are:

1. To investigate the impact of intellectual capital on bank financial performance.
2. To investigate the impact of components of IC on bank financial performance.
3. To determine which component is critical in improving bank financial performance.

Underpinning Theory

Penrose (2009) was the first to introduce Resource Based Theory. According to Resource Based View (RBV) organization should focus internally for the best utilization of available resources, rather than finding out those resources externally to gain competitive advantage. Resource-based theory aided in understanding how firms deploy their resources to gain long-term competitive advantages. This implies that, and likewise, the performance of tangible assets is dependent upon the performance of intangible assets.

Knowledge based theory

The Company's Resource-Based View (RBV), which provides strong strategic support for intellectual resources, evolved into the Knowledge-Based View (KBV). The success of businesses today is largely attributed to their knowledge, and it is widely acknowledged that applying new information is essential to achieving and sustaining competitive advantages (OlaREWaju et al., 2021)..

Intellectual capital theory

Stewart, Edvinsson, and Malone are the three authors who have made the most significant contributions to the idea of intellectual capital. Intellectual capital refers to the ownership of knowledge, personal expertise, and organizational technology, relationships with customers, and professional talents that provide an edge over rivals (Edvinsson & Malone 1997). Stewart (1997) asserts that IC is "packaged valuable knowledge." He says that "According to the general theory, knowledge assets, are created when free-floating brainpower takes on some meaningful order or when it is given strong shape (a mailing list, a spreadsheet, schedule of meetings, a graphic representation), and gathered in a way that makes it possible for it to be defined, shared, and utilized. Whenever a human capacity exists, value is created.

Intellectual Capital and its Measurement

Among the prominent techniques employed to gauge efficiency across three components, structural capital, capital employed, and human capital, the Value Added Intellectual Coefficient (VAIC) model introduced by Pulic (1998) holds a predominant position. The VAIC model was used in many studies to assess intellectual capital (Nadeem et al., 2017; Bayraktaroglu et al., 2019). In accordance with Pulic (1998), Pulic (2000b), and Pulic (2008), VAIC is made up of three components, and the coefficient of intellectual capital, which are measured by human capital efficiency structure capital efficiency, and capital employed efficiency respectively. It determines how much value is produced by a firm's use of its physical and IC resources.

$$VAIC = HCE + SCE + CCE$$

Prior to determining the efficiency levels, the value added by the company (VA) must be determined.

$$VA = \text{output} - \text{input}$$

Value addition represents a change in earnings per unit produced. A company's value can be determined by dividing its inputs and outputs. Input consists of administrative expenses excluding employee wages and benefits, whereas output is the yearly operating revenue from sales of goods and services (which are considered an investment rather than expenditure) (Bayraktaroglu et al., 2019).

Critics argue that Pulic's model, which only incorporates three VAIC components, is insufficient. Innovative capital, which needs to be separated from structural capital as a whole but was not taken into account by VAIC in its calculation of VAIC, is included in structural capital as well. The term "research and development" (R & D) refers to an organization's creative capital. Knowledge management R & D spending is crucial to business. Spending in research and development helps the business evolve technologically and contributes to its expansion. Various researches looked into how R&D contributed to value creation. Therefore, Chauvin and Hirschey (1993) discovered a favorable influence of R & D on corporate value of firms and established a significant relationship between firms' R & D and stock returns.

Second, neither relational capital nor relational capital efficiency are covered by the VAIC model's definition of IC efficiency. While research shows that human, structural, and relational capital make up IC. Due to these VAIC constraints, a number of researches have modified the VAIC model; in particular, Chan (2009) and Ulum (2014)'s work deserves praise. Due to its foundation in audited financial data, objectivity, and the flexibility to be utilized for cross-sectional comparisons, such as between enterprises, the VAIC has clear advantages over other measures of IC (Firer & Williams, 2003). Accessibility to outside stakeholders with regard to the intangible worth of the company is one of the main advantages of VAIC over other metrics. Due to their significance in advancing technology and creating the firm's brand value, they recommended that R&D and advertising expenses, which are utilized as substitutes for innovation and relational capital, were advised to be "viewed as asset-like investments" as opposed to expenses. (Chen et al., 2005). However, Vishnu and Gupta (2014, 2015) replaced relational capital with marketing, selling, and advertising expenses because these costs are required "to establish and maintain a

relationship with external stakeholders," despite adding relational capital efficiency as a new component to the original VAIC model in their research on Indian pharmaceutical firms. Similar to how HCE was calculated in the original VAIC model, the definition of relational capital efficiency by Vishnu and Gupta (2014) involves expressing it as the quotient of value added (VA) to costs associated with marketing, selling, and advertising.

The research cited previously indicates that relational capital and innovation capital are the two predominant components of intellectual capital that the original VAIC framework does not adequately acknowledge. However, among the studies proposing an expanded model, there has been no alteration to the fundamental premise that substitutes for intellectual capital elements should be perceived as investments, akin to assets rather than expenditures. This perspective remains consistent due to their contribution to business growth, analogous to how labor costs are treated in the original VAIC methodology.

The revised version of VAIC presented in this publication incorporates Relational Capital (RC) and innovation as its new component, aligning with similar adaptations by Vishnu and Gupta (2014), Iazzolino et al. (2014), and Nimtrakoon (2015) for proper measurement of components of IC. Relational Capital and innovation capital have neglected by VAIC model (Smriti & Das, 2018). The proxy for innovation capital will be research and development expenses.

Financial Performance

An important measure for the performance evaluation of a company is profit (Efriyanti et al., 2012). We can say that the financial performance of company tells us that how effectively and efficiently the financial operations of the company is being managed in order to generate profit (Budiyono & Arum, 2020). Researchers have given various explanations and measurements for firm performance. Efficiency is achieved if the company is able to utilize low amount of the input with optimal output, while effectiveness is ability of management to determine the right tools to achieve desired goals. Good or bad financial performance will affect company's value (Utama et al., 2016) Performance of company can be evaluated by two measures. Return on Assets (ROA) & Return on Equity (ROE) serve as measures that approximate a company's profitability. ROA evaluates the company's skill in efficiently deploying its assets to yield profits, revealing the magnitude to which the company's revenues surpass its costs. In essence, ROA provides insight into how adeptly the company transforms its asset investment into profit generation. (Chen et al, 2005; Firer & Williams, 2003)

$$ROA = \text{Net income} / \text{Total asset}$$

ROE is the profitability measure. it shows the firm's ability to turn equity into profit and considered as an important measure for investors. Return on equity measures the efficiency of company that ascertain the ability of firm to generate revenues from equity (Chen et al.,2005; Nawaz & Haniffa, 2017).

$$ROE = \text{Net income} / \text{Total equity}$$

Intellectual capital and Financial Performance

As outlined by Kurfi et al. (2017), VAIC serves as an analytical approach designed to aid managers, proprietors, and stakeholders in effectively monitoring and evaluating the value added (VA) through a company's total assets. The VAIC, formulated by Ante Pulic in 1998, has been employed in preceding research on intellectual capital to assess its efficacy. Additionally, Pulic (1998) came to the conclusion that the effectiveness and broadness of how IC and capital are employed to produce value may be evaluated using the (VAIC) theory. For every organization to provide value, physical and intangible resources are required (Nawaz & Haniffa 2021). Studies utilizing Pulic's (2000) VAIC approach, demonstrate a significant relationship between IC and business performance. (Especially, in banking sector) (Nawaz et al, 2021).Through the utilization of the VAIC model, Ozkan et al. (2017) unveiled that both human capital (HC) and physical capital contribute positively to the financial performance of Turkish banks. . According to Xu et al. (2022) during the COVID-19 era, only human resources have a favorable effect on bank's profitability in China & Pakistan. Recent research, such as that by Xu & Lu (2021), Lu et al, (2020),has demonstrated the importance of innovation capital in enhancing business performance.

Hypothesis 1: IC has a significant impact on Firm performance of banking sector of Pakistan

Human capital efficiency and financial performance

According to Becker, human capital (HC) is created through investing in people in the form of better education, skill development through instruction, medical care, etc, rather than moving physical or financial capital because knowledge, skills, and values cannot be separated from people (Becker, 1967). Human capital is an important component that contributes in increasing wealth of nation, and quality of work can improve by increasing staff members (Alamanda, 2019). In a broader sense, human capital refers to factors affecting the workforce's human resources as well as the distinctive needs of talents and abilities expressed by employees' values, expertise, competencies, and additional attributes (McGregor et al., 2004).Every unit of capital spent in HC adds value to the company, as

measured by the HCE ratio. HCE, denoting the relationship between a firm's value added (VA) and its investment in human capital, serves as an initial gauge for evaluating the efficacy of utilizing HC in value generation. As stated in the company's annual reports, these costs are included in the salary and wage costs (Deep & Narwal, 2014). Human capital is positively related with return on assets, according to studies by Nimtrakoon (2015), Nadeem et al., (2018a), Bayrataroglu et al, (2019), Chowdhury et al., (2019) and Soewarno, N & Tjahjadi, B (2020).

Hypothesis 1a: HCE has a significant impact on Firm performance of banking sector of Pakistan.

Structural capital efficiency and firm performance

Structural Capital is a company-created infrastructure that enables everyone involved to innovate and contribute to the company's dynamic activities (Anderson & Lawi, 2021). It is non human knowledge, which comprises of strategies, process manuals, databases, routines, and other items that are able to increase its material value (Nawaz, 2017). SCE is that important information which remains attached with firm even after an employee leave that job (Poh, Kilicman, & Ibrahim, 2018). As a result, Businesses with sound structural capital will continue to foster an environment at work where individuals are encouraged to try new things, pick up new abilities, and put those skills to use. In a study on IC and company performance by Bontis (2000), it was shown that regardless of the industry, IC had a favorable relationship with business execution. An additional research endeavor undertaken by Maditinos et al. (2010), aimed at corroborating the outcomes of Bontis (2000), unveiled a linkage between structural capital and the performance of the company.

Hypothesis 1b: SCE has a significant impact on Firm performance of banking sector of Pakistan.

Capital employed efficiency and firm performance

The term "capital employed" refers to all of the capital, invested in a company's current and fixed assets. According to Das and Smriti (2018), the most crucial resources for enhancing firm productivity and profitability are the physical assets. The VAIC model, which was created from the perspective of adding value to the organization through the use of IC, states that each unit of financial capital contributes to value creation. The firm is more effective at using material capital to create value if the ratio is higher. Capital employed efficiency is a measure of how effectively a business uses its resources to add value (Buallay, 2018; Bayraktaroglu et al., 2019; Denopoljac et al., 2016). The increased value can be observed in

the form of dividends and rising market share prices. Appuhami and Bhuyan (2015) also identified a noteworthy correlation between the distribution of stock dividends among shares of publicly listed firms on the Thai stock market and the employed capital. The relationship between IC and the organizational effectiveness of commercial banks in Islamabad, Pakistan, was also the subject of research by Khalique et al. in 2011.

Hypothesis 1c: CEE has a significant impact on Firm performance of banking sector of Pakistan.

Relational capital efficiency and firm performance

Relational Capital is an organization's capacity to enhance connections with community members in a way that encourages the possibility of economic growth by boosting HC and SC (Denopoljac et al., 2016). According to its name, RC refers to the information that is integrated into a company's external relationships (Wu et al., 2007; Cabrita & Bontis 2008). The establishment and maintenance of critical terms, with consumers and suppliers is referred to as relational capital (Chu et al., 2006). Essentially, RC gives itself a competitive edge by developing closer ties with customers, whether directly or by using the intermediary of brands. It's challenging for accountants to understand the value of the capacity to establish these kinds of connections (Gowthorpe, 2009). According to Gogan et al. (2016), RC has a considerable impact on the financial success of Romanian businesses. Within the stock exchanges industry, there is evidence of a favorable impact of relational capital on firm performance (Nimtrakoon, 2015). The financial results of the technology sector of five stock exchanges don't seem to be significantly improved by RC (Nimtrakoon, 2015).

Hypothesis 1d: RCE has a significant impact on Firm performance of banking sector of Pakistan.

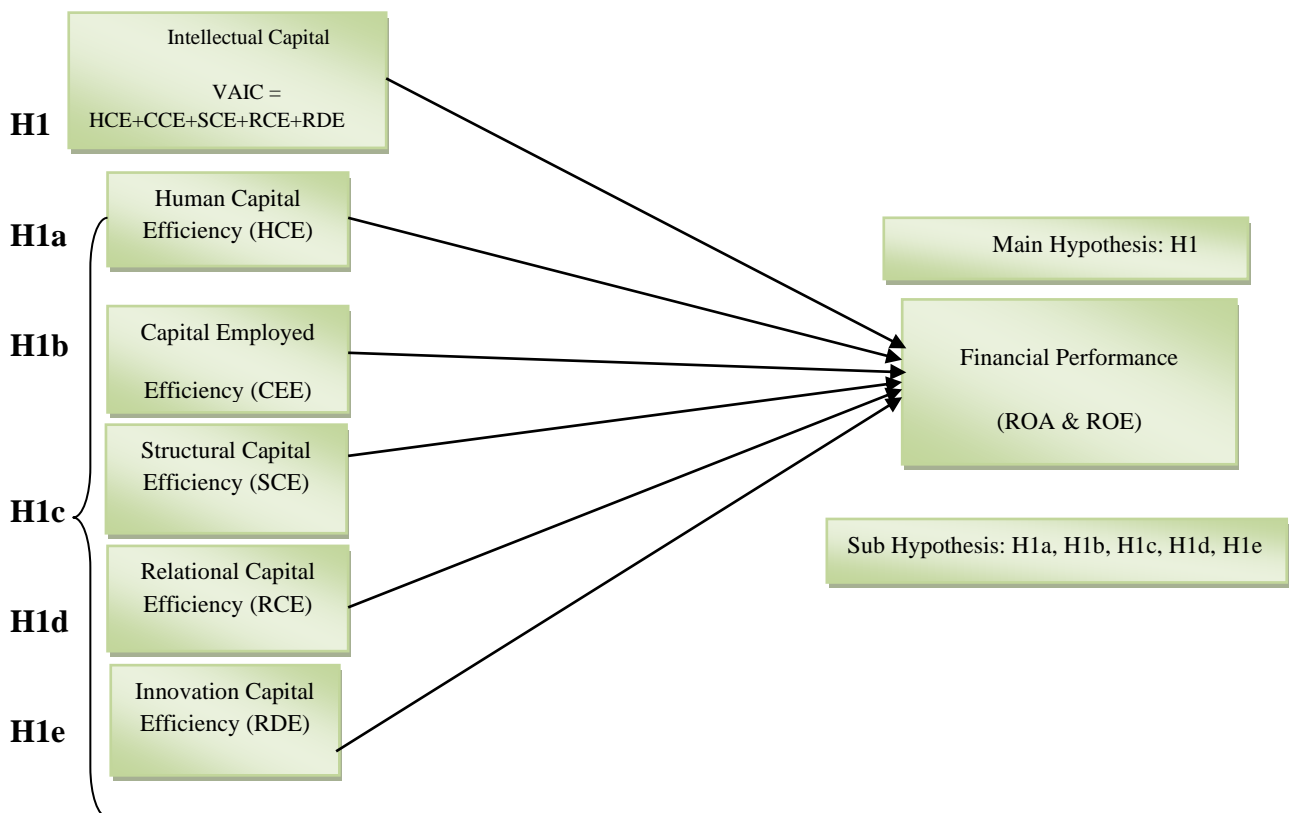
Innovation capital efficiency and firm performance

Innovation capital begins with innovative skills. It is the generation of new information based on past knowledge. It refers to a company's capacity to generate novel products and inventive concepts (Nimtrakoon, 2015). Innovation efficiency is a useful indicator of innovative abilities. It helps in the improvement of Research & Development investment to measure innovation efficiency accurately (Chen et al; 2017). A company can increase profit through product innovation while reducing manufacturing costs through technological innovation (Chen et al., 2004). Firms can avoid price, advertising, and promotion rivalry by embracing innovation (Mendi & Costamagna, 2017). Innovation plays a crucial role in determining competitive advantage, as highlighted by Ramos-Hidalgo et al. (2022). Performance of

Taiwan's IT/electronic industry is positively correlated with Innovation Capital (return on investments, revenue, and profitability) (Chen et al; 2017). Innovation Capital has not shown any effect on firm performance, employee productivity, or return on assets; nonetheless, it has a favorable influence on Thai companies' revenue growth R&D costs are strongly correlated with how Chinese firms would do in the future. (Phusavat et al., 2011).

Hypothesis 1e: RDE has a significant relationship with Firm performance of banking sector of Pakistan.

Conceptual Framework



METHODOLOGY

A comprehensive approach known as a research design outlines the techniques and steps to be taken in order to gather and analyze the required data. (Zikmund, 2003). The research approach that will use here is positivism, which means study's design is quantitative, focusing on numerical data obtained from banks' financial statements.

The study pertains to how Intellectual Capital affects the Financial Performance of banks. The causal relationship between the independent variables, VAIC and its components CEE, HCE, SCE, RCE, and RDE,” and the dependent variables, as measured by “ROA” and “ROE”, is going to be investigated. This study utilized panel data regression analysis to investigate how intellectual capital has affected the financial performance of the banking

industry in Pakistan. Data has been taken from the year 2015 to 2022 because banks retained 7 to 8 years data (Pedneault 2014). The sample taken for this study is all banks working in Pakistan, including government, public, private, Specialized and foreign banks. Various tests such as descriptive analysis, regression, and correlation will be conducted for data analysis, employing the Stata software. A balance sheet analysis and audited annual reports from the State Bank of Pakistan were used to confirm the accuracy of the data.

Public Sector Banks

First women Bank, National Bank, Sindh Bank, Bank of Khyber, Bank of Punjab

Private Sector Banks

Albaraka Bank, Allied Bank, Askari bank, Bank Al Habib, Bank Alfalah, Bank Islami, Dubai Islamic Bank, Faysal Bank, Habib Bank, Habib Metropolitan Bank, JS bank, MCB Bank, MCB Islamic Bank, Meezan Bank, Samba Bank, Silk Bank, Soneri Bank, Standard Chartered

Specialized Banks

Industrial Development Bank, SME Bank, The Punjab Provincial Cooperative Bank, Zarai Taraqiati Bank,

Foreign Banks

Bank of China, Citi Bank, Deutsche Bank, Industrial and Commercial Bank of China,

Return on equity and return on assets are the dependent variables employed to assess bank performance.

Modified and extended Value Added Intellectual Capital (VAIC)

The modified and extended VAIC analytical framework was developed with the aim of effectively monitoring and assessing the Value Added (VA) performance achieved by a company's total capital and its key resource components (Kurfi et al., 2017). The VAIC model quantifies a firm's intellectual capability and efficacy using indicators such as HCE, CEE, SCE, RDE, and RCE". The VAIC is the aggregate of these efficiencies. Better efficiency is represented by higher VAIC performance (Bayraktaroglu et al., 2019).

Calculation of VAIC components will be followed as.

$$HCE = VA/HC$$

$$HC = \text{Salaries and wages}$$

$$VA = \text{value added}$$

$$CEE = VA/CE$$

CE = Total assets- Total Liabilities

SCE = SC/VA

SC = VA – HC

RDE =Research & Development expenses/VA

RCE =Marketing and advertising expenses/VA

Value Added (VA)

Previously VA was calculated by pulic (1998) by adding labor cost, depreciation and amortization into operating profit. He argued that when a firm spends on its employees, that spending should be treated as investment instead of cost, because it benefits the firm for so long. According to this statement R and D, marketing and advertising expenses added back, and modification of VA according to modified model is as follows.

*VA= Operating profit+ Marketing and advertizing expenses +employees salaries and wages
Depreciation +Research and development expenses + Amortization*

VAIC will be computed as

VAIC = HCE+SCE+ CCE+RDE+RCE

Regression Model

$ROA = \alpha + \beta_1 VAIC + \varepsilon$

$ROE = \alpha + \beta_1 VAIC + \varepsilon$

Model 1: $ROA = \alpha + \beta_1 (CEE) + \beta_2 (HCE) + \beta_3 (SCE) + \beta_4 (RCE) + \beta_5 (RDE) + \beta_6 VAIC + \varepsilon$

Model 2: $ROE = \alpha + \beta_1 (CEE) + \beta_2 (HCE) + \beta_3 (SCE) + \beta_4 (RCE) + \beta_5 (RDE) + VAIC + \varepsilon$

ANALYSIS

Descriptive statistics

Table 1 summarizes the descriptive analysis of performance measures and modified and extended VAIC model measures of dependent and independent variables for 33 banks working in Pakistan from 2015 to 2022, with 264 observations. The table displays the dependent and independent variables' means, maximums, minimums, standard deviations, and number of observations.

Table 1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
HCE	264	3.123	2.032	.129	12.566
CCE	264	.366	.65	-4.597	5.069

SCE	264	.606	.218	.001	.999
RCE	264	.022	.098	0	1.574
RDE	264	.111	.164	0	1.053
VAIC	264	4.23	2.416	-.909	15.28
ROA	264	.185	1.508	-1.652	23.92
ROE	264	.0068	.033	-.321	.1833

According to the positive mean values of company performance, the banking industry in Pakistan has a favorable performance on average. The highest mean value of the IC efficiency values is found in HCE, indicating the significance of human resources to banking industry in value creation. This aligns with the findings of Xu and Wang (2018, 2019a), Bayraktaroglu et al. (2019), and Xu and Li (2019). Innovation capital and RC make a little but noticeable difference in the creation of value. The industry obtained a VAIC of 4.23, meaning that for every unit invested in the industry, 4.23 units were created.

Table 2: Correlation Analysis

Variables	ROA	ROE	HCE	CEE	SCE	RCE	RDE	VAIC
(1) ROA	1.000							
(2) ROE	0.017	1.000						
(3) HCE	-0.020	0.071	1.000					
(4) CEE	0.424	-0.097	0.148	1.000				
(5) SCE	0.003	0.107	0.665	0.158	1.000			
(6) RCE	0.019	-0.118	0.082	0.061	0.060	1.000		
(7) RDE	-0.060	0.043	0.210	-0.044	0.136	-0.006	1.000	
(8) VAIC	0.092	0.041	0.758	0.407	0.702	0.131	0.244	1.000

The result in the table 2 demonstrates a significant positive correlation between ROA and CCE (0.424) which means it is profitable to invest in CCE, and bank should attempt to enhance its capital employed efficiency. There is a positive relationship between ROA and SCE, RCE VAIC, but the correlation association is relatively weak, which means that companies with higher VAIC and RCE may have slightly higher ROA, but the correlation is not significant. There is a positive relationship between ROA and SCE, RCE VAIC, but the correlation association is relatively weak, which means that companies with higher VAIC and RCE may have slightly higher ROA, but the correlation is not significant. Financial establishments should work towards enhancing their efficiency in structural capital and relational capital. By doing so, they can enhance the effectiveness of their intellectual resources, leading to an increase in the Value Added Intellectual Coefficient (VAIC). Consequently, it is anticipated that this will yield a favorable influence on the financial performance of these institutions.

Output given in the table depicts a weak negative correlation of ROE with CEE and RCE, which means that there is a slight tendency for higher ROE values to be associated with

slightly lower RCE and CEE values. A strong positive association of VAIC with HCE and SCE have also been witnessed here.

Table 3: Regression Model Test

Regression results analysis Model 1 (ROA)

ROA	Coef.	St.Err.	t-value	p-value	95% Conf	Interval]	Sig
HCE	-1.111	.148	-7.51	0	-1.402	-.821	***
CCE	1.407	3.49	0.40	.687	-5.451	8.26	
SCE	-1.068	.556	-1.92	.055	-2.157	.021	*
RCE	-1.625	.879	-1.85	.064	-3.347	.097	*
RDE	-1.263	.543	-2.33	.02	-2.327	-.199	**
VAIC	1.054	.132	7.98	0	.795	1.312	***
Constant	.023	.262	0.09	.929	-.491	.538	
Mean dependent var		0.185	SD dependent var		1.508		
Overall r-squared		0.189	Number of obs		264		
Chi-square		65.088	Prob > chi2		0.000		
R-squared within		0.306	R-squared between		0.098		

*** $p < .01$, ** $p < .05$, * $p < .1$

The information in the table 3 demonstrated that R-squared is a measure of the proportion of the dependent variable's overall variance that can be accounted for by the independent variables, and its value is 0.189. The model explains approximately 19% variation in ROA. The F-statistic is 65.088 and the chances that the null hypothesis (according to which there is no significant association amid dependent and independent variables) will not be accepted are 0.000000. The total model has a significance level of 1%; it concludes that variations in the return on assets of on Pakistani banks are significantly influenced by all of the independent variables taken together.

The beta coefficient of VAIC, regressed as an independent variable, is 1.054 & corresponding P value is 0, which shows that when intellectual capital increased by 1 unit ROA will increased by 1.054 units, and statistically highly significant. The outcome further demonstrates that VAIC has favorable effect on return on asset. The study's findings are consistent with those of research by Chen et al, (2005); Tan et al, (2007) and Ting and Lean (2009), which showed that VAIC and ROA had a strong positive association. The results indicate that HCE have a negative but significant relation with firm's profitability of Pakistani banks. This finding is similar to the findings of Ferraro and Veltri,(2011), Ginesti et al.,(2018); Ozkan et al., (2017). The lack of significance shown by CEE may be due to the extremely low cost of capital in comparison to the rate of inflation. The outcome is consistent

with other studies conducted by Isanzua (2015) and Ekwe (2013). According to our results; RCE and SCE have shown negative impact on business profitability. Results are contradicting with Xu and Wang (2019a) studies, who also claimed that RCE is the most important element that influences firm profitability. Lower profitability will result from an increase in RC and innovation capital. RDE had a detrimental effect on the company's profitability, which is in line with the conclusions made by Xu and Wang (2018).

Table 4: Regression results analysis Model 2 (ROE)

ROE	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
HCE	.005	.003	1.49	.137	-.002	.011	
CCE	.15	.021	-0.34	.732	0	0	
SCE	.02	.013	1.56	.12	-.005	.045	
RCE	-.023	.018	-1.28	.199	-.059	.012	
RDE	.019	.013	1.50	.135	-.006	.043	
VAIC	-.005	.003	-1.82	.068	-.01	0	*
Constant	-.001	.007	-0.09	.928	-.015	.014	
Mean dependent var		0.007	SD dependent var		0.033		
Overall r-squared		0.036	Number of obs		264		
Chi-square		9.784	Prob > chi2		0.134		
R-squared within		0.037	R-squared between		0.041		

*** $p < .01$, ** $p < .05$, * $p < .1$

According to the estimation findings shown in the table 4, a model with an R-squared value of 0.036 is considered to be comparatively weak. This figure indicates the percentage of the overall variance in the dependent variable that is accounted for by the independent variables. In this case, the model explains approximately 0.036% of the variation in ROE. The probability value is 0.134, which claims that the dependent variable (ROE) and the independent factors do not have a statistically significant relationship. This overall model is insignificant. The findings support several of the well-known studies (Mondal & Ghosh, 2012; Morariu, 2014) who assert that IC does not predict ROE. The coefficient of HCE, CCE, SCE and RDE is positive along with p value higher than 0.005, which shows a positive and insignificant relationship with ROE. While RCE and VAIC shows a negative and insignificant relationship with ROE.

Discussion

Managers in the banking sector of Pakistan should place more emphasize on the importance of both human and financial capital. They need to invest efficiently in their HC, by providing ongoing training and education. Our findings indicated that RCE has a detrimental impact on business profitability, in contrast to Xu and Wang's (2019a) contention that RCE is the most

important factor impacting firm profitability. Lower profitability will result from an increase in RC and IC. The negligible effects of CEE, SCE and RCE show that banking sector of Pakistan should focus on creating these resources by maintaining a clear knowledge strategy, adopting information systems and tools, building a creative organizational culture, and taking other related actions. Banks should create networks for technological innovation in the meantime to enhance their skills for technology innovation through various activities. Additionally, solid social networking connections with both their clients and suppliers should be made with the aim of enhancing the company's reputation. In addition to offering useful outcomes for managers and decision-makers, this study significantly advances the body of knowledge. However, there are still some limitations in the study. In order to further demonstrate how IC efficiency affects a firm's financial success; future research could take use of data from various industries. In this study, the entire banking industry is taken into account. Future research studies may make a distinction between banks in the private and public sectors and look into how much they affect bank performance.

Conclusion

The objectives of this study were twofold: to explore the connection between intellectual capital and the performance of banks and to examine how intellectual capital influences the value of the banking sector. The researcher wraps up with few suggestions for elucidating the relationship between intellectual capital and the financial performance of Pakistani banks based on the findings of the regression analysis mentioned in the earlier parts. This study intends to shed light on the importance of intellectual capital, especially in the banking sector, which is essential to the functioning of any economy. After completing an econometric analysis on the obtained data, it is concluded IC significantly and favorably affects the financial performance of banking sector of Pakistan. Study establishes the following results in respect to the VAIC components.

The empirical findings of the study suggest that intellectual capital generally contributes value in a positive manner. There exists a positive correlation between VAIC, and the financial prosperity of Pakistan's banking sector, assessed through return on assets (ROA), which means VAIC significantly and favorably impacts financial performance of Pakistani banks. While ROE have shown an insignificant relation with VAIC components on the whole and also there is no significant relationship found between any of variable individually. Human capital (HC) exerts a notable and adverse influence on financial performance as

gauged by return on assets (ROA). This discovery aligns with the research conducted by Andreeva and Garanina (2016).

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