Nexus between Intellectual Capital and Performance of a Financial Institution

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Abstract: Intellectual Capital (IC) plays crucial role and it is taken as a vital assets for business accomplishment of high-tech firms like banks so there is need of time to give attention to the concept and applications of IC in commercial banks. The main focus of this research is to explore the impact of IC on financial & non- financial performance of commercial banks listed in KSE for the period   2010-2020. Value Added Intellectual Coefficient (VAIC^TM) technique was used to calculate the intellectual capital of business. To analysis panel data,   fixed effect and random effect regression model technique was used to examine the link between IC components and business performance. The findings of this empirical study indicates that structural capital efficiency has higher association with business performance as compare to capital employed efficiency and human capital efficiency. VAIC has positive relationship with financial performance and market performance but negative relationship with customer satisfaction. Based on current study, findings it is recommended that commercial banks in Pakistan should focus on their intellectual capital to get the benefits and to become a standard for the other sectors.

Keywords: Intellectual capital, Business Performance, VAIC, Capital employed, Structural capital, Human capital

1. Introduction

In current economy, success of the organization is dependent on the recognition that which abilities are required for the organization and how these abilities are utilised to get competitive advantage in the industry. (Khalique, Shaari, & Isa, 2013). Enterprises are competing to preserve their

competitive gain by way of using their own specific and unique information (Grant, 1996; Prusak, 2001). Knowledge is worthwhile strategic asset for enterprises to accomplish gains as well as one of the important resources of organization(Khalique, Shaari, & Isa, 2013).

Knowledge Based assets have been depicted as the key sources in behind the competitive advantage of organization (Ting & Lean, 2009). On other hand, Khalique, Isa & Shaari (2011b) argued that in knowledge based economy intellectual capital (IC) has turned out to be more essential to include values when it is contrasted with tangible resources. IC contributes in organizational growth more, than the other sources. (Foray, 2004).In the current environment of competition, high tech enterprises are mostly founded on knowledgeable assets which are intellectual capital. (Khalique M. , Shaari, Md.Isa, & Samad, 2013).

For better understanding of intellectual capital, researchers classified it into numbers of components; Edvinsson (1997) classified IC in two components, structure capital & human capital. Stewart (1997) further extended the distribution into three parts customer capital, human capital & structure capital. But Brooking (1996), Bontis (1998) and Kujansivu (2009) claimed that intellectual capital have not built only on three elements but it also consist of other intangible resources such as skills, brand name, organisation structure, knowledge, customer relationship and competence of employees. In 2005, Ismail presented spiritual capital as one of integrate factor of IC. Intellectual capital is mixture of human capital, customer capital & structural capital. (Riahi-Belkaoui 2003).Banking industry has developed as highly knowledge intensive sector in highly dynamic and competitive environment (Mavridis, 2004). If knowledge intensive organizations want to lead the finance sector, it is necessary for them to capitalize their resource particularly intellectual capital (Khalique M. , Shaari, Md.Isa, & Samad, 2013).For research of intellectual capital subject, banking sector is very good choice because it is highly knowledge intensive and their complete work force is equally intellectual (Mavridis, 2004).

2. Literature Review

After the industrial revolution the attention of people moved from physical terms to brainpower which is though about the most important factor in economic life (Goh, 2005). The current system is determined by expertise knowledge, technology & relationship with all stakeholders etc. which jointly called intellectual capital. (Ahangar, 2011)

2.1 Intellectual Capital

The concept of intellectual capital was first introduced by John Kenneth Galbraith in 1969. But this concept were popularized by Tom Stewart in 1991, when his article "Brain power: How intellectual capital is becoming America's most valuable assets" was published in Fortune Magazine. (Kalkan, Bozkurt, & Arman, 2014).The shortest definition of IC is given by Stewart (1997) as intellectual capital is "packaged useful knowledge. Intellectual capital is called know-how capital which includes individual & structural capital. Individual capital is sum of personal knowledge, experience, skills, social abilities and professional capabilities while structural capital is organizational competence, it includes organization's history, systems, software, handbooks, experience and computer programmes(Sveiby, 1989)

Edvinsson & Malone (1997) described "IC as the knowledge that can be converted into value." The success of a firm is based on how effectively and efficiently an organization used its intellectual capital in competitive environment (Porter, 1999).

2.2 Human Capital

I knowledge economy, we cannot deny the importance of human capital. Human Capital is major source of value addition for organization. It is based on knowledge, professional skills, competence, attitude, and intellectual abilities (Fitz-enz, 2000). Wright, McMahan & McWilliams (1994) stated that in resource base perspective, human capital is a source of sustainable competitive advantage. Seleim, Ashour & Bontis (2007) also studied the association of human capital and firm performance for software companies and found positive significance between them.

2.3 Structural Capital

Structure capital is also central factor in intellectual capital. It includes all non- human factors like routine, formula, policies, procedures, competitive, databases (Khalique M., Shaari, Md. Isa, &Ageel (2011d). Rehman, Asghar, & Rehman (2013) recognised structure capital as non-human asset including processes, rules, databases, procedure, patents, copyrights and trademarks.

Goh (2005) pointed out that structure capital is knowledge of firm that remain in business even when employees leave it at night. It is a process that helps the employees in their work to increase their performance as well as enhance organizational productivity (Bontis N. , 1998).

According to Carbrita & Vaz (2006) SC represent the capabilities of an organization to fulfil its internal and external challenges.

2.4 Capital Employed

Capital employed is also important component of intellectual capital. Capital employed is also called as "customer capital", "relational capital" and "external capital." Bontis (2002) stated that capital employed can be measured as a function of longevity while the literature of marketing argued that long lasting association is source of competitive advantage. The increase in capital employed is possible with the increase in human capital and structural capital. Capital employed is one of main factor which convert intellectual capital into market value(Pouraghajan, Ramezani, & Mohammadzadeh, 2013).

2.5 Market Performance

The market value of company eventually represents the value of company's all net assets. Those companies are signalling high value of intangible assets will get high positive response from market. (Fourati & Affes, 2013) .The intangible assets value increase cause increase in market value of company. (Low.J., 2000). Market value of firm share compared with the book value of firm is used as proxy measure of market value of firm.

2.6 Business Performance

The measurement of business performance is very vital for the organization. There are numbers of market, accounting and financial measures which are used to measure the business profitability, productivity and market performance evaluation. In its study on IC and business performance Chu, Chan, & Yu (2011) used three proxies assets turnover (ATO), return on assets (ROA) & market to book ratio (M/B) to examine the business performance. Zack, McKeen, & Singh (2009) defines the business performance measures in different perspective such as customer satisfaction, rate of new product, innovation customer retention etc.

The narrowest idea to measure the organizational performance is financial indicators, whether the broader idea to estimate the organizational performance is indicators of operational performance. (Schendel & Hofer, 1979)

2.7 Intellectual Capital and Business Performance

Sveiby (2010) reviews 34 methods of measuring the IC. Among all these methods, VAIC™(Value Added Intellectual Coefficient) method is most widely used and recommended method for appropriate measuring of IC performance. VAIC™ method measures how much new value has been created because of per invested monetary unit of resources. A high coefficient shows high value creation by using company resources. Ahangar (2011) investigated the influence of IC on the financial performance (profitability, sale growth & employee productivity) in financial sectors of Iran. The analysis of this research shows that IC significantly affects the profitability and productivity of companies and also explained that HC has direct relationship with corporate performance.

Sharabati (2010) analysed the effect of intellectual capital on the performance of pharmaceutical companies in Jordan and the result of study showed that IC positively influence business performance. Muhammad & Ismail (2009) conducted a survey on banking sector of Malaysia. The result of analysis showed that IC has positive relationship with corporate performance but it also showed that IC was very relax in banking sector in comparison of insurance and brokerage industry. They founded that in Malaysia, market value is determined by capital employed rather than CI.Using the extensive data set from the period of five year 2001 to 2005 including Hang Seng stock exchanges companies Chan (2009) investigated the association between efficiency of IC, its components in firm performance (return on assets, productivity, return on equity and market value). The result proved the only structural capital has positive linking with profitability of firm. Young, Su, Fang, & Fang (2009) conducted a study on Asian banks of eight countries and they claimed that the main elements which create value for the banks are human capital and physical capital.

Daryaee, Pakdel, Easapour, &Khalaflu (2011) argued that intellectual capital has no association with return on assets but if corporate value is calculated by Tobin's Q then it has positive relationship with intellectual capital. In his study Bontis, Chua, & Richardson (2000) examined the three elements of intellectual capital and their interrelation and concluded that human capital and customer capital are main factors due to which company runs and structural capital has positively influence over corporate performance. Cabrita & Bontis (2008) conducted a research on Portuguese banking context, to investigate the inter-relationships and interaction among the Intellectual capital components and organizational performance and result conclude IC components have positively associated with firm performance. Norma &McGEE (2006) investigated the intellectual capital association with new Venture Performance. The study has been conducted on high- tech USA ventures companies the result concluded that human capital is most vital elements when estimating the operating performance. Ranjith Appuhami (2007) found positive association with capital gain on share of investors.

Tan, Plowman, & Hancock (2007) carried out the study by taking the 150 corporations listed in Singapore stock exchange and experiential that IC was found to be positively linked with return on equity, earning per share, and annual share returns Using the extensive data set from the period of three year 2005 to 2007 including 11 Australian owned banks Joshi, Cahill, & Sidhu (2010) investigated the VAIC™ role in business performance the finding that HCE has significant relationship with financial performance of company and in contrast of SCE and CEE, HCE plays an important role for enhancing the banks performance. Same type of study conducted in insurance sector of Pakistan by

Rehman, Ilyas, &Rehman (2011), Chu, Chan, & Yu (2011) conducted an investigation between IC and market performance of Hong Kong Stock Exchange. The finding concluded that HCE was negative significantly associated with market performance. Firer &Willams (2003) conducted research to examine the IC and M/B ratio relationship on African based firm in 2001, research result showed that intellectual capital is not correlated with market value.

Zehri, Abdelbaki, & Bouabddellah (2012) conducted research in Tunisia to investigate the relationship between intellectual capital and business performance. The research concluded the financial and economic performance has direct relationship with intellectual capital but the direct relationship of market performance with intellectual capital was not confirmed. Kehelwalatenna & Gunaratne (2010) conducted research to measure the intellectual capital while business performance measured by return on equity and holding period return and investor response was measure by market to book ratio. The study shows that intellectual capital is significantly link with the investor response and firm performance in both sectors.SCE has negative but significant relationship with M/B ratio and HCE has positive significant relationship with market performance (Maditinos, Chatzoudes, Tsairidis, & Thetiou ,2011).Capital employed has positive associated with ROA and has negative significantly related with M/B ratio (Puntillo,2009).
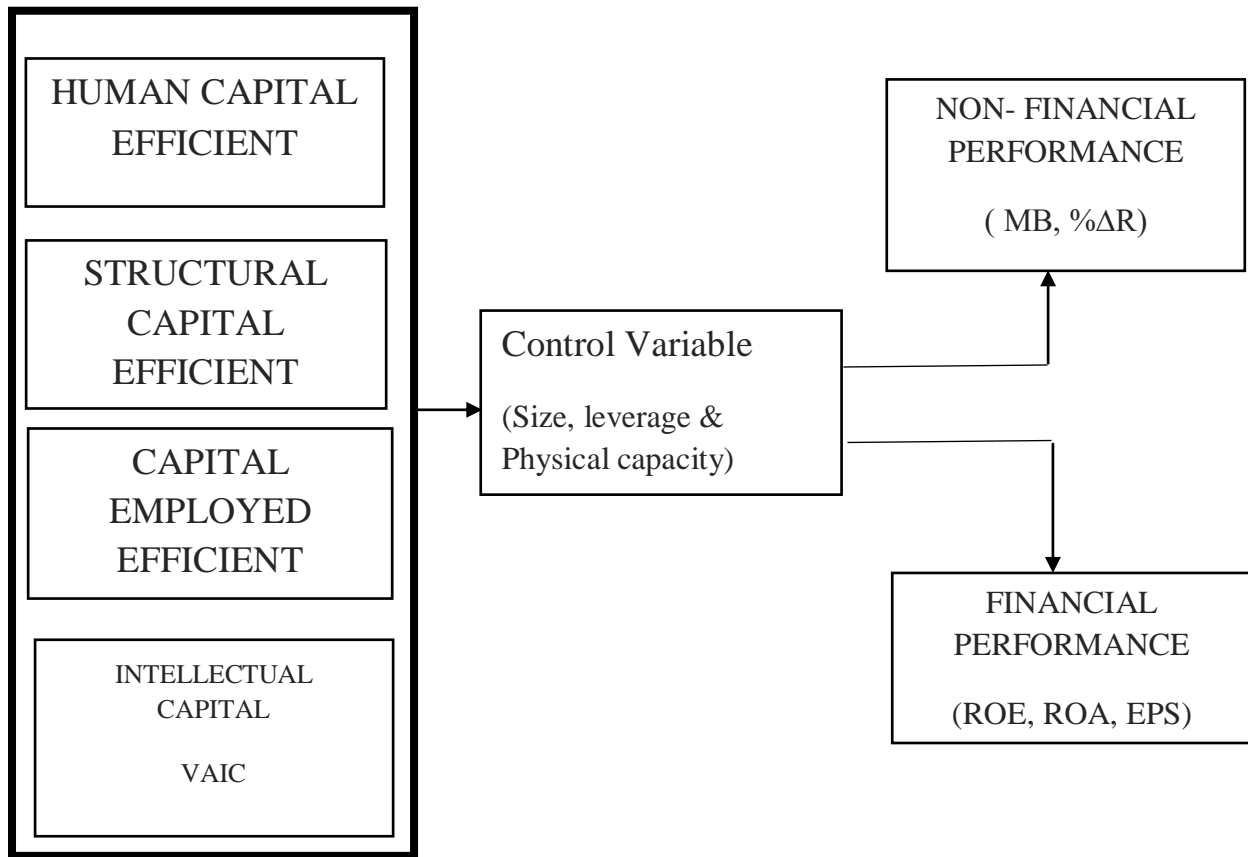
2.8 Research Gap

Limited studies done in Pakistan to inspect the linkage between IC and firm are performance. Intellectual capital directly or indirectly associated with various stakeholders like shareholders, managers, researchers and performance makers. This research finds the IC revelation in long run. Current study evaluate the intellectual capital with business performance in Pakistani banking sector, which managers may use it to evaluate their performance and also use this information as a benchmark.

2.9 Hypotheses

H_1: Human capital efficiency has significant positive relationship with ROE
H_2: Structural capital efficiency has significant positive relationship with ROE
H_3: Capital employed efficiency has significant positive relationship with ROE
H_4: Human capital efficiency has significant positive relationship with ROA
H_5: Structural capital efficiency has significant positive relationship with ROA
H_6: Capital employed efficiency has significant positive relationship with ROA
H_7: Human capital efficiency has significant positive relationship with EPS
H_8: Structural capital efficiency has significant positive relationship with EPS
H_9: Capital employed efficiency has significant positive relationship with EPS
H_{10}: Human capital efficiency has significant positive relationship with Market Performance
H_{11}: Structural capital efficiency has significant positive relationship with Market Performance
H_{12}: Capital employed efficiency has significant positive relationship with Market Performance
H_{13}: Human capital efficiency has significant positive relationship with Customer satisfaction
H_{14}: Structural capital efficiency has significant positive relationship with Customer satisfaction
H_{15}: Capital employed efficiency has significant positive relationship with Customer satisfaction
H_{16}: Intellectual capital has significant positive relationship with ROE
H_{17}: Intellectual capital has significant positive relationship with ROA
H_{18}: Intellectual capital has significant positive relationship with EPS
H_{19}: Intellectual capital has significant positive relationship with Market Performance
H_{20}: Intellectual capital has significant positive relationship with Customer satisfaction

Conceptual Frame Work

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┌─────────────────────────────────────┐
│  ┌───────────────────────────────┐  │          ┌──────────────────────┐
│  │   HUMAN CAPITAL               │  │          │   NON- FINANCIAL     │
│  │   EFFICIENT                   │  │          │   PERFORMANCE        │
│  └───────────────────────────────┘  │          │                      │
│  ┌───────────────────────────────┐  │          │   ( MB, %ΔR)         │
│  │   STRUCTURAL                  │  │          └──────────────────────┘
│  │   CAPITAL                     │  │     ┌──────────────────────┐
│  │   EFFICIENT                   │  │     │  Control Variable    │
│  └───────────────────────────────┘  │     │                      │
│  ┌───────────────────────────────┐  │────▶│  (Size, leverage &   │
│  │   CAPITAL                     │  │     │  Physical capacity)  │
│  │   EMPLOYED                    │  │     └──────────────────────┘
│  │   EFFICIENT                   │  │          ┌──────────────────────┐
│  └───────────────────────────────┘  │          │   FINANCIAL          │
│  ┌───────────────────────────────┐  │          │   PERFORMANCE        │
│  │   INTELLECTUAL                │  │          │                      │
│  │   CAPITAL                     │  │          │   (ROE, ROA, EPS)    │
│  │   VAIC                        │  │          └──────────────────────┘
│  └───────────────────────────────┘  │
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3. Research Methodology

3.1 Population/Sample

There were 21 banks considered as a target population. Data of 7 banks was no available for all the 10 years under study due. As the result of data screening and transformation procedure, 14 banks listed at Karachi Stock Exchange were included in the final sample.

This sample technique was called purposive sampling technique and this was previously used by (Javid & Iqbal, 2010).

3.2 Data collection

This study was based on the panel data. The nature of data was secondary, which was collected from the audited annual reports of the respective banks. The period of study was the financial year from 2010 to 2020. The all data was collected from the official website of these banks. Pooled Regression Model, Fixed Effect Regression Model, Random Effect Regression Model and Hausman Test were used to analyse the data.

3.3 Data Analysis

To analyse the relationship between intellectual capital and business performance, quantitative data analysis techniques has been used. Independent variable such as intellectual capital is calculated by

VAIC (HEC + SCE + CEE) and dependent variable is measured by ROE, ROA, EPS, M/B and Change in revenue with the control variable size, physical capacity and leverage had been used, in the formulation of current research model. Analysis techniques were based on descriptive statistic and estimation of model through regression models. The link between variables was checked through correlation analysis.

4. Descriptive Statistics

Descriptive data analysis of dependent variables (ROE, ROA, EPS, MB, %Δ R), independent variables (HCE, SCE, CEE, VAIC) and control variables (size, leverage & physical capacity) is given below in Table 5.1. The descriptive statistic included mean, standard deviation, minimum level and maximum level. The findings of above table showed that there are 140 observations and mean value shows HEC and VAIC had greatest mean value (8.19 and 9.13) and standard deviation (1.00 and 1.2). These result showed that HEC and VAIC were independent variables which caused the most of variance in dependent variables.

Table 1 Descriptive Analysis

Variable	Obs.	Mean	Std. Dev.	Min	Max
ROE	140	.141401	.2978504	-1.989413	.4989051
ROA	140	.0122359	.0114449	-.05411	.037189
EPS	140	7.211071	7.793496	-19.04	24.47
M/B	140	1.703404	1.1517	.2823591	6.329687
%Δ R	140	7.346856	7.270791	.7541938	53.89794
HCE	140	8.199491	3.030441	1.006249	19.58107
SCE	140	.8587165	.0842842	.0062102	.9489303
CEE	140	.0798209	.0149422	.0082704	.1172332
VAIC	140	9.138029	3.088229	1.02073	20.61283
SIZE	140	19.47942	.9363442	17.03734	21.29379
DER	140	14.73844	8.095973	1.257592	76.5135
PC	140	.0324471	.0817958	.0043662	.9410532

4.1 *Correlation Analysis*

To evaluate the relationship between the dependent variables and independent variables the correlation had been used by using the E-Views. The correlation matrix is given in table 5.2

significance of correlation among variables is show by ρ-value. ρ-value is less than 0.05 shows significant correlation among variables at 95% confidence interval.

Table 2 Correlation Matrix

	ROE	ROA	EPS	MB	R	HCE	SCE	CEE	VAIC	SIZE	DER	PC
ROE	1											
ROA	0.8528*	1										
EPS	0.6174*	0.8512*	1									
MB	0.2424*	0.4626*	0.4873*	1								
R	0.0094	-0.0703	-0.1555	-0.1566	1							
HCE	0.1114	0.1521	-0.0359	0.0650	-0.0792	1						
SCE	0.5147*	0.4581*	0.2144*	-0.0036	-0.0043	0.6248*	1					
CEE	0.3385*	0.5152*	0.4384*	-0.0797	0.0713	0.2843*	0.5255*	1				
VAIC	0.1250	0.1643	-0.0273	0.0633	-0.0775	0.9997*	0.6430*	0.2982*	1			
SIZE	0.1312	0.2393*	0.5292*	0.0462	0.1410	-0.2737*	-0.0885	0.3608*	0.2692*	1		
DER	-0.5475*	-0.5430*	-0.4230*	0.0217	0.1148	-0.0288	-0.1822*	-0.3059*	-0.0348*	0.0491	1	
PC	0.0459	0.0335	-0.0118	0.1106	-0.0450	-0.0303	0.0169	0.0083	0.0292*	-0.0570	-0.0027	1

Significant at $p < 0.05$*

Human capital efficiency is positively correlated with ROE, ROA, SCE, CEE and change in revenue and negatively correlated with MB and EPS. SCE and CEE are positively correlated with ROE, ROA, EPS and HCE, negatively correlated with MB and R. ROA, EPS and MB are negatively correlated with percentage in revenue.

4.2 Regression Analysis

To investigate the effect of IC on business performance indicators i.e. ROE, ROA, EPS, MB & %Δ Revenue with control variables i.e. size, leverage and physical capacity, ten regression models indicators have been made.

Table 3 *Regression Analysis for Model 1*

Dependent Variable ROE	Pooled Regression (OLS)	Fixed Effect Regression Model (FE)	Random Effect Regression Model (RE)
β_0	-2.5985	-1.2204	-2.5985
	0.000	0.107	0.000
HCE	-0.0199	-0.0077	-0.0199
	0.0101	0.4539	0.0057
SCE	2.3758	2.1942	2.375
	0.0000	0.000	0.000
CEE	-3.8821	-4.7663	-3.882
	0.0179	0.009	0.0109
SIZE	0.0739	0.0121	0.0739
	0.0012	0.7572	0.0005
DER	-0.0184	-0.0213	-0.0184
	0.0000	0.0000	0.000
PC	0.1525	-0.0176	0.1525
	0.4675	0.9317	0.434
R^2	0.5646	0.66	0.56
ADJ. R^2	0.5449	0.60	0.54
F- Statistics	28.74	12.33	28.74
	0.000	0.000	0.000
Hausman Test			
Chi 2	27.45		
Prob> chi 2	0.0001		

Fixed effect regression indicated that HCE has no significant and positive impact on the return on equity while SCE has positive and significant relationship with return on equity. CEE has significant but negative impact on return on equity. The probability value is 0.4539 for HCE which is greater than the 0.05, HCE has no significant and positive association with return on equity. SCE has 0.000 ρ-value which is less than 0.05 so we accept the alternative hypothesis and concluded that SCE has positive and significant relationship influence the business performance while CEE has 0.009 p- value but has negative relationship so we reject null, and concluded that CEE has significant but not positive association with return on equity. The value of R^2 is 0.66 which show that variance in ROE is due to 1% change in HCE, SCE, CEE and F-statistics shows that fitness of test is good.

Based on the current findings of fixed effect regression model following regression equation can be formed:

ROE = -1.2204 – 0.007HCE + 2.1942SCE – 4.766CEE + 0.0121SIZE – 0.0213DER – 0.0176PC

Table 4 *Regression Analysis for Model 2*

Dependent Variable ROA	Pooled Regression (OLS)	Fixed Effect Regression Model (FE)	Random Effect Regression Model (RE)
β_o	-0.08473	0.0280	-0.05414
	0.000	0.278	0.0049
HCE	-0.00023	0.0003	1.66E-06
	0.4645	0.2896	0.99
SCE	0.0511	0.0535	0.0543
	0.0000	0.000	0.000
CEE	0.0821	0.0061	0.0168
	0.2083	0.919	0.7673
SIZE	0.0029	-0.0029	0.0013
	0.0013	0.028	0.1477
DER	-0.00064	-0.0005	-0.00061
	0.0000	0.000	0.000
PC	0.0051	0.0022	0.0033
	0.539	0.744	0.6255
R^2	0.520	0.73	0.46
ADJ. R^2	0.503	0.69	0.43
F- Statistics	24.50	17.23	19.03
	0.000	0.000	0.000
Hausman Test			
Chi 2	42.75		
Prob> chi 2	0.000		

The value of R^2 is 0.73 which represent that variance in ROA is due to 1% change in HCE, SCE and CEE. The value of F-statistic shows that fitness of test is good . The value of ROA will change 0.0003 if one rupee change in HCE but the ρ-value of HCE is 0.289 which is greater than 0.05, therefore concluded that HCE has positive but no significant association with business performance as measured by ROA of companies.

ROA = 0.0280 +0.0003HCE + 0.0535 SCE + 0.0061CEE – 0.0029SIZE – 0.0005DER – 0.00229PC

Regression Analysis for Model 3

Dependent Variable EPS	Pooled Regression (OLS)	Fixed Effect Regression Model (FE)	Random Effect Regression Model (RE)
β_0	-92.5974	-1.4516	-44.611
	0.000	0.9157	0.0002
HCE	-0.0518	0.3976	0.223
	0.8063	0.0355	0.1967
SCE	17.752	23.150	23.489
	0.0313	0.000	0.000
CEE	8.9566	-57.73	-60.16
	0.841	0.08	0.0585
SIZE	4.6229	-0.3175	2.0126
	0.0000	0.6571	0.001
DER	-0.3951	-0.250	-0.3119
	0.0000	0.000	0.000
PC	1.4069	0.3614	0.5112
	0.8078	0.9321	0.8905
R^2	0.516	0.83	0.33
ADJ. R^2	0.4949	0.81	0.30
F- Statistics	23.706	32.19	11.25
	0.0000	0.000	0.000
Hausman Test			
Chi 2	62.74		
Prob. > chi 2	0.000		

Based on the current findings of fixed effect regression model following regression equation can be formed:

EPS = -1.4516 + 0.397HCE + 23.150SCE -57.73CEE – 0.317SIZE – 0.2507DER + 0.36143PC

Table 6 *Regression Analysis for Model 4*

Dependent Variable MB	Pooled Regression (OLS)	Fixed Effect Regression Model (FE)	Random Effect Regression Model (RE)
β_0	-1.8615	14.939	5.0533
	0.4815	0.000	0.0514
HCE	0.0662	0.1090	0.083
	0.1316	0.0144	0.0335
SCE	0.0531	1.5787	1.370
	0.975	0.2208	0.274
CEE	-16.285	-33.145	-31.58
	0.0807	0.000	0.000
SIZE	0.2214	-0.6735	-0.143
	0.0853	0.0001	0.2775
DER	-0.0065	0.01593	0.0032
	0.6182	0.2156	0.779
PC	1.7978	1.3931	1.494
	0.1353	0.1153	0.087
R^2	0.049	0.58	0.19
ADJ. R^2	0.006	0.51	0.15
F- Statistics	1.15	8.92	5.21
	0.333	0.000	0.00007
Hausman Specification Test			
Chi 2	51.60		
Prob> chi 2	0.000		

The p- value is 0.014 for HCE which is less than 0.05 so we reject the null hypothesis and concluded that HCE has positive impact on MB. The probability is 0.2208 for SCE which is greater than 0.05 which indicates that no significant association but positive relationship so we accept the null hypothesis while p-value for CEE is 0.000 which is less than 0.05 so concluded that CEE has significant but negative association with MB. Based on the current findings following regression equation can be formed:

MB = 14.939 +0.1090HCE + 1.578SCE – 33.145CEE – 0.673SIZE + 0.0159DER + 1.393PC

Table 7 *Regression Analysis for Model 5*

Dependent Variable %ΔR	Pooled Regression (OLS)	Fixed Effect Regression Model (FE)	Random Effect Regression Model (RE)
β_0	-10.01	-171.72	-156.08
	0.5495	0.000	0.000
HCE	-0.2827	0.238	0.22
	0.308	0.178	0.200
SCE	4.3974	-4.572	-4.438
	0.6818	0.376	0.3884
CEE	48.191	1.13	9.518
	0.412	0.970	0.7564
SIZE	0.5257	9.2448	8.402
	0.5166	0.000	0.000
DER	0.1325	0.064	0.0724
	0.1101	0.209	0.1551
PC	-4.084	-2.73	-2.815
	0.5905	0.439	0.4251
R^2	0.044	0.832	0.60
ADJ. R^2	0.0016	0.80	0.58
F- Statistics	1.038	31.39	34.01
	0.40	0.000	0.000
Hausman Specification Test			
Chi 2	24.78		
Prob> chi 2	0.0004		

Fixed effect regression indicated that HCE, SCE and CEE has not significant with %ΔR but HCE and CEE has positive while SCE has negative impact on %ΔR. The value of %ΔR will change by 0.2388, -4.5728 and 1.131, if one rupee change in HCE, SCE and CEE respectively. The ρ- value 0.178 for HCE which is not less than 0.05, thus we accept the null hypothesis and concluded that HCE has positive but not significant impact on %ΔR. The probability is -0.376 for SCE which is greater than 0.05 which indicates that no significant positive relationship. Following regression equation can be formed:

%ΔR = -171.72 +0.2388HCE – 4.572SCE + 1.131CEE + 9.244SIZE + 0.0648DER – 2.731PC

Table 8 *Regression Analysis for Model 6*

Dependent Variable ROE	Pooled Regression (OLS)	Fixed Effect Regression Model (FE)	Random Effect Regression Model (RE)
β_0	-0.9843	-0.830	0.1558
	0.0379	0.117	0.8447
VAIC	0.0157	0.0347	0.021
	0.0253	0.0002	0.0034
SIZE	0.0040	-0.0013	0.055
	0.0051	0.973	0.035
DER	-0.0203	-0.020	-0.0207
	0.0000	0.000	0.000
PC	0.2216	-0.00262	0.113
	0.3824	0.9914	0.630
R^2	0.352	0.51	0.32
ADJ. R^2	0.333	0.44	0.31
F- Statistics	18.351	7.59	16.60
	0.000	0.000	0.000
Hausman Test			
Chi 2	14.55		
Prob. > chi 2	0.0057		

The output from the pooled regression showed that VAIC has positive significant impact on ROE. The Hausman test represents that p- value is 0.0057 which is less than 0.05 so we concluded that Fixed Effect regression model is better than Random effect regression model. F-statistic shows that this model is good fit.

ROE = 0.1558 + 0.0347VAIC – 0.00135SIZE – 0.0207DER – 0.0026PC

Table 9 *Regression Analysis for Model 7*

Dependent Variable ROA	Pooled Regression (OLS)	Fixed Effect Regression Model (FE)	Random Effect Regression Model (RE)
β_0	-0.0636	0.0408	-0.2324
	0.0003	0.1114	0.2427
VAIC	0.00087	0.00170	0.0012
	0.0007	0.000	0.000
SIZE	0.0040	-0.00187	0.0017
	0.0000	0.1503	0.0861
DER	-0.00078	-0.00053	-0.00066
	0.000	0.1503	0.000
PC	0.0081	0.00328	0.00438
	0.38	0.6757	0.5704
R^2	0.419	0.66	0.33

ADJ. R^2	0.4022	0.61	0.31
F- Statistics	24.41	13.97	17.15
	0.0000	0.000	0.000
Hausman Test			
Chi 2	27.06		
Prob. > chi 2	0.000		

The result from fixed effect regression shows that VAIC has positive and significant association with ROA. The value of R^2 is 0.66 which shows the good explanatory power of model. F-statistic shows that this model is good fit.

ROA = 0.0408 + 0.00170VAIC − 0.00187SIZE − 0.00053DER − 0.0032PC

Table 10 *Regression Analysis for Model 8*

Dependent Variable EPS	Pooled Regression (OLS)	Fixed Effect Regression Model (FE)	Random Effect Regression Model (RE)
β₀	-83.752	14.279	-19.655
	0.000	0.27	0.0862
VAIC	0.2900	0.813	0.655
	0.073	0.000	0.000
SIZE	4.8558	-0.563	1.291
	0.000	0.390	0.025
DER	-0.430	-0.240	-0.291
	0.000	0.000	0.000
PC	2.249	0.470	0.5952
	0.701	0.905	0.8798
R^2	0.494	0.81	0.27
ADJ. R^2	0.479	0.78	0.25
F- Statistics	33.029	31.22	12.631
	0.000	0.000	0.000
Hausman Specification Test			
Chi 2	40.25		
Prob> chi 2	0.000		

Based on the current findings of fixed effect regression model following regression equation can be formed:

EPS = 14.279 +0.8133VAIC − 0.5632SIZE − 0.2405DER + 0.4703PC

Table 11 *Regression Analysis for Model 9*

Dependent Variable MB	Pooled Regression (OLS)	Fixed Effect Regression Model (FE)	Random Effect Regression Model (RE)
β_0	-0.5023	20.926	10.561
	0.8221	0.000	0.000
VAIC	0.0327	0.060	0.038
	0.3231	0.0775	0.216
SIZE	0.0928	-1.039	-0.488
	0.396	0.000	0.0001
DER	0.0030	0.028	0.0182
	0.8026	0.031	0.1291
PC	1.6545	1.247	1.326
	0.1707	0.185	0.154
R^2	0.022	0.51	0.11
ADJ. R^2	-0.00647	0.45	0.09
F- Statistics	0.776	7.74	4.47
	0.5422	0.000	0.001
Hausman Test			
Chi 2	37.49		
Prob. > chi 2	0.000		

Based on the current findings of fixed effect regression model following regression equation can be formed:MB = 20.92 +0.060VAIC – 1.039SIZE + 0.0289DER + 1.247PC

The association between MB and intellectual capital are in consistence with the findings given by (Fourati & Affes, 2013), (Zehri, Abdelbaki, & Bouabddellah, 2012).

Table 12 *Regression Analysis for Model 10*

Dependent Variable %ΔR	Pooled Regression (OLS)	Fixed Effect Regression Model (FE)	Random Effect Regression Model (RE)
β_0	-11.547	-173.132	-155.526
	0.4106	0.000	0.000
VAIC	-0.098	0.121	0.134
	0.633	0.342	0.286
SIZE	0.949	9.161	8.247
	0.1675	0.000	0.000
DER	0.096	0.067	0.072
	0.207	0.178	0.139
PC	-3.4608	-2.813	-2.862
	0.6469	0.4239	0.414
R^2	0.034	0.83	0.58

ADJ. R^2	0.0059	0.80	0.57
F- Statistics	1.208	35.32	47.77
	0.3101	0.000	0.000
Hausman Specification Test			
Chi 2	30.50		
Prob> chi 2	0.000		

Based on the current findings of fixed effect regression model following regression equation can be formed:%ΔR = - 173.132 + 0.1219VAIC + 9.1615SIZE + 0.0674DER – 2.8135PC

5. Conclusion, Recommendations & Limitations

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Major Findings

On the basis of above analysis it was concluded that HEC has no significant relationship with ROE, ROA, EPS, MB and R but has positive association with ROE, MB and ROA. VAIC has positive association with all dependent variables except customer satisfaction. The explanatory power of all model are good fit. Finally, we can say the light of current study the intellectual capital has positive and significant impact on the business performance.

Practical implication

1. This study is helpful for the managers of commercial banks in this way that they can get a valuable awareness about the IC importance for the value creation and can apply it to maximize the wealth of organization.
2. Measuring and evaluating the company's performance by using this technique will increase the transparency of evaluation.
3. It will deliver valuable information to the stakeholders about the performance of firm in which they are interested.
4. It will helpful for the commercial banks to make themselves a benchmark for the other sectors on the basis of efficiency for this establish strategies which will improve and enhance the firm productivity.
5. It would help the developing country particularly Pakistan in balancing its rare resources while allocating them for intellectual capital and physical capital.

Limitation of Research

Limitations that exist in the current research elements and interpretation of results and its ability to generalize the case should be considered are:

1. Every country has diverse culture and environment that's why this study is not appropriate to every country and economy.
2. This research only discussed banking firms listed at KSE; it may not reflects other corporations' performance that's listed at other stock exchanges of Pakistan .
3. This research used single specific model of intellectual capital measurement instead of comparing different methods.

4. All data gathered from the financial statement prepared on the basis of historical cost, alteration and modified information in financial statements based on current value may be different from the outcomes of current research.

Future Research Direction

The future research on evaluating the performance should be on specific variables like human capital, it can enhance the awareness regarding the importance of human capital as vital tool to evaluating the organizational performance.

For obtaining the more accurate evaluation of intellectual capital of commercial banks, The Pakistani commercial banks competence could be measured against the foreign banks to give a comparative analysis of how could be done better.

Another study could be done in future to evaluate the relation of IC and firm performance by adopting both research methods qualitative and quantitative. The future research can be done by using different techniques for measuring the IC and investigate association of IC and company performance.

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