Pakistan Social Sciences Review
www.pssr.org.pk

RESEARCH PAPER

Revisiting the Nexus Between Intellectual Capital and Performance of BRICS Financial Sector

Wasim ul Rehman*[1] Labiba Sheikh[2] Faryal Jalil [3]

1. Assistant Professor Department of Business Administration, University of the Punjab, Gujranwala Campus, Punjab, Pakistan
2. Assistant Professor Institute of Business Administration, University of the Punjab, Lahore, Punjab, Pakistan
3. Assistant Professor Institute of Quality and Technology Management, University of the Punjab Lahore, Punjab, Pakistan

PAPER INFO

Received:
February 09, 2021
Accepted:
March 01, 2021
Online:
March 15, 2021

Keywords:
BRICS,
Banks Intellectual Capital,
Profitability,
Value Added Growth

***Corresponding Author**

wasim.rehman@pugc.edu.pk

ABSTRACT

The study tends to evaluate the intellectual capital (IC) performance of BRICS' banks over the period of 2010 to 2014 using the Value-Added Intellectual Capital (VAIC™) typology developed by Ante Pulic (1998, 2000). A micro panel data on IC, ROA, EPS and VA growth was calculated from consolidated annual reports of 29 publically listed banks. They result of the study shed light that in all banks human capital efficiency is an important determinant for measuring the IC performance of banks compare to structural and physical capital efficiency. In addition, this study also ranks the banks based on VAIC™ and VA performance. In case of empirical results of the study, it explains a positive and significant relationship of human capital efficiency and structural capital efficiency (SCE) with VA growth whereas capital employed efficiency is not significantly related with VA growth. Moreover, results of the study found a positive and significant connection between VAIC™ and VA growth. However, this study fails to find any significant relationship of ROA and EPS with IC. Hence, this study is novel attempt in context of BRICS banking sector which implies that VAIC™ is the most robust methodology for evaluating the IC performance and its relationship with VA growth. Future research is required on large scale longitudinal data using panel data analysis in order to expand its generalizability.

Introduction

In a cut throat competition, the rise of 'knowledge economy' embedded by knowledge and information has created the interest of IC for sustainable performance of firms' (Tan et al., 2007; Rehman et al., 2011; Joshi, et al., 2013). Prior research suggests that measuring the performance of firms through traditional ratios

such as ROI and ROE are no longer sufficient to examine the role of IC for value creation (Liang et al.,2010).With rise of knowledge-based economy in the banking sector it has been found that investment on human resources, research and development, technology and customer intimacy are integral components to remain competitive through leveraging better performance outcomes and value creation (Goldfinger, 1997; Nakamura, 1999). Indeed, knowledge-based view (KBV) argues that knowledge resources commonly referred as IC are strategic intangible resources, difficult to imitate, replace and substitute which play important role to achieve sustainable performance of firms (Grant, 1996; Spender, 1996; Boisot, 1998). As, a result of this transition from production to knowledge economy, there is an immense pressure exerted by external stakeholders on management practitioners of banking sector to measure, disclose and evaluate the performance of IC in terms of leveraging value creation and performance (Marr et al., 2003).

Interestingly, practitioners and management scholars also recognize IC as important determinant for IC driven performance in knowledge economies (Tovstiga and Tulugurova, 2007). According to Bogner and Bansal, (2007) that knowledge recourses (IC) are more likely to add momentum for achieving sustainable performance and competitive edge rather than physical resources in knowledge driven environment (Teece et al., 1997). Further knowledge resources help to constitute the organizational capability which is commonly referred as IC of organization. However, in case if knowledge remains isolated than it becomes difficult for firms to make optimal use of knowledge resources which further fails to construct the intellectual capital (Hsu and Sabherwal, 2012).

Keeping in this view, this discussion postulates that IC is an instrument used to capture the firm's value (Guthrie, 2001; Sveiby, 1997; Stewart, 1997). Prior research asserted that established measurement mechanisms of IC lost their relevance due to inability to provide accurate information to executives which is imperative to manage intangible resources and knowledge-based initiatives (Bornemann and Leitner, 2002). This gab is bridge up by VAIC™ model developed by Ante Pulic (1998, 2000) to measure the IC performance and its relationship with creation added performance of firms. Traditionally, many accounting reporting mechanisms begun to include "Goodwill" as intangible into their business and accounting practices (International Federation of Accountants, 1998). However, accounting practices failed to account for and identification of other intangibles particularly in knowledge bases organizations (International Federation of Accountants, 1998; Guthrie et al., 1999). Nevertheless, firms who reported their intangible assets were Skandia firms (Bontis, 1998). After that number of dedicated publications was reported in well reputed journals. Extant of research efforts were devoted to inspect the association of IC with performance outcomes in developed nations such as Germany (Kristandl and Bontis, 2007), Portugal (Cabrita et al., 2007; Cabrita and Bontis, 2008), Australia (Joshi et al., 2013; Bontis and Girardi, 2000), Ireland (O'Regan et al., 2001).

Further, this multidisciplinary phenomenon has eminent appeal in financial sector of BRICS' i.e. Brazil, Russia, India, China and South Africa. This sector is one of the knowledge-oriented sectors that plays an integral role for the development of emerging economies. However, richness of IC lends itself towards multiple perspective scope and as well difficult to measure and evaluate (Bontis et al., 1999). Nevertheless, intense global competition recognized it as a dynamic force for economy growth and development (Huang and Liu, 2005).Recent, IC practices e.g. human capital (employees' competencies, skill and knowledge), relational capital (strategic alliances with stakeholders') and structural capital (infrastructure capital; simulation models, rules and regulations etc.) has not received noticeable consideration in contemporary accounting and management practices (Stewart, 1997). IC is the combination of knowledge resources leveraged through creative ideas, abilities, strategic relations and infrastructures capabilities which provide competitive positioning to a firm (Sharabati et al., 2010).

Prior discussion highlights that many studies investigated the role of IC's and financial performance in context of developed and developing countries (Kamath, 2008; Dıez et al., 2010; Clarke et al.,2011; Laing et al.,2010; Rehman, et al., 2011; Joshi et al., 2012; Mehralian et al., 2012; Gan and Saleh, 2008; Bontis et al., 2000; Tan et al., 2007; Brennan and Connell,2000; Bontis, 1998; Goh, 2005; Firer and Williams, 2003ure). Nevertheless, there is a scarcity of research investigating the role of IC performance and VA growth, in addition to traditional financial measures more specially, in context of BRICS banking sector. Therefore, this study attempted to examine the impact of IC's components (i.e. human, structural, capital employed) on VA Growth along with traditional performance measure (i.e. ROA and EPS) using VAIC™model developed by Ante Pulic (1998, 2000).

Literature Review

Many organizations around the globe adopted the IC management strategies to improve the efficiency of organizations, thus recognizing IC as competitive advantage (Drucker, 1999a; Collis, 1996; Prahalad and Hamel, 1998). Edvinsson (in Bontis, 2000) conceptualized IC as practical experience, expert's skills, managerial technology and customer intimacy. Stewart (1997) argued that IC as knowledge, skill, and intellectual capabilities of individuals which can be easily formalized and apprehended for leveraging wealth creation.

Rehman et al., (2011) discovered the empirical evidence while investigating the relationshipof IC performance indicators with financial performance indicators in 21 insurance companies listed at Karachi Stock Exchange (KSE) in Pakistan. They found that human capital efficiency (HCE) is an essential component for measuring the IC performance of insurance sector. It showed the positive and significant relation with ROE. Further, this study concluded that SCE, CEE, VAIC™ and VA have significant and positive influence on financial performance indicators (e.g. EPS, ROI and ROE).

Joshi et al., (2012) explored the IC performance of Australian financial sector over the period of 2006 to 2008 using VAIC™. The results of the study revealed that HCE is a detrimental for VAIC™ performance compare to other IC constituent. Furthermore, this study implied that high level of HEC and SCE do not lead to better financial performance of Australian financial sector. However, capital employed efficiency (SCE) is a significant determinant of financial performance. Kamath (2008) finds that HCE significantly influence the financial performance of Pharmaceutical sector of India. Similarly, a study conducted in Malaysia finds that HEC significantly augment the financial performance (Gan and Saleh, 2008). Similarly, Bontis et al., (2000) inspected theimpact of IC (i.e. human, structural and relationship capital) on service and non-servicebased industry in Malaysia. The study found that SC has more positive effect on business performance of service sector than non-service industry.

Goh (2005) found the empirical relationship between IC and performance of Malaysian domestic and foreign banks using VAIC™ typology. The results concluded that value creation both in domestic and commercial banks are more influenced by HC thus suggesting that more investment initiatives on HC provides better returns than physical and SC. Whereas, domestic banks performed better for value creation than foreign banks. Tan et al. (2007) also investigated empirically, the relation between IC and financial returns (i.e. ROE, EPS and ASR) of 150 registered companies at the Stock Exchange of Singapore, by employing VAIC™ model. The results revealed that there exists a positive relationship between IC and companies' current and future performance and a positive relationship between rate of growth of firm IC and its future performance. Hence, IC rich firms better predicts the financial performance (Bramhandkar et al., 2007).

Material and Methods

Measurement of (IC) using the Ante Pulic (VAIC™) model

VAIC™ model is one of the most important and consistent approach for the measuring the IC performance. It is developed by Ante Pulic (1997, 1998, 2001 and 2002), and also known as Austrian Approach. VAIC™ is an analytical approach used to measure the value creation efficiency of both intangible assets (i.e. human and structural capital) and tangible assets (i.e. physical capital). However, this methodology is questioned by many authors. First, it is being questioned by Chang's (2007), who asserted that this model ignored the R&D expenditures and IPRs which are important indicators to capture the IC performance. Secondly, Maditinos et al. (2011) pointed out that VAIC™ reliability leads to serious debate due to its' ineffectiveness to capture the real business growth or market value. Further, it ignored the degree of risk which is an important indicator to capture real IC performance. Thirdly, a study criticized that VAIC™ is not an effective approach for IC performance for companies with negative operating profit and negative book value (Chu et al., 2011). Furthermore, they point out that it leads to inaccurate results for companies with more input than output. Recently, Stahle et al. (2011) criticized

that VAIC™ is not properly conceived the concept of IC performance. It only evaluates the performance of physical capital and labor productivity, which has nothing to postulate the human and structural capital. Besides that, this methodology is seriously challenged and criticized in recent literature of IC. However, it is still most consistent and robustly used approach to measure IC performance of firms due to the non-availability of absolute methodology to evaluate the IC performance (Riahi-Belkauui 2003; Ahangar 2011; Kamukama et al., 2010; Diez et al. 2010; Dunn and Lucas 2010; Maditinos et al. 2011;; Mavridis 2004;Joshi, Cahill and Sidhu 2010; Goo and Tseng 2005;Mavridis 2005; Tan et al., 2007; Pew et al. 2007; Yalama and Coskun 2007; Zeghal and Maaloul 2010; Goh 2005).

Value Added (VA) as an indicator of (VAIC™)

There is no adequate method to evaluate the IC capabilities of current business operations. The VAIC™ is intended to furnish the status of value creation efficiency including both tangible and intangible assets. It takes into account the values from financial statements in order to capture the value-added creation. VAIC™ is robustly used internationally due to its viability of apply at any size of business, easy to calculate which does not demand any rigorous accounting and business practices (Goh 2005; Tseng and Goo 2005). This method starts with value added (VA) where (VA) is attributed as difference between Output and Input. The Output presents the gross revenue of banks over the period of, whereas the Input presents all operating expenses (excluding personal costs) of banks over the period of 2010 to 2014.

- Output =Gross Revenue of all the products and services sold at market price
- Input= Operating expenses (without personal costs).
- Value added =Output-Input.

The second step is to assess the relation between value added and human cost. The value-added HC or HEC means how much the value is generated by one financial unit if invested on HC of banks. HC presents the cost of wages and salaries of employees. It is not considered as a part of input however, considered as an investment. Hence HCE indicates skills of employees to create value for firms.

- HC =personal cost, considered as an investment
- HCE =VA/HC (indicator of HCE)

The third step is to assess the relation between VA and SCE. SCE shows the relationship between SC and VA. It shows degree of SC in generating value creation efficiency. Pulic points out that SC are the final outcome of VA minus HC which indicates that smaller the contribution of HC leads to greater contribution of SC. Nevertheless, Pulic (2000) set evidence and found the new insights while exploring the relationship between VA, HC and SC. He found that in traditional industries

(e.g. heavy industries, mining etc.) the difference between VA and HC is marginal whereas SC is a least contributor for VA. Unlike in knowledge-based industries (e.g. banking, pharmaceutical, software sector etc.) HC accounts for only 25 to 40 percent and the major contribution goes in the favor of SC. Hence, third relationship is measured slightly differently as HC and SC are inversely related and therefore, SCE is measured as follow:

- SC= VA–HC
- SCE= SC/VA

Forth step is to assess the relation between VA and CE of both physical and financial assets. It is pertinent to consider financial and physical capital to evaluate degree of efficiency generated by CE. This suggests that that how much value is produced by investing 1 monetary unit on CE.

- CA= (Capital invested in physical and financial capital).
- CEE= VA/CA (indicator of capital employed efficiency).

The final step is the calculation of Value-Added Intellectual Coefficient (VAIC™) which is given below.

- VAIC™ = HCE + SCE + CEE

Data Collection and Hypotheses

Total 29 banks listed in their respective national stock exchanges were selected for IC's performance and data analysis. The criteria for the selection of each bank was based on its' market capitalization. The data pertaining to IC's components (i.e. HC, SC and CE), financial indicators (i.e. ROA and EPS) and value added (VA) were extracted and calculated using the Ante Pulic typology for VIAC™ performance from consolidated annual reports of banksfor period, 2010 to 2014. The hypotheses are established on the bases of the findings of prior studies (Firer and Williams 2003; Rehman et al., 2011; Diez et al., 2010; Ze´ghal and Maaloul 2010; Ting and Lean 2009; Chang, 2007) who posited a significant relationship of IC's components with the indicators of financial performance i.e. EPS, ROA and VA growth. Based on prior discussion, the study proposes the following hypotheses;

H_1: Higher the values of HCE, SCE and CEE lead to better financial performance in terms of ROA and EPS.

H_2: Higher the values of HCE, SCE and CEE lead to better performance of value-added growth.

H_3: Higher the value of VAIC™ lead to better performance of value-added growth.

Results and Discussion

Table 1 depicts the five years (i.e. 2010 to 2014) average of performance of (VAIC™) and its components (i.e. HCE, SCE and CEE). This study takes into account the Pulic model to calculate the intellectual capital efficiency (ICE) which is the composition of HCE and SCE and physical capital (i.e. CEE). VAIC™ is one of the important and resilient typology which evaluates IC efficiency both intangible and tangible assets where IC is dependent on physical capital and it cannot create valueitself (Tseng and Goo, 2005).Therefore, the results of table 1 postulate that average performance of HCE relatively contributes more for measuring the performance of VAIC™, in all the selected banks of BRICS countries. It further asserted that HC is one of the important strategic intangible assets for creating value for the banks. For example, in case of Brazil, 'Banco Safra S.A.' yields the highest five-year average performance of HCE which is $22.362 against average $1 investment on HC among selected banks of BRICS countries followed by Axis bank of India (HCE=11.383) and 'Industrial Bank Co., Ltd China (HCE=10.696) are most efficient banks with respect to capitalizing HC. However, Industrial and Commercial Bank of China Ltd' is the least efficient bank with (HCE=0.171). This implies that HCE is an important determinant to improve the ICE of BRICS banks. Nevertheless, the results of table 1 also illustrate that almost 85% value creation is attributed by HCE compared to SCE and CEE. This is because that financial products and services of banks substantially dependent on HCE.

Table 1
VAIC™ and Performance Indicators

Sr.	Countries	Banks	HCE $	SCE $	CEE $	VAIC™ $
1	India	Bank of India	9.063	0.886	0.697	10.645
2	India	Bank of Baroda	9.242	0.890	0.065	10.197
3	India	HDFC Bank	8.271	0.874	0.080	9.226
4	India	Axis Bank	11.383	0.912	0.079	12.374
5	India	Punjab National Bank	7.230	0.857	0.081	8.168
6	India	United Bank of India	9.361	0.891	2.062	12.315
7	China	Agricultural Bank of China	2.750	0.636	0.019	3.405
8	China	Industrial and Commercial Bank of China Ltd	0.171	-6.532	0.001	-6.360
9	China	China Citic Bank	7.863	0.854	0.039	8.755
10	China	Industrial Bank Co., Ltd China	10.696	0.897	0.042	11.635
11	China	China Construction Bank	7.314	0.862	0.041	8.218
12	China	Shanghai Pudong Development Bank	6.804	0.843	0.026	7.674
13	South Africa	Bidvest Bank	0.561	-1.167	0.029	-0.577
14	South Africa	Capitec Bank	6.454	0.514	0.265	7.233
15	South Africa	NedBank Ltd	3.489	0.710	0.058	4.257
16	South Africa	Imperial Bank of South Africa	4.572	0.768	0.118	5.457

17	South Africa	Standard Bank of South Africa	5.989	0.693	0.037	6.719
18	South Africa	First Rand Bank Ltd	1.939	0.479	0.039	2.457
19	Brazil	Bradesco	4.304	0.750	0.061	5.116
20	Brazil	Banco.Do Brasil	7.389	0.858	0.095	8.342
21	Brazil	Banco Safra S.A.	22.362	0.909	0.236	23.508
22	Brazil	Itaú Unibanco Holding S.A.	5.112	0.800	0.078	5.990
23	Brazil	Banco Santander (Euro Millions)	2.523	0.568	0.021	3.112
24	Russia	Sberbank	4.133	0.351	0.080	4.563
25	Russia	Vneshtorgbank Russia	5.838	0.828	0.067	6.733
26	Russia	Gazprombank	3.388	0.333	0.032	3.753
27	Russia	Mdm	3.468	0.654	0.070	4.192
28	Russia	Promsvyazbank	5.827	0.826	0.089	6.742
29	Russia	Nomos-Bank	6.844	0.850	0.067	7.760

Table 2 demonstrates the results of VAIC™ and VA ranking. With respect to VAIC™ ranking the bank of 'Banco Safra S.A.' of Brazil is the most efficient bank with respect to (VAIC™=$23.51), followed by 'Axis Bank' of India (VAIC™=$12.37), 'United Bank of India' (VAIC™=$12.31), 'Industrial Bank Co., Ltd of China' (VAIC™=$11.63), 'Bank of India' (VAIC™=$10.65) and Bank of Baroda' (VAIC™=10.20). These are the most efficient banks with respect to five-year average performance of VAIC™ out of selected BRICS' banks. However, the least efficient bank is Industrial and Commercial Bank of China Ltd. based on (VAIC™ =-6.36). As, Banco Safra S.A. is the most the efficient bank, therefore, VAIC™=$23.51 indicates that for average 1-USD investment on human, structural and physical capital generate on average the value of $23.51. VAIC™ performance is not alone indication of efficiency; it is also pertinent to find the value creation efficiency of selected banks.

Although, 'Banco Safra S.A.' is the most efficient bank in terms of five-year VAIC™ performance, whereas, it has been ranked at twelfth position with respect to five-year average performance of VA. It created the $ 1.319 billion average VA performance over the period of 2010 to 2014. Table 2 also indicates that 'China Construction Bank' was the most efficient bank with respect to VA creation. It has generated the value of $ 9.148 billion which has been ranked at 1st for average VA performance. However, Banco. do Brasil, Agricultural Bank of China, Itaú Unibanco Holding S.A. and SBERBANK were ranked at 2nd, 3rd, 4th and 5th position which have created on average value of $5.332billion, $4.001billion, $3.728billion and $3.712billion respectively. However, the least efficient bank with respect to average VA performance is Bidvest Bank creating value for $ 0.00135 billion.

Table 2
Ranking of VAIC™ and VA

Banks	VAIC™ ($)	VAIC™ Ranking	Banks	VA ($)	VA Ranking
Banco Safra S.A.	23.51	1	China Construction Bank	91,481,503	1
Axis Bank	12.37	2	Banco.do Brasil	53,320,096	2
United Bank of India	12.31	3	Agricultural Bank of	40,019,167	3

			China		
Industrial Bank co., Ltd China	11.63	4	Itaú Unibanco Holding S.A.	37,283,062	4
Bank of India	10.65	5	SBERBANK	37,132,200	5
Bank of Baroda	10.20	6	Bradesco	26,073,110	6
HDFC Bank	9.23	7	Industrial Bank co., Ltd China	20,878,288	7
China Citic Bank	8.76	8	China Citic Bank	20,336,878	8
Banco.do Brazil	8.34	9	Vneshtorg Bank Russia	16,081,367	9
China Construction Bank	8.22	10	Shanghai Pudong development Bank	13,657,361	10
Punjab National bank	8.17	11	Banco Santander	13,390,297	11
Nomos-Bank	7.76	12	Banco Safra S.A.	13,194,138	12
Shanghai Pudong Development bank	7.67	13	Punjab National Bank	6,474,690	13
Capitec Bank	7.23	14	Bank of Baroda	5,621,777	14
PROMSVYAZ BANK	6.74	15	Bank of India	5,373,012	15
Vneshtorgbank Russia	6.73	16	HDFC bank	5,152,495	16
Standard Bank of South Africa	6.72	17	Nedbank Ltd	4,267,544	17
Itaú Unibanco Holding S.A.	5.99	18	Axis Bank	4,235,315	18
Imperial Bank of south Africa	5.46	19	Standard Bank of South Africa	4,096,995	19
Bradesco	5.12	20	GAZPROMBANK	3,338,740	20
SBERBANK	4.56	21	First Rand Bank Ltd	3,196,669	21
Nedbank Ltd	4.26	22	Industrial and Commercial Bank of China LTd	2,673,567	22
MDM	4.19	23	Nomos-Bank	2,381,129	23
GAZPROMBANK	3.75	24	PROMSVYAZBANK	1,923,476	24
Agricultural Bank of China	3.41	25	United Bank of India	1,520,954	25
Banco Santander	3.11	26	Capitec Bank	8,578,21.6	26
First Rand bank Ltd	2.46	27	MDM	7,587,20.8	27
Bidvest Bank	-0.58	28	Imperial Bank of South Africa	4,634,81.7	28
Industrial and Commercial Bank of China Ltd	-6.36	29	Bidvest Bank	13,580.16	29

Table 3 presents the descriptive statistics of VAIC™, its components (i.e. HEC, SCE and CEE) and VA growth and the results of correlation analysis among the selected variables. Results of correlation analysis reveal that independent variables (i.e. HCE, SCE and CEE) statistically significant and positively related with each other and hence also explain a significant positive relationship with dependent variable (VA Growth) except CEE, because CEE is inversely related with VA Growth, which is also an insignificant relationship.

Table 3
Correlation Analysis for Selected Variables

Variables	HCE	SCE	CEE	VAIC™	VAGROWTH
HCE	1				
SCE	0.27**	1			
CEE	0.51*	0.17**	1		
VAIC™	0.10*	0.40*	0.53*	1	
VAGROWTH	0.15*	0.17**	-0.062	0.16**	1

*, **, ***represents 10%, 5% and 1% level of signifiance.

Model Specification

We utilized the micro panel data of 29 selected banks from BRICS banks over the period of 2010 to 2014. Data was collated from consolidated annual reports of respective banks. Initially, data was collected in local currency units and then it was converted into common measure of unit i.e. in USD by using average year exchange rate of each respective country for the respective year. Exchange rate data was taken from world development indicators (WDI) from the period of 2010 to 2014.

The selected model can be represented as following

$$Y_{it} = K_{it}\,\beta + W_i\,\alpha + \varepsilon_{it}$$

I = entity specific dimension, t = time specific dimension

$\mathbf{Y_{it}}$ = ROA, EPS and VA growth of i^{th} bank in t^{th} time period as dependent variables.

$\mathbf{K_{it}}\ \boldsymbol{\beta}$ =Matrix of independent variables (does not have intercept term) including: HCE, SCE and CEE.

$\boldsymbol{W_{it}}\ \boldsymbol{\alpha}$ = entity (Bank) specific characteristics which may be observable or unobservable.

If all specific characteristics of banks are observable and constant then it is a classical linear regression model and can be estimated by ordinary least square. Whereas, if specific characteristics of banks are unobserved, then dummy variables are used to capture the effect of entity specific factors, as represented in entity specific intercept term. Such model is estimated by Least Square dummy variable or fixed effect model. In current study we have used the fixed effect model with the assumption that all the banks are not homogenous and each bank has its own characteristics and to capture the effect of such heterogeneity fixed effect model is more appropriate.

Table 4 illustrates the results of fixed effect model. The findings of the study demonstrate a positive week (β=.00364) but statistically insignificant (p>0.10) relationship of CEE with ROA. This table also showed that SCE and HCE are not significantly (p>0.10) influence the financial performance (ROA) of banks. Thus, implies that both are inversely related with ROA. The value of R^2 shows that all components of VAIC™ jointly explain the 1.1% variation in the model. Further, table 4 demonstrates that two control variables (i.e. number of employees and branches) are statistically insignificant and inversely related with financial performance of banks.

Table 4
Regression Results Outcome Variable (ROA)

Results of Fixed Effect Model				
Variables	B	Robust (S.E)	T	p>|t|
CEE	.00364	.0088342	0.41	0.683
SCE	-.052656	.0787017	-0.67	0.509
HEC	-.0060454	.006781	-0.89	0.380
No. of Employees	-.002009	.0035191	-0.57	0.573
No. of Branches	-.0000782	.0000895	-0.87	0.389
Constant	2.216041	.5892448	3.76	0.001
R^2 = 0.011, F(5,28) = 1.63, Prob. > F =0.1836				

Table 5 reveals the results of performance indicator of VAIC™ with earning per share (EPS) of banks using fixed effect model. The findings of the study indicate a positive (β=.1864668; β=.2934206) but statistically insignificant (p>0.10) relationship of CEE and SCE with EPS. However, HCE is negative and insignificantly related with EPS. Table 5 also explains the negative and statistically insignificant relationship of EPS with control variables (i.e. No. of employees and branches). The value of R^2 indicate that all components of VAIC™ jointly explain the 3.6% variation in the model.

Table 5
Regression Results Outcome Variable (EPS)

Results of Fixed Effect Model				
Variables	B	Robust (S.E)	T	p>|t|
CEE	.1864668	.9384643	0.20	0.844
SCE	.2934206	.2266544	1.29	0.206
HEC	-.1102282	.1405014	-0.78	0.439
No of Employees	-.02621	.0244907	-1.07	0.294
No of Branches	-.0010595	.0008672	-1.22	0.232
Constant	34.56583	6.065815	5.70	0.000
R^2 = 0.0361, F(3,28) = 0.61, Prob. > F =0.6957				

Table 6 reports the results of multiple regression analysis. The results indicated a positive and significant relationship of HCE and SCE (β=0.077; β=0.474)

with VA Growth at (p< 0.01). However, CEE positive (β=0.598) but insignificantly related with VA Growth. The value of R^2 indicates that all components of VAIC™ jointly explain 15% variation in the model. Nevertheless, results of coefficients indicate that CEE (β=0.598) more positively but insignificantly contributes to VA Growth followed by SCE (β=0.474) and CEE (β=0.077). However, SCE and HCE explain the significant relationship with value added (VA).

Table 6
Regression Results Outcome Variable (VA Growth)

Results of Fixed Effect Model				
Variables	B	Robust (S.E)	T	p>|t|
CEE	0.598	0.946	0.63	0.532
SCE	0.474***	0.117	4.02	0.000
HCE	0.077 ***	0.021	3.57	0.001
Cons	-0.424***	0.136	-3.11	0.004
R^2 = 0.15, F(3,28) = 12.92, Prob. > F =0.0000 ***represents 1% level of significance				

Table 7 reveals the results of simple regression analysis. The results of the simple regression analysis indicate a positive and significant relationship of VAIC™ (β=0.0859) with VA Growth at (p< 0.01). The value of R^2 indicates that VAIC™ 14.1% variation in the model.

Table 7
Regression Results Outcome Variable: VA Growth

Results of Fixed Effect Model				
Variable	B	Robust (S.E)	T	P>|t|
VAIC™	0.0859***	0.0156	5.48	0.000
Cons	-0.225**	0.114	-1.97	0.05
R^2 =0.14, F(1,28) = 29.98, Prob. > F = 0.0000, ***, ** represents 1% and 5% level of significance respectively.				

Conclusion

IC is a significant source for value creation. Bontis (2000) argued that banks are one of the important sectors of knowledge-based economy where knowledge resources (IC) drive the economy. Therefore, the study underpins the explanatory research design and evaluates the ICE (i.e. HCE and SCE) and physical capital (CEE) performance of BRICS banks using VAIC™ developed by Ante Pulic (2000) and further impact of IC' determinants on banks financial performance (i.e. ROA and EPS) and VA growth. This study makes a significant contribution into theoretical premise of KBV and thus suggesting that IC is a competitive and strategic resource to determine thesustainable performance banks. Extant of research suggested that firms' value is based on physical capital. However, recent research on intangible resources postulated that intangible resources provide more competitive positioning

than tangible resources of firms (Barney, 1991; Bontis, 2000; Edvinsson and Malone, 1997).

Drawing from the sample of 29 publicly listed banks of BRICS countries, this study highlights the IC performance of BRICS banks and its association with the financial performance and VA growth. In doing so, this study has revealed the following aspects of relationship:

1. A positive relationship of CEE with corporate performance (i.e. ROA and EPS) of banks

2. A positive relationship of constituents of IC(i.e. HCE, SEC and CEE) and VAIC™ with VA Growth of BRICS banks

3. A negative relationship of HCE and SCE with ROA and EPS of BRICS banks

The theoretical propositions of IC underpin that HC and SC of banks are the principal components for value creation (Diez et al., 2010). Therefore, using the VAIC™ typology in this study recommends that HCE relatively contributes more for measuring the performance of VAIC™, in banking sector of BRICS countries. Thus, indicating that human resources are more important for measuring IC performance than physical and structural capital. These results are in line with (Rehman et al., 2011; Joshi et al., 2010; Joshi et al., 2013;Kamath, 2008; Goh, 2005). However, SCE and CEE relatively contribute lesser in measuring performance of intellectual capital (IC)in the banking sector of BRICS countries. This finding is also in align with Ting and Lean, (2009), Rehman et al., (2011) and Maditinos et al., (2011).

With respect to relationship of HCE and SCE the results of study indicate a negative and insignificant relationship with traditional performance measure (ROA) whereas, CEE shows weak positive but statistically insignificant relationship with ROA. Further, SCE and CEE positively and HCE negatively influence the profitability (EPS) of BRICS banks, moreover these relationships are statistically insignificant. These findings are consistent with the studies of Firer and Williams (2003) and Diez et al., (2010), who implies that corporate performance still based on physical capital instead on intellectual capital efficiency of banks. Moreover, the study found contradictory results that HEC and SCE failed to report the significant influence on corporate performance of banks. Hence, these findings do not warrant the prior research (Riahi-Belkaoui, 2003; Rehman et al., 2011; Tan et al., 2007; Goo and Tseng, 2005; Pew et al., 2007).

However, the positive relationship of all the performance components of VAIC™ with VA growth indicates that HCE, SCE and CEE contribute positively to create value by increasing the sale growth which is consistent with (Diez et al., 2010). Further, positive relationship of IC's determinants with VA growth are also consistent with the findings of the Edvinsson and Malone, (1997),Lev and Feng, (2001) andGuthrie(2001) who have implied that effective utility of IC brings out competitive positioning for the banks to survive in a dynamic environment and to

create value for the banks. Positive relationship of VAIC™ with VA growth also support the argument of Pulic (2000, 2004) who posits that higher the performance of VAIC™ means better the performance of banks in terms of IC. A positive relationship of VAIC™ with VA growth in this study also reinforces that IC is a competitive tool and therefore, organization utilize IC in order to remain competitive and direct the future performance in a global dynamic environment (Hurwitz et al., 2002;Bontis, 1998;Brennan and Connell, 2000;Nonaka, 1995). Hence, banks with higher value of IC yield to provide better future performance (Tan et al., 2007).

Limitations and Call for Future Research

Despite having a significant relationship of intellectual capital with traditional performance measure such as earning per share (EPS) and return of assets (ROA), this study finds a positive and significant relationship of HCE, SCE and VAIC™ with value added growth. Hence this concludes that effective utility of IC brings out competitive positioning for the banks to survive in a dynamic environment and to create value for the banks. These findings are consistent with (Diez et al., 2010; Edvinsson and Malone, 1997; Lev and Feng, 2001; Guthrie, 2001). However, future researchers would have to conduct their research on large number of banks using macro panel data. This limitation indicates that future researcher would yield better results if they conduct research on large scale longitudinal research design using panel data analysis.

References

Ahangar, R.G. (2011).The relationship between intellectual capital and financial performance: An empirical investigation in an Iranian company. *African Journal of Business and Management*, 5(1), 88-95.

Barney, J. (1991). Firm resources and sustained competitive advantage, *Journal of Management,* 17(1), 99-120.

Clarke, M., Seng, D., & Whiting, R., H. (2011). Intellectual capital and firm performance in Australia, *Journal of Intellectual Capital*, 12(4), 505-530

Bogner, W. C. & P. Bansal (2007), Knowledge management as the basis of sustained high performance. *Journal of Management Studies*, 44(1), 165-188.

Bontis, N. (1998). Intellectual capital: an exploratory study that develops measures and models. *Management Decision, 36(2), p. 63.*

Bontis, N., Dragonetti, N., Jacobsen, K. & Roos, G. (1999). The knowledge toolbox: a review of the tools available to measure and manage intangible resources. *European Management Journal*, 17(4), 391-402.

Bontis, N. & Girardi, J. (2000). Teaching knowledge management and intellectual capitallessons: an empirical examination of the TANGO simulation, *International Journal of Technology Management*, 27(5-8), 545-55.

Boisot, M. (1998). *Knowledge Assets: Securing Competitive Advantage in the Information Economy,* Oxford University Press, New York, NY.

Bontis, N., Chua, W., Keow, C. & Richardson, S. (2000). Intellectual capital and business performance in Malaysian industries. *Journal of Intellectual Capital*, 1(1), 85-100.

Bornemann, M. & Leitner, K.H. (2002). Measuring and reporting intellectual capital: the case of a research technology organization. *Singapore Management Review*, 24(3), 7-19.

Brennan, N. & Connell, B. (2000). Intellectual capital: current issues and policy implications. *Journal of Intellectual Capital*, 1(3), 206-40.

Cabrita, M.R. & Bontis, N. (2008). Intellectual capital and business performance in the Portuguese banking industry. *International Journal of Technology Management*, 43 (1-3), 212-37.

Cabrita, M., Landeiro de Vaz, J. & Bontis, N. (2007). Modelling the creation of value from intellectual capital: a Portuguese banking perspective. *International Journal of Knowledge and Learning*, Vol. 3 (2/3), 266-80.

Collis, D.J. (1996). *Organizational capability as a source of profit*, in Moingeon, B. and Edmondson, A. (Eds), Organizational Learning and Competitive Advantage, Sage, London.

Chang, S.L. (2007). Valuing Intellectual Capital and Firms' Performance: Modifying Value Added Intellectual Coefficient (VAICTM) in Taiwan IT industry. *Unpublished Doctoral dissertation, Golden Gate University, San Francisco*.

Chu, S.K. W., Chan, K.H., & Wu, W.W. Y. (2011). Charting intellectual capital performance of the gateway to China. *Journal of Intellectual Capital*, 12(2), 249-76.

Chu, S.K.W., Chan, K.H., Yu, K.Y., Ng, H.T. & Wong, W.K. (2011). An Empirical Study of the Impact of Intellectual Capital on Business Performance. *Journal of Information & Knowledge Management,* 10(1), 11-21.

Drucker, P.F. (1999a). Knowledge-worker productivity: the biggest challenge. *California Management Review*, 41(2), 79-94.

Edvinsson, L. (1997). Measuring intellectual capital at Skandia. *Long Range Planning*, 30(3), 266-373.

Goldfinger, C. (1997). Intangible economy and its implications for statistics and statisticians. *International Statistical Review*, 65(2), 191-220.

Firer, S. & Williams, S.M. (2003). Intellectual capital and traditional measures of corporate performance. *Journal of Intellectual Capital*, 4(3), 348-60.

Gan, K. & Saleh, Z. (2008). Intellectual capital and corporate performance of technology-intensive companies: Malaysia evidence. *Asian Journal of Business and Accounting*, 1(1), 113-30.

Grant, R. M. (1996a). Toward a knowledge-based theory of the firm. *Strategic Management Journal*, 17(S2), 109-122.

Goh, P.C. (2005). Intellectual capital performance of commercial banks in Malaysia. *Journal of Intellectual Capital*, 6(3), 385-396.

Guthrie, J., Petty, R., Ferrier, F. & Well, R. (1999). There is no accounting for intellectual capital in Australia: review of annual reporting practices and the internal measurement of intangibles within Australian organizations", paper presented at the International Symposium *Measuring and Reporting Intellectual Capital: Experiences, Issues and Prospects*, OECD, Amsterdam, June.

Guthrie, J. (2001). The management, measurement and the reporting of intellectual capital. *Journal of Intellectual Capital*, 2(1), p. 27.

Gholamhossein, M. Ali, R. Reza, M. S. & Hamid, R. R. (2012). Intellectual capital and corporate performance in Iranian pharmaceutical industry. *Journal of Intellectual Capital*, 13(1), 138-158

Hsu, C.I. & Sabherwal, R. (2012). Relationship between Intellectual Capital and Knowledge Management: An Empirical Investigation. *Decision Sciences*, 43(3), 489-524

Huang, C.J. & Liu, C.J. (2005). Exploration for the relationship between innovation, IT and performance. *Journal of Intellectual Capital, 6(2), 237-52.-*

Hurwitz, J., Lines, S., Montgomery, B. & Schmidt, J. (2002). The linkage between management practices, intangibles performance and stock returns. *Journal of Intellectual Capital*, 3(1), 51-61.

International Federation of Accountants (1998). *The Measurement and Management of Intellectual Capital*, International Federation of Accountants, New York, NY.

Joshi, M., Cahill, D. & Sidhu, J. (2010). Intellectual capital performance in the banking sector: An assessment of Australian owned banks. *Journal of Human Resource Costing & Accounting*, 14(2), 151-170. doi: 10.1108/14013381011062649

Kamath, G. B. (2007). The intellectual capital performance of Indian banking sector. *Journal of Intellectual Capital*, 8(1), 96–123.

Kamath, G.B. (2008). Intellectual capital and corporate performance in Indian pharmaceutical industry. *Journal of Intellectual Capital*, 9(4), 684-704.

Kristandl, G. & Bontis, N. (2007). The impact of voluntary disclosure on cost of equity capital and risk premium estimates in a temporal setting. *Journal of Intellectual Capital*, 8(4), 577-94.

Kujansivu, P. and Lo¨nnqvist, A. (2007). Investigating the value and efficiency of intellectual capital. *Journal of Intellectual Capital*, 8(2), 272-87.

Laing, G., Dunn, J. & Hughes-Lucas, S. (2010). Applying the VAIC model to Australian hotels. *Journal of Intellectual Capital*, 11(3), 269–283.

Lev, B. and Feng, G. (2001). *Intangible assets: measurement, drivers, usefulness,* New York University, New York, NY

Maditinos, D., Chatzoudes,D., Tsairidis,C. & Theriou,G. (2012). The impact of intellectual capital on firms' market value and financial performance. *Journal of Intellectual Capital*, 12(1), 132-151

Marr, B., Gray, D. & Neely, A. (2003). Why do firms measure their intellectual capital? *Journal of Intellectual Capital*, 4(4), 441-64.

Mavridis, D. (2004). The intellectual capital performance of the Japanese banking sector. *Journal of Intellectual Capital*, 5(1), 92-111.

Mohiuddin, M., Najibullah, S., & Shahid, A. I. (2006). An Exploratory Study on Intellectual Capital Performance of the Commercial Banks in Bangladesh. The Cost and Management, 34(6), 40–54.

Muhammad, N. M. N., & Ismail, M. K. A. (2009). Intellectual Capital Efficiency and Firm's Performance: Study on Malaysian Financial Sectors. *International Journal of Economics and Finance*, 1(2), 206–212.

Nakamura, L. (1999). *Intangibles: what put the new in the new economy?* Federal Reserve Bank of Philadelphia Business Review, July/August, pp. 15-30.

Nonaka, I. (1994). *A dynamic theory of organizational knowledge creation*. Organization Science, 14-37.

Prahalad, C. K. & Ramaswamy, V. (2000). Co-opting Customer Competence. *Harvard Business Review*, 78(1), 79-87.

Pulic, A. (1997). *The physical and intellectual capital of Austrian banks.* http://irc. mcmaster.ca (accessed 11 June 2004).

Pulic, A. (1998). *Measuring the performance of intellectual potential in knowledge economy*. www.vaic-on.net (accessed 30 June 2004).

Pulic, A. (2001). *Value creation efficiency analysis of Croation banks 1996-2000*. International Business Consulting LLC, Zagreb, available at: www.vaic-on.net

Pulic, A. (2001). *Value creation efficiency analysis of Croatian banks 1996-2000.* www.vaic-on.net

Pulic, A. (2002a). National IC-efficiency report of Croatian economy, www.vaic-on.net

Pulic, A. (2002b). Do we know if we create or destroy value? www.vaic-on.net

Riahi-Belkaoui, A. (2003). Intellectual capital and firm performance of US multinational firms. *Journal of Intellectual Capital*, 4(2), 215-26.

Rehman, U. W., Ilyas.M., & Rehman, U.H. (2011). Intellectual capital performance and its impact on financial returns of companies: An empirical study from insurance sector of Pakistan. *African journal of business management*, 5(20), 8041-8049.

Sharabati, A.A.A.,Jawad,S.N. & Bontis,N.(2010). Intellectual capital and business performance in the pharmaceutical sector of Jordan. *Management Decision*, 48(1), 105-131

Stewart, T. (1997). *Intellectual capital: The new wealth of organization*, http:// members.aol.com

Tan, H. P., Plowman, D., & Hancock, P. (2007). Intellectual capital and financial returns of companies, *Journal of Intellectual Capital*, 8(1), 76-95.

Teece, D. J., G. Pisano & A. Shuen (1997), Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509-533.

Ting, W.K. & Lean, H.H. (2009**).** Intellectual capital performance of financial institutions in Malaysia, *Journal of Intellectual Capital*, 10(4), 588–599

Tovstiga, G. &Tulugurva. E. (2007). Intellectual capital practices and performance in Russian enterprises, *Journal of Intellectual Capital Practices*, 8(4), 695-707.

Tseng, C. & James Goo, Y. (2005). Intellectual capital and corporate value in an emerging economy: empirical study of Taiwanese manufacturers. *R&D Management*, 35(2), 187-201.

Spender, J. C. (1996), Making knowledge the basis of a dynamic theory of the firm. *Strategic Management Journal*, 17(S2), 45-62.

Stewart, T.A. (1997). *Intellectual Capital: The Wealth of New Organisations*, Nicholas Brealey Publishing, London.

Sveiby, K. (1997). *The New Organizational Wealth: Managing and Measuring Knowledge-based Assets*, Berrett-Koehler, San Fancisco, CA.

Yalama,A. & Coskun, M. (2007). Intellectual capital performance of quoted banks on the Istanbul stock exchange market. *Journal of Intellectual Capital*, 8(2), 256-271