

Intellectual Capital And Financial Performance: A Study In The Context Of Pakistani Banking Sector

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Article Info	Abstract
<p>Article History</p> <p>Received: April 05, 2021</p> <p>Accepted: November 08, 2021</p> <hr/> <p>Keywords : Knowledge, Economy Intellectual Capital, Pulic's Vaic Technique, Financial Performance Ratios</p> <p>DOI: 10.5281/zenodo.5655221</p>	<p><i>This research investigates the interrelationship between the efficiency of intellectual capital (as measured by Ante Pulic's VAIC technique) and the financial returns (as measured by the ROA and ROE ratios) of scheduled banks working in Pakistan. Secondary data of 26 banks was obtained from the period, 2009 to 2019. This panel data was analyzed by using stepwise multiple regression technique. The results of the empirical analysis show that the intellectual capital of Pakistani scheduled banks have a good impact on its financial returns. When the intellectual capitals of these banks are further divided into its components then, the human capital and the capital employed have a positive and significant impact on their financial performance. Whereas, the result of the structural capital efficiency coefficient shows that it has a negative relation with financial performance. On the basis of banks ownership, private-owned banks have the highest values of VAIC coefficients as compare to public-owned banks. For future research, inclusion of other financial firms like insurance companies, mutual funds, assets management firms etc in the study could provide a best estimate of this concept. This study is set to contribute to the banking sector of Pakistan by providing an empirical evidence of IC impact on financial performance.</i></p>

Introduction

An investigation conducted by Ocean Tomo in 1976 (a financial services firm) claimed that 83 % of the market economic value of S&P 500 companies was calculated by their physical assets, while the rest of 17% was due to intangible assets. After 40 years, a drastic decay was observed in 2016 with the figure of a reversed ratio figured in only 16% of the market value of S&P 500 companies is calculated by their tangible assets, while the remaining 84% is due to intangible assets (Ocean Tomo report, 2016). This report highlights the importance of intangible assets in current business world. After the introduction of modern technologies, the paradigm of input driven economies was transformed into knowledge based economies. Now, intangible resources are more crucial for the success or failure of an organization. In conventional management practices, business organizations had four factors of production (like land, labor, capital, and entrepreneur) utilized by the businesses for their value addition process. Presently, in knowledge-based economies, intellectual resources have become the active player in the organization value addition process (Bontis, Keow, & Richardson, 2000). Modern businesses need a business model which mainly rely value addition through the efficient and effective utilization of organization intellectual capital. The world's most successful and leading organizations, such as Google, Facebook, Amazon, Wal-Mart, Apple and Microsoft are at the top of their respective markets as they efficiently utilize their knowledge resources (Salajeghe, Sayadi, & Mirkamali, 2014).

Despite the fact that Pakistan is not a knowledge-based economy, there are numerous driving forces (likewise, technological progression, high competitiveness and a shortage of knowledge workers) which are speeding up its journey towards a knowledge-driven economy. The government of Pakistan's new economic master plan (Planning Commission of Pakistan, 2019) suggests the development of new economic policies and strategies which enhance this transformation of an input-based economy into a knowledge-based country. In Pakistan, the rate of this economic and social change is also going to be accelerated in the near future, led by the multibillion dollar infrastructural developments in the entire country under the project of the China Pakistan Economic Corridor (CPEC). The CPEC is multibillion-dollar infrastructural framework of regional connectivity. Keeping in view the above business scenario, business organizations need to concentrate on investing more in customer relations, employees training programmes, and research & development programmes (R & D) in order to enhance their knowledge resources.

In the past, the concept of IC was the most researched topic among researchers and academicians in the developed world (Sharabati, Jawad, & Bontis., 2010). They argued that the majority of the studies were conducted in the developed countries of the world, like in different Scandinavian countries (i.e. Sweden, Denmark, Norway, and Finland etc) and in Anglophonic countries like the USA, UK, Canada, New Zealand,

etc. For example, in the United Kingdom (Roos, Roos, Edvinsson, & Dragonetti, 1997), in Australia (Sveiby, 1998), in Scandinavia (Malone, 1997), in Canada (Bontis, 1998) and in the United States America (Stewart, 2007) shed light on this concept in their studies. Because of this active role that IC resources play in the developed world, this emerging concept has seen mushroom growth in developing countries such as Malaysia, Iran, Taiwan, Hong Kong, and Pakistan. Academicians and researchers in the management field from developing countries have also addressed this concept in studies. In Malaysia (Bontis, 2000), in Iran (Mehralian, Rajabzadeh, Sadeh, & Rasekh, 2012), and in Pakistan (Latif, Malik, & Aslam, 2012) addressed this core issue. Role of IC in emerging economies can also be more prominent as they are rich in human capital (Kamath, 2007).

Intellectual capital in Pakistan's banking industry

Banks are financial institutions which deal in money. They borrow money from the surplus units and lend it to the deficit units of economy in the form of their bank accounts (Shaha, Khan, and Shaha, 2018). The banking sector of Pakistan has experienced a highly competitive and dynamic business environment. The dearth of technological progression, global competitiveness, the scarcity of knowledge workers, short life cycle of banking products, and the mutable nature of bank customers have driven the Pakistani banks to focus more on their knowledge resources. Therefore, banks are required to boost their competitive advantages by efficient utilizing their intellectual resources (Fiordelisi, Monferrà, and Sampagnaro, 2014). Keeping in view the potential role of intangible assets in knowledge economy, this issue needs to be addressed in financial markets; predominantly the banking sector, where traditional practices of accounting are followed. These traditional practices of accounting neglect the role of intellectual capital. Taking this subject into account, this study fills the void gap in literature by a new insight into the knowledge economy and helps the decision makers' to involve their knowledge resources in decision making process. Moreover, this study lays the door for more research into other aspects of this multifaceted notion in the future. The main objective of this research is to investigate the nature of relationship between the intellectual capital efficiency and financial return of Pakistani scheduled banks. The structure of this study is as follows: chapter two represents a critical review of IC-related published literature. Chapter three contains the research methodology of the study and then followed by references.

Theoretical framework

Definition of intellectual capital (IC)

An economist, J.K. Galbraith, first introduced this buzzing concept of intellectual capital in 1969 (Khalique, Shaari, Abdul, Isa, & Ageel, 2011). Many researchers and academicians of the management field argued that there is no universal definition of IC in current literature (Engström, Westnes, & Furdal Westnes, 2003). Similarly, they also argued that there is no universal word which completely explains this buzzing concept. The literature review shows that this concept is commonly referred to the organization's intangible assets, patents, brands, technical knowledge, technical experience and strong relations with customers.

Main components of intellectual capital (IC)

After reviewing the related literature of IC, we concluded that there were different frameworks for measuring the performance of IC. According to Edvinsson (1997), that IC was the collective sum of the organization's human capital, structural capital and customer capital. Alternatively it can be written as:

Intellectual capital = human capital + structural capital + customer capital

Numerous authors in the management field, like Bontis (2000); Chen (2008); Hsu and Fang (2009); and Shih, Chang, and Lin (2010), also supports the three-dimensional nature of intellectual capital consisting of human capital, structural capital, and the capital employed.

The human capital

It was recognized as the highly significant, non physical asset of a firm. Wang, Wang, and Liang (2014), defined human capital as the collective sum of the firm's all human resources, their skills, competencies, innovativeness, experience, wisdom and commitment. It was a generic term used for employee motivations, leadership and problem solving abilities. Human capital also included the values, habits and attitude of the organization employees towards their work (Tarus & Sitienei, 2015). All these skills were owned and possessed by their employees and travelled with them when they switched to another organization. In monetary terms, it is the sum of all rewards and compensation paid to employees by organizations for their services rendered. Staff monthly salaries, bonuses, training & development program costs, allowances, and any other perk were some examples of human capital. Hussi (2004) and Mention and Bontis (2013) all described human capital as a knowledge resource which was not under the direct control of the organization's management.

The structural capital

These are the supportive and non-human parts of an organization's infrastructure that facilitate their human capital to work within the firm. Edvinsson and Malone (1997) explained it as an embodiment, empowerment, or prolongation of the human assets of an organization. One of the basic differences between human and structural capital is their right of ownership. In organizations the human capital is usually possessed by their employees, while structural capital is possessed and controlled by the organization itself. Usually, structural capital consists of the information system, data bases, procedures, copy rights, patents, trademarks and organizational culture (Kianto, Hurmelinna-Laukkanen, & Ritala, 2010; Sharabati, Jawad, & Bontis, 2010; Wang et al., 2014). Joshi, Cahill, Sidhu, and Kansal (2013) all considered structural capital as a type of knowledge asset which is created, developed and possessed by a company. Unlike human capital, firms are the actual owners of this type of asset (Mention & Bontis, 2013).

The relational capital

It is the tendency of customers to use the products or services of any business. In other words it simply shows the loyalty or preference of customers to the services of a firm. It is also called as external or customer capital. It represents the relationship of an organization with their stake holders. Chang and Tseng (2005) suggest that customer capital gives a strong foundation for value creation to the organization.

Measurement of intellectual capital

After recognizing a vibrant role of intellectual capital in the knowledge era, researchers and scholars of the management field raise an important question about its calculation. For the current research, the definition of IC as given by Pulic (1998) has been adopted throughout the research. Pulic (1998), proposed that IC is comprised of human capital, structural capital, and physical capital. Regardless of the increasing acknowledgment of IC in firm market value, there was no unified measure of IC available in the market (Zeghal & Maaloul, 2010). Goh (2005) argued that there were thirty-four different techniques used for calculating the influence of IC on the financial returns of firms. A few of them were: calculated intangible values approach (CIV), the economic values addition method (EVA), market capitalization method, market to book values technique, balanced score-card method, direct IC approach, and value addition intellectual capital coefficients (VAIC) technique. Among all, the VAIC™, an Australian approach was the widely used and latest technique of measuring the efficiency of IC in banks. This technique was proposed by Pulic 1998;Khalique, Shaari, Isa, & Samad, (2013) investigated the influence of intellectual capital on the financial performance of businesses in the contextual background of the Malaysian banking sector. They used the Pulic's VAIC technique in their research. Multiple regression and Pearson correlation techniques were also used. The findings of the study confirmed a strong link of Malaysian banks with their financial returns. Similarly, Mention & Bontis, (2013) also explored the concept of IC in the Belgium & Luxembourg banking industry. They also used the Pulic's VAIC model and found that human capital has a direct influence on the financial performance. On the other hand, the other two components i.e. the structural & relational capital both show an insignificant relation with banks financial performance.

The aforementioned concept of IC has been further explained the application of IC in the Brazilian real estate firms. Results of the study found a significant and inverse link between the intellectual capital and ROIC of Brazilian real estate firms. Whereas, physical or tangible assets employed have positive impact on their annual returns. Moreover, Khalique and Pablos (2015) also conducted another study to explore the impacts of IC resources on financial performance of small and medium enterprises (SMEs) operating in electronics market of Malaysia. Findings of the study proved that IC of firms was the core strategic asset which decides the success of firms and helps in their value creation process. Results of the study found a negative impact of customer capital and the social capital on the financial performance of SMEs operating in Malaysia. These findings were important because it gives different results from prior studies conducted in same context. The emerging concept of IC in the listed non financial firms of 14 different European countries. They specifically investigated the effect of intellectual resources on firm's performance along with their market values. Their research result showed that intellectual resources are prime factor of firm's value creation process. Among other components, the human capital of a firm is a key factor in its market value

Ozkan, Cakan, and Kayacan (2017) investigated the relationship of IC resources with the financial performance of various banks of Turkey. Secondary data was gathered from 44 banks between 2005 and 2014. They concluded that overall performance of intellectual capital of Turkish banks was heavily affected by the efficiency of their human resources. When VAIC was classified into sub components, then human capital efficiency (HCE) and capital employed efficiency (CEE) have positive impact on financial performance of banks (as measured by ROA ratio). However, it was also noticed the impact of capital employed was much more than the human capital of Turkish banks. In Pakistan this concept was at its embryonic stage and there was less number of studies found addressing this emerging concept. Therefore, there was a great need of time to

investigate this concept in the context of Pakistan. Eventually, Abbasi, Arif, Fawad, and Jaffar (2019), performed another similar study to find effect of intellectual resources on financial returns of various companies registered with Karachi Stock exchange. They chose the sample data for the period 2010 to 2014. They also used the VAIC technique and their result provides an additional confirmation of this core concept. In the light of above literature, it was proved that VAIC was the best analytical model used for calculating the efficiency of Intellectual capital in financial sector.

Research hypothesis

Impact of intellectual capital on financial performance

Prior research of different scholars of the management field suggests that intellectual capital efficiency was positively linked with financial returns of businesses like the work of Bontis, (2000); Khalique et al., (2013); Khan et al., (2012). Findings of these studies also revealed positive link between IC and financial performance. Therefore, we can hypothesize that intellectual capital efficiency of Pakistani scheduled banks have a positive impact on their financial performance.

Hypothesis No. 1: Intellectual capital (as calculated by VAIC technique) is positively associated with financial returns of Pakistani scheduled banks (as measured by ROA and ROE ratios).

Impacts of human capital on financial performance

The Pulic's VAIC technique (used as the proxy of IC measurement), states that IC is composed of three components namely human capital, structural capital and capital employed. Results of following mentioned studies proved that the various elements of IC have strong link with financial performance. Among all elements, the efficiency of human capital efficiency has a vital role in its IC performance. The empirical results of Goh, (2005) and Khalique et al., (2013) found a strong link between HCE and financial performance of banks. In the light of above findings, we can hypothesize that human capital efficiency of Pakistani scheduled banks has a positive impact on their financial performance.

Hypothesis No. 2: Human capital efficiency is positively associated with financial returns of Pakistani scheduled banks (as calculated by ROA and ROE ratios).

Impact of capital employed on financial performance

Similarly, the findings of prior studies found that capital employed efficiency (CEE) of firms also showed a link with their financial performance, such as, Chen, (2008) and Joshi, Cahill, Sidhu, and Kansal (2013). In the light of above literature, we can hypothesize that capital employed efficiency of Pakistani scheduled banks was linked with their financial performance.

Hypothesis No. 3: Capital employed efficiency is positively associated with financial returns of Pakistani scheduled banks (as calculated by ROA and ROE ratios).

Impact of structural capital on financial performance

Furthermore, many other researchers found a direct and significant link between structural capital efficiency of firm with its financial performance (Khalique & Pablos, 2015; Khalique et al., 2013). Finding of another research by, Chen (2008), pointed out that the structural capital of firms has also positive effect on their financial performance. Findings of this study also paid great attention to the role of structural capital in the financial performance of firms. In light of above literature, we can hypothesize that structural capital have positive link with financial performance of firms.

Hypothesis No. 4: Structural capital efficiency is positively associated with financial returns of Pakistani scheduled banks (as calculated by ROA and ROE ratios).

Research methodology

Research design

The research design of this study is quantitative in nature because it primarily focuses on the numerical data of selected commercial banks. Regression technique will be use to find the cause and effect relationship between Pakistani scheduled banks financial performance indicators (as an dependant variable) and IC with its components (as an independent variables) along with three control variables (firm size, firm age, and financial leverage) will examined.

Target population

The targeted population for study was all the scheduled banks working in Pakistan. According to SBP report (scheduled banks statistics, June 2018) there are 33 scheduled banks working in Pakistan. Out of these 33 banks, 29 banks were owned by domestic investors while 4 are owned by foreign investors.

Sample size and data collection

The sample consists of 29 scheduled banks owned by local investors. Due to unavailability of annual reports of Sindh bank, MCB Islamic bank and Burj bank, they were excluded from sample. The final sample consists of 26 banks and this sample represents the 84 percent of total population of Pakistani banks. Details of selected banks were given in Table 1.

Table 1. List of scheduled banks included in sample

Bank Name	Abbreviation
Zarai Tarqaiyati Bank Ltd.	ZTBL Bank
Summit Bank Ltd.	Summit Bank
Standard Chartered Bank Ltd.	Standard Bank
Soneri Bank Ltd.	Soneri Bank
Silk Bank Ltd.	Silk Bank
SME Bank Ltd.	SME Bank
Samba Bank Ltd.	Samba Bank
NIB Bank Ltd.	NIB Bank
National Bank of Pakistan Ltd.	NBP Bank
Meezan Bank Ltd.	Meezan Bank
Muslim Commercial Bank Ltd.	MCB Bank
JS Bank Ltd.	JS Bank
The First Women's Bank Ltd.	Women Bank
Dubai Islamic Bank (Pakistan) Ltd.	Dubai Bank
Habib Metropolitan Bank Ltd.	Habib Metro Bank
Bank of Punjab Ltd.	Bank of Punjab
Bank Alfalah Ltd.	Bank Alfalah
Al-Baraka Bank (Pakistan) Ltd.	Baraka Bank
Askari Bank Ltd.	Askari Bank
Bank of Khyber Ltd.	Bank of Khyber
Bank AlHabib Ltd.	Bank AlHabib
United Bank Ltd.	United Bank
Bank Islami Pakistan Ltd.	Bank Islami
Faysal Bank Ltd.	Faysal Bank
Habib Bank Ltd.	Habib Bank
Allied Bank Ltd.	Allied Bank
Total	26

Required data was extracted from an audited annual report of sampled banks adopting a time line beginning in year 2009 and ends in year 2019. Therefore, total sample consists of 286 observations. SBP database, DSpace repository, open door, Pakistan banks association and concerned bank official websites were used to obtain these annual reports.

Measurement of the variables used in study

Measurement of the independent variable (bank IC)

Pulic's VAIC along with its three elements i.e. the human capital efficiency (HCE), the structural capital efficiency (SCE) and the capital employed efficiency (CEE) were used as the independent variables. Pulic (1998) used the following steps for calculating the VAIC coefficients. The first step aims to measure the firm ability to develop their value addition (VA). Value addition is simply, the difference between output (the firm total income in a specific year) and input (firm operating expenses in a specific year). Stähle, Stähle, and Aho (2011) alternatively measured the value addition of a firm by following formula:

$$VA = NI + DP + T + W \quad (1)$$

In equation 1, NI represents the annual net income of a bank after deducting its annual taxes in a specific year, DP represents their depreciation expense for a specific year; T represents the bank annual tax while W represents the salaries and wages of their employees in a specific year. The only assumption of this value addition process is that the expenses incurred on firm employees should be dealt as a future investment not a

cost. In second step, we measure a relation between value addition of a firm and their human capital. We measure human capital efficiency, (HCE) by following formula:

$$HCE_{it} = VA_{it} / HC_{it} \quad (2)$$

Here HC is the human capital and equals to the investment in shape of employees salaries & their wages (direct staff, indirect staff, and marketing staff). In other words, HCE simply measure the efficiency of human capital in order to generate the firm VA. The third step aims to measure the efficiency of structural capital (SCE) and also its contribution in value addition (VA). Structural capital (SC) is obtained by subtracting HC from the VA. The relation between HC and SCE is of inverse nature i.e. higher the value of HC, smaller will be the value of SCE. The Structural capital efficiency of a firm was calculated by following formula.

$$SCE_{it} = SC_{it} / VA_{it} \quad (3)$$

The fourth step aims to measure the marginal contribution of per unit of financial capital to value addition (VA). In other words, CEE shows the efficiency of financial or physical capital in order to generate its VA. CEE was calculated as follows.

$$CEE_{it} = VA_{it} / CE_{it} \quad (4)$$

Here CE was book value of physical assets.

In fifth step we calculate the coefficient of VAIC by adding the values of HCE, SCE and CEE coming from equation 2, 3, and 4 respectively.

$$VAIC_{it} = HCE_{it} + SCE_{it} + CEE_{it} \quad (5)$$

Measurement of dependent variables (bank profitability)

The profitability of these scheduled banks was measured by following financial ratios:

Return on asset (ROA) ratio

ROA is a sign of efficiency that how efficiently a firm is utilizing its assets to generate their earnings. It is computed by dividing total net annual income of a firm by its total assets (Firer, 2003).

$$\text{Return on asset} = \text{Net annual income} / \text{Average total assets}$$

Returns on equity (ROE) ratio

ROE ratio tells that how efficiently a company is getting its profits over its common stockholder's equity. It is computed by dividing the total Net annual income of a firm by its equity of share holder's.

$$\text{Returns on equity} = \text{Net annual income} / \text{Share holder's equity.}$$

Measurement of control variables

A type of variable which is kept constant in order to measure or assess the relationship between other variables is called as Control variables. In this study we include following 3 control variables (like bank age, bank size, and financial leverage). These control variables have been also used in several studies for example Mondal & Ghosh, (2012).

Table 2. Summary of variables used in study

Name of Variables	Measurement
Independent variable	
Intellectual capital by (VAIC)	HCE + SCE + CEE
Human capital efficiency (HCE)	VA/HC
Structural capital efficiency (SCE)	SC/VA
Capital employed efficiency (CEE)	VA/CE
Dependent variable	
Returns on average asset ratio (ROA)	Net annual income/average total assets
Returns on equity ratio (ROE)	Net annual income/total equity
Control variables	
Bank age	Current year – year of bank establishment
Bank size	Natural logarithm of bank assets.
Financial leverage (BANKLEV)	Total debt of bank / total assets of bank.

Regression models

Based on theoretical framework, we have two dependant variables, four independent variables and three control variables. So, six regression models have been designed to investigate the impact of intellectual capital on financial returns. These regression models are expressed in table 3. Multiple linear regression techniques were used to measure the nature of relationship between the components of VAIC and financial performance

indicators (ROA and ROE ratios). Model 1a and model 1b tests the relationship between the VAIC and ROA and ROE respectively. Similarly model 2a and model 2b again tests the relationship of VAIC with financial performance along with three control variables like (bank age, bank size, and financial leverage). Model 3a and model 3b, examines the link of VAIC components i.e. (HCE, SCE, CEE) with the ROA and ROE ratios respectively. Similarly model 4a and model 4b examines the same relationship along with control variables.

Table 3. Regression models used in study

Regression equations	
Model 1a	$ROA_{it} = \beta_0 + \beta_1(VAIC)_{it} + \varepsilon_{it}$
Model 1b	$ROE_{it} = \beta_0 + \beta_1(VAIC)_{it} + \varepsilon_{it}$
Model 2a	$ROA_{it} = \beta_0 + \beta_1(VAIC)_{it} + \beta_2(BANK.AGE)_{it} + \beta_3(BANK.SIZE)_{it} + \beta_4(BANK.LEV)_{it} + \varepsilon_{it}$
Model 2b	$ROE_{it} = \beta_0 + \beta_1.(VAIC)_{it} + \beta_2.(BANK.AGE)_{it} + \beta_3.(BANK.SIZE)_{it} + \beta_4.(BANK.LEV)_{it} + \varepsilon_{it}$
Model 3a	$ROA_{it} = \beta_0 + \beta_1.(HCE)_{it} + \beta_2.(SCE)_{it} + \beta_3.(CEE)_{it} + \varepsilon_{it}$
Model 3b	$ROE_{it} = \beta_0 + \beta_1.(HCE)_{it} + \beta_2.(SCE)_{it} + \beta_3.(CEE)_{it} + \varepsilon_{it}$
Model 4a	$ROA_{it} = \beta_0 + \beta_1.(HCE)_{it} + \beta_2.(SCE)_{it} + \beta_3.(CEE)_{it} + \beta_4.(BANK.AGE)_{it} + \beta_5.(BANK.SIZE)_{it} + \beta_6.(BANK.LEV)_{it} + \varepsilon_{it}$
Model 4b	$ROE_{it} = \beta_0 + \beta_1.(HCE)_{it} + \beta_2.(SCE)_{it} + \beta_3.(CEE)_{it} + \beta_4.(BANK.AGE)_{it} + \beta_5.(BANK.SIZE)_{it} + \beta_6.(BANK.LEV)_{it} + \varepsilon_{it}$

Results and discussion

Summary statistics

Table 4. Shows the descriptive statistics of all main variables used in this study. The values of summary statistics show that VAIC coefficient of sampled scheduled banks varies from (2.300) to (4.854). Based on the values VAIC coefficients, United Bank Ltd. (VAIC= 4.854), Habib Bank Ltd. (VAIC=4.630), and Meezan Bank Ltd. (VAIC= 4.410) are the scheduled banks of Pakistan with higher values of VAIC among 26 other scheduled banks. Similarly, Bank Islami (VAIC=2.300) and First Women bank (VAIC=3.067) are the scheduled banks with lower values of VAIC coefficients. On the other hand, if we analyzed the individual component of VAIC. It can be observed that the human capital efficiency coefficient (HCE) of Pakistani banks have strong positive impact on their financial performance. These findings are also consistent with the results of many other studies like (Goh, 2005; Khalique et al., 2013; Latif, Malik, & Aslam, 2012; Ozkan, Cakan, and Kayacan, 2017).

Table 4. Summary statistics of all the variables used in study

Bank	VAIC		HCE		CEE		SCE		ROA		ROE	
	Mea n	St. Dev.	Mea n	St. Dev.	Mean	St. Dev.	Mea n	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
ZTBL Bank	3.45 4	0.906	2.71 4	0.72 5	0.664 3	0.17	0.075 3	0.021	0.010	0.006	0.127 0.052	0.044
Summit Bank	3.54 1	0.931	2.46 1	0.42 1	0.544 1	0.12	0.053 1	0.033	0.011	0.004	0.133 0.041	0.052
Standard Chartered	3.44 2	0.906	2.21 4	0.75 0	0.616 7	0.12	0.021 7	0.054	0.013	0.002	0.127 0.043	0.041
Soneri Bank	3.94 7	1.035	3.18 3	0.92 8	0.720 2	0.14	0.043 2	0.025	0.015	0.003	0.134 0.035	0.043
Silk Bank	3.37 2	0.721	2.54 4	0.47 7	0.779 4	0.28	0.047 4	0.023	0.006	0.004	0.095 0.096	0.035
SME Bank	3.34 2	0.768	2.48 0	0.38 2	0.822 1	0.43	0.039 1	0.015	0.010	0.003	0.111 0.067	0.096
Samba Bank	3.24 9	0.609	2.38 9	0.20 6	0.824 5	0.41	0.035 5	0.024	0.007	0.002	0.112 0.078	0.067
NIB Bank	3.28 0	0.468	2.50 8	0.33 1	0.710 5	0.12	0.061 5	0.023	0.011	0.003	0.128 0.078	0.078

National Bank	3.57	0.767	2.56	0.33	0.803	0.43	0.048	0.018	0.012	0.004	0.214	0.056
Meezan Bank	4.41	0.734	3.76	0.68	0.604	0.03	0.041	0.026	0.012	0.005	0.211	0.040
MCB Bank	4.34	1.865	3.21	1.35	1.076	0.51	0.056	0.032	0.011	0.003	0.221	0.041
JS Bank	3.80	1.824	2.77	0.90	0.730	0.48	0.297	0.505	0.011	0.003	0.119	0.041
First Women Bank	3.06	1.305	2.05	0.79	0.968	0.50	0.039	0.037	0.008	0.002	0.115	0.054
Dubai Bank	3.61	1.481	2.57	0.93	0.985	0.55	0.047	0.026	0.010	0.004	0.144	0.044
Habib Metro Bank	4.03	1.862	2.98	1.39	0.996	0.48	0.052	0.025	0.012	0.006	0.154	0.056
Bank of Punjab	3.88	2.215	3.15	1.61	0.701	0.60	0.028	0.034	0.008	0.005	0.092	0.081
Bank Al-Falah	4.00	1.764	3.02	1.16	0.942	0.56	0.041	0.032	0.009	0.001	0.167	0.079
Al-Baraka Bank	3.66	1.748	2.89	1.25	0.632	0.33	0.138	0.293	0.012	0.001	0.113	0.041
Askari Bank	3.25	0.919	2.16	0.28	0.666	0.19	0.423	0.484	0.008	0.003	0.140	0.052
Khyber Bank	3.39	1.699	2.34	0.79	0.778	0.62	0.270	0.559	0.009	0.002	0.113	0.037
Habib Bank	4.63	0.404	3.85	0.37	0.738	0.02	0.034	0.002	0.013	0.004	0.087	0.026
United Bank	4.85	0.924	4.07	0.86	0.745	0.05	0.034	0.006	0.014	0.005	0.144	0.050
Bank Islami	2.30	1.025	1.89	0.42	0.379	0.60	0.026	0.020	0.007	0.005	0.086	0.06
Faysal Bank	3.41	1.659	2.96	1.46	0.430	0.19	0.022	0.007	0.009	0.004	0.115	0.062
Bank Al-Habib	4.00	0.754	3.29	0.70	0.672	0.04	0.034	0.009	0.014	0.005	0.177	0.028
Allied Bank	4.12	0.710	3.39	0.67	0.700	0.02	0.029	0.008	0.014	0.006	0.172	0.032

Note: First column of the table presents the mean and standard deviation values of VAIC. Second, third and fourth column represents the mean and standard deviation values of HCE, CEE and SCE respectively. In fifth and sixth column, mean and standard deviation values of ROA and ROE present respectively.

Correlation analysis

The correlation analysis measures nature and strength of relationship between two or more than two variables. Table 5; show the results of correlation analysis of all variables (ROA, ROE, VAIC, HCE, SCE, and CEE) used in this study. This could be observed from correlation matrix that all the explanatory variables (VAIC, HCE, SCE, and CEE) have positive correlation with the dependent variables (ROA and ROE ratios). The two proxies measuring the financial performance of banks (ROA and ROE ratios) have a moderate and positive correlation (ROA and ROE $r=0.5814$), implying that banks with higher values of ROA generally have high value of ROE. The correlation coefficients of various intellectual capital components give somewhat mixed results like the human capital with capital employed coefficients have weak and positive correlation (HCE and CEE, $r=0.476$). Similarly the correlation coefficients between structural capital and human capital (SCE and HCE, $r=0.144$) and structural capital with capital employed (SCE and CEE, $r=0.275$) are also week and positive relationship. These sign of week relationship among various components of intellectual capital indicates that these variables (HCE, SCE, and CEE) are not strongly linked with each other and they function in the operations of bank quite independently from one another. Based on these values, we can assume that a bank with a significant amount of human capital may not need to invest money in form of processes, brands, systems, structures etc. similarly a bank with large amount of structural capital may not need to pay a good sum of money to their employees or workers in shape of their salaries or wages.

Table 5. Correlation matrix for variables used in study

	ROA	ROE	VAIC	HCE	SCE	CEE
ROA	1					
ROE	0.581488	1				
VAIC	0.670817	0.606472	1			
HCE	0.695276	0.565489	0.933022	1		
SCE	0.10717	0.212814	0.349351	0.144288	1	
CEE	0.403383	0.451488	0.726772	0.476318	0.275097	1

Empirical results

This section aims to discuss the findings of our empirical analysis of different regression models as previously shown in table 3. According to the balance panel data analysis method, we use Hausman test for the selection of appropriate model (either fixed effect model or random effect model) for estimations. After applying Hausman test with respect panel data analysis, regression models (1a, 1b, 2b, 3a, 4a, and 4b) were estimated by using the one way individual random effect model and remaining regression models (2a, and 3b) were estimated by using one way individual fixed effect model. The regression results of model 1a and model 1b have shown that VAIC of Pakistani scheduled banks has significant and positive effect on their ROA and ROE ratios respectively. The \bar{R}^2 values of model 1a, and model 1b, shows that bank's VAIC (independent variable) collectively explains the 65.07 percent and 47.82 percent of variance in their respective ROA and ROE ratio values.

Model 2a, and model 2b, further investigates the relationship of bank's VAIC, control variables (Bank age, bank size, bank financial leverage) and profitability ratios (ROA and ROE). Among the three control variables only the bank age and financial leverage have a significant and positive impact on bank's profitability ratio (ROA and ROE). In model 3a, and model 3b, the relationship of VAIC components i.e. (HCE, SCE, and CEE) and bank profitability ratios i.e. (ROA and ROE) has been checked. The regression results of model 3a, and model 3b, have shown that HCE of Pakistani scheduled banks has significant and positive impact on their ROA and ROE ratios. Results of similar nature were also observed for the effect of CEE over ROA and ROE ratios. These results are also in line or consistent with the findings of other studies like (Goh, 2005; Latif, Malik, & Aslam, 2012; Dzenopoljac, Janosevic, & Bontis, 2016; Ozkan, Cakan, and Kayacan, 2017). But in case of SCE relationship with ROA and ROE ratios, it was observed that SCE has positive and insignificant relationship with the both ROA and ROE ratios. Findings of Ozkan, Cakan, and Kayacan, (2017) also found the similar nature of relationship between structural capital efficiency and the financial performance of various banks operating in the banking industry of Turkey. The \bar{R}^2 values of model 3a, and model 3b, shows that the components of VAIC collectively explains the 68.43 percent and 84.97 percent variance in their profitability ratios.

Model 4a, and model 4b, further investigates the impact of VAIC components i.e. (HCE, SCE and CEE) on ROA and ROE in the presence of three control variable i.e. (Bank age, bank size and financial leverage). Regression results show that HCE and CEE have positive and significant impact over ROA and ROE ratios. These results are also consistent with the findings of Chen (2008); Hsu and Fang (2009); Shih, Chang, and Lin (2010); Ozkan, Cakan, and Kayacan, (2017). Finally, the regression results obtained regarding the impact of VAIC along with three control variables (bank age, bank size, and bank financial leverage) on the financial returns of banks as demonstrated in model 2a and 2b. Results show that bank age and financial leverage of banks have positive and significant impact on the financial ratios of Pakistani scheduled banks. Only one control variable i.e. bank size shows negative impact on the financial returns of banks. Similarly, in model 4a and 4b, we measured the impact of IC components on financial returns of banks along with three control variables. Regression results show that financial leverage of banks have positive and significant impact on financial returns while the impact of bank size is negative on both ROA and ROE ratios.

Table 6. Result of regression analysis matrix of all variables used in study.

Independent variables	Model 1a	Model 1b	Model 2a	Model 2b	Model 3a	Model 3b	Model 4a	Model 4b
Constant	0.0019 (3.161)	0.0213 (2.109)	-0.0134 (6.199)	0.0363 (6.370)	0.0015 (3.790)	0.0168 (2.704)	0.0015 (3.626)	0.0394 (5.630)
VAIC	0.001* 0.0022 (17.676)	0.035** 0.0304 (16.173)	0.000* 0.0007 (3.908)	0.000* 0.0245 (24.268)	0.000* 0.000*	0.007* 0.000*	0.000* 0.000*	0.0000* 0.000*
HCE					0.0029 (41.051)	0.0330 (22.235)	0.0023 (14.609)	0.0129 (4.891)
SCE					0.000* 0.00017	0.000* 0.0099	0.000* -0.0015	0.000* -0.0013

					(0.347)	(1.343)	(-2.585)	(-0.189)
					0.7286	0.1801	0.0102	0.8496
CEE					0.00099	0.028866	0.001607	0.053069
					5	(9.173)	(4.471)	(10.523)
					(3.000)	0.000*	0.000*	0.000*
					0.002*			
BANK AGE		0.00076	0.00022				-1.47E-	0.000322
		(13.480)	(4.730)				05	(7.105)
		0.000*	0.000*				(-3.002)	0.000*
							0.002*	
BANK SIZE		-	-				-8.00E-	-
		0.000835	0.001653				05	0.001969
		(3.193)	(7.505)				(-8.649)	(-8.745)
		0.0016*	0.000*				0.000*	0.000*
FINANCIAL		0.0010	0.0066				0.0011	0.0109
LEV.		(9.924)	(3.126)				(5.008)	(5.037)
		0.000*	0.002*				0.000*	0.000*
R squared	0.651	0.480	0.868	0.691	0.687	0.864	0.732	0.714
R ²	0.650	0.478	0.853	0.687	0.684	0.849	0.726	0.708
F-statistic	531.990	262.204	58.141	157.660	206.961	58.582	127.292	116.429
F(P value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N	286	286	286	286	286	286	286	286

Note: Figures in parenthesis are the values of t statistics. * indicates the significance of parameters at 1%, ** indicates the significance of parameters at 5%

Conclusions

In modern knowledge economy, intellectual capital of firms represents the main source of competitive advantage. Managers and the scholars of the management field should focus on the role of these intangible assets in value addition process. Numerous studies have been conducted to investigate this concept. The review of related literature also proved this relationship of intellectual capital and financial returns of firms. Main objective of current research is also to test this associationship between IC resources and financial returns of Pakistani scheduled banks. Pulic's VAIC model was used to test this relationship among the scheduled banks operating in Pakistan. Keeping in view, that majority of the similar nature studies in Pakistan focused on different sectors of economy like, Makki & Lodhi (2008), investigated this concept in industrial units of Lahore; Ahmad and Ahmed (2016), also conducted similar nature study to prove this link of intellectual resources efficiency with financial performance of 78 different modaraba, insurance, leasing and mutual fund registered companies working in financial market of Pakistan. Current study is a modest attempt to explain the role of intellectual resources in the banking sector of Pakistan. The empirical results of the extant research based on stepwise multiple linear regression analysis, give the mixed results of this relationship and suggest that financial performance of Pakistani scheduled banks was primarily affect by their human capital. On the other side, the efficiencies of structural capital and capital employed have low impact on financial returns (ROA and ROE ratios) Abbasi, Arif, Fawad, and Jaffar (2019).

The empirical result of all regression models demonstrates that both human capital efficiency and capital employed efficiency of Pakistani scheduled banks have significant and positive impact on their financial returns. This dominant role of HCE and CEE in financial performance measure was also supported by the findings of similar studies like (Goh, 2005; Khaliq et al., 2013; Ahmad and Ahmed 2016; Abbasi, Arif, Fawad, and Jaffar (2019). This study is not without some limitations like selected sample is confined to the scheduled banks operating in Pakistan. It is suggested for future research that this concept may also be applied to other players of the Pakistan financial market (like assets management companies, insurance firms, mutual fund companies etc) for better understanding of underlying concept in the context of Pakistan. In short, the findings of this research provide additional evidence of the impact of intellectual capital on the financial performance of banks working in Pakistan. Thus, proved the strategic role of the intellectual capital in the knowledge based industries. Bank managers and researchers of the management field need to recognize this important role played by these knowledge resources.

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