

Measuring intellectual capital performance of Indian banks

A public and private sector comparison

Sukhdev Singh

Guru Nanak Dev Engineering College, Ludhiana, India

Jasvinder Sidhu and Mahesh Joshi

School of Accounting, RMIT University, Melbourne, Australia, and

Monika Kansal

Department of Business and Law, CQ University, Melbourne, Australia

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Abstract

Purpose – The purpose of this paper is to measure the intellectual capital performance of Indian banks and established a relationship between intellectual capital and return on assets (ROA). The paper also compared the intellectual capital performance of public sector and private sector banks. **Design/methodology/approach** – This study is based on secondary data from the top 20 Indian banks. Ten banks were selected from each of the public and private sectors on the basis of paid-up equity capital. The analysis was made using the value added intellectual coefficient, the coefficient of variation, exponential growth rates, trend analysis, Yule's coefficient, the coefficient of correlation, the *F*-test and the *t*-test.

Findings – The study revealed that private sectors have performed relatively better regarding the creation of total information coefficient (IC). However, the ROA was still below the international benchmark of > 1 percent. The major cause of the lower IC and the reduced ROA is disproportionate to the increase in capital employed and escalating non-performing assets in the Indian banking sector.

Practical implications – The study focussed on managers and identified the causes of lower performance. It proposed numerous strategies to improve the aggregate score of IC, which is closely related to bank profitability.

Originality/value – This is the first study to make a comparative analysis of intellectual capital performance in public and private sector banks in India and in addition to the traditional style of measuring sectoral performance. Further, the study employed new statistical tools, such as Yule's coefficient of association, to establish the association between performance variables.

Keywords Performance, Intellectual capital, Indian banks

Paper type Research paper

1. Introduction

During the last few decades, numerous aspects of human life have registered growth and development, with human intellectual power driving enormous advancements in the areas of science, research, technology, and overall economic advancement. Rich intellectual resources, and the means of recognizing and recording these, have provided additional competitive edges for organizations and nations. According to Joshi *et al.* (2010), knowledge is important for continuous growth and advancement in different field. Further they emphasized the need to research in analyzing knowledge's role in corporate performance. Various terms have been used for intellectual capital, including "intangibles," "knowledge assets," "intangible assets," "intangible resources," and "intangible goods" (Bontis, 2001; Kujansivu and Lönnqvist, 2007; Lev, 2003). In the absence of a widely accepted definition of intellectual capital, Lev's (2003, p. 7) explanation of intangible assets fits closely with the general interpretation: "intangible assets are



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non-physical sources of value (claims to future benefits) generated by innovation (discovery), unique organizational designs, or human resource practices.” The commonly understood classification for intellectual capital is in the form of human capital, internal (structural) capital and external (relational) capital (Edvinsson and Malone, 1997). A brief description of these terms is provided in the following paragraphs.

Human capital is the tacit knowledge that individual employees accumulate via their education, experience, attitudes, and other personal traits that they take with them into the organization. If used individually or in combination with the knowledge of others, this may bring value to the organization. Human capital is generally identified in the form of employees’ attitudes, commitment, satisfaction, educational qualifications, skills, and capabilities (Curado *et al.*, 2014).

Internal (structural) capital refers to internal knowledge that is accrued via the processes and procedures that the organization adopts. Sveiby (1997, p. 10) defined structural capital as “patents, concepts, models and computer and administrative systems.” These include habits, practices, processes, routines, information systems, working cultures, and databases (Curado *et al.*, 2014; Abhayawansa and Guthrie, 2014).

External capital is the knowledge and competitive advantage that organizations accrue from their external relationships. Sveiby (1997, p. 10) defined relational capital as “relationships with customers and suppliers.” External or relational capital for an organization is a combination of relationships with outside parties (including customers, suppliers, competitors, governments, and the community) and the reputation of the organization based on its transactions, products, and services provided to these parties (Jardon and Martos, 2009; Curado *et al.*, 2014).

The efficiency and performance of the public and private banking sectors is an important area of research (Kumar and Gulati, 2009; Joshi *et al.*, 2013), with accounting academics and professional practitioners keen to determine the role of knowledge management and intellectual capital in enhancing banking sector efficiency. Intellectual capital is recognized as a major asset category that is capable of generating sustainable competitive development and high levels of financial performance (Barney, 1991). However, it remains difficult to establish an appropriate basis to measure intellectual capital (Puntillo, 2009), although a number of approaches have been proposed and used by researchers (Joshi *et al.*, 2010). A simple basis for measuring intellectual capital is determining the difference between a firm’s market value and book value (Edvinsson and Malone, 1997).

In India, following the emergence of the era of economic liberalization in 1991, the nation’s banking sector has become a fast-growing industry that has contributed to the growth of other major industries. Increased competition from new private sector banks has led to a more customer-centric approach in India’s banking sector. This has paved the way for enhanced productivity, efficiency, and profitability (Sanyal and Shankar, 2011). Considering the importance of intellectual capital and the growth of the banking sector in India, this study seeks to measure the intellectual capital of commercial banks in India. It employs the value added intellectual coefficient (VAIC) and statistical tools to test three hypotheses in order to study the relationships between the elements of intellectual capital. The study sample constitutes of a total of 20 commercial Indian banks: ten banks from each of the public and private sectors. For the full names of all banks mentioned in this paper, please see Table AI.

As a knowledge-intensive service sector, the banking sector provides an ideal context for a study of intellectual capital performance (Mavridis, 2004). The process of value creation in service industries relies more heavily on intellectual assets than on physical assets (Stewart, 1997). The intellectual skills of employees also play a significant role in

value adding. According to the World Bank (2003), human capital, which is a component of intellectual capital, plays a supportive role in accelerating the pace of technological progress – such progress is critical to the success of the banking sector.

This paper derives its motivation from the constructive role played by the banking sector in developing economies and other parts of the world. This paper is also motivated by the need for a comparative analysis of the intellectual capital performance of the two types of banking companies in India, based on their ownership pattern – public and private sector banks. This paper contributes to the accounting research literature in two ways. First, it extends prior research of intellectual capital performance in the banking industry, which is often excluded from research because of the sector's rigorous performance measurement approaches. Second, it adds a new dimension to studies conducted on the performance of the banking sector because it compares the performance of public and private sector banks in the developing economy of India.

This paper is structured as follows. Section 2 reviews the role of the services sector in a knowledge economy. Section 3 discusses the structure of the Indian banking sector, and includes a brief comparison of public and private sector banks. Section 4 explores prior research and develops the main corporate governance hypotheses. Section 5 discusses the research objectives, and Section 6 presents the research methodology and hypotheses. Section 7 summarizes the main findings of the research project, and Section 8 provides the conclusion, including the study's limitations and implications.

2. Role of the service sector in a knowledge economy

The World Bank (2011) identified the importance of knowledge and intellectual ability: "Knowledge is like light. Weightless and intangible, it can easily travel the world, enlightening the lives of people everywhere." The term "knowledge economy" originated from the need to manage knowledge at micro and macro levels (Joshi *et al.*, 2010), and the growth of this knowledge economy has increased the importance of intellectual capital (Cabrita and Vaz, 2006). The Organisation for Economic Co-operation and Development (1996) defined knowledge economies as economies in which the production, distribution, and use of knowledge are the main drivers of growth, wealth creation, and employment across all industries – not only those industries classified as "high-tech" or knowledge intensive.

Table I compares the Knowledge Economy Index (KEI) rank of India with the top 10 countries in world, and the contribution made by the service sector in respective

KEI rank 2012	Country	Service sector share of GDP % 2011 ^a	KEI ^b 2012
1	Sweden	70.9	9.43
2	Finland	67.8	9.33
3	Denmark	76.4	9.16
4	The Netherlands	73.1	9.11
5	Norway	57.7	9.11
6	New Zealand	70.7	8.97
7	Canada	71	8.92
8	Germany	70.6	8.90
9	Australia	71.4	8.88
10	Switzerland	71.3	8.87
110	India	56.4	3.06

Sources: www.cia.gov/; www.worldbank.org/kam

Table I.
Service sector
share in GDP
and KEI rank

countries towards the gross domestic product (GDP). The top 10 countries in the index are developed economies. This table indicates a close association between the share of service sector and the KEI index. For all top 10 countries, except Norway, the service sector provides more than two-thirds of the GDP. In India, the share of the service sector is 56.4 percent and the KEI is 110. Thus, it is clear that India performs poorly as a knowledge economy, and its relatively low service sector contribution is one reason for this, given that the top 10 countries' service sectors provide a relatively large proportion of their GDPs. India needs to improve the efficiency of its service sector in order to play a more dominant economic role at the international level. Singh and Kansal (2011) stated that India needs to exploit the full potential of its service sector to keep pace with its set growth targets. There is ample opportunity for India's banking industry to improve, which would help raise the country's KEI.

3. The Indian banking sector

The banking sector is categorized as a service sector. This sector exists in an increasingly dynamic and challenging environment due to the globalization of the world's economies (Joshi *et al.*, 2010). As discussed in the previous section, India could improve its performance as a knowledge economy by raising the share of its service sector in the national GDP. India's banking sector is dominated by the Public Sector Union (PSU) banks, which are its oldest and largest banks; however, it also includes private and foreign banks. The banking sector continues to play a dominant role in the Indian financial sector, with more than 70 percent of the financial sector's assets owned by the banking sector. In the banking sector, the PSU banks own more than 80 percent of commercial banks' assets (Singh, 2006). The Indian banking sector has been recognized as a strong sector globally because it was relatively less affected by the global financial meltdown. During 2010-2011, the return on assets (ROA) in the Indian banking sector was 1.1 percent and the return on equity was 15 percent – these returns are among the highest in the world (Mohan, 2012).

The banking sector is a service provider and catalyst of service creation. The Indian service sector continues to show strong growth of 7-8 percent. During the last two decades, the service sector base has expanded, and the Indian economy has grown as a result. This sector relies on India's abundant human capital, and continues to provide momentum to both consumption and asset creation in the economy (Kamath, 2012). In addition, the Indian banking sector is expected to grow by approximately 20 percent over the next decade (*The Business Line*, 2012).

Table II shows that public sector banks in India dominate the nation's banking activities, and are larger than private sector banks in terms of total assets and profitability. However the share of the private sector is increasing. Private sector growth has dominated public sector growth in terms of deposits, total assets, operating profits, and (most importantly) control over non-performing assets (NPAs).

The public and private banking sectors are an important area of research (Sathye, 2003; Kumar and Gulati, 2009). Sanyal and Shankar (2011) argued that increased competition from new private sector banks leads to more customer-centric approach explaining enhanced productivity, efficiency, and profitability of Indian banks. This presents a case for an interesting study to compare the intellectual capital performance of public and private sector banks in India. The current study addresses this need, and contributes to the existing literature on measuring intellectual capital in two ways. First, it provides a comparative analysis of the public and private sector

							Intellectual capital performance of Indian banks
Sl. no.	Category	2010	2011	2012	% change		
					In 2011 from 2010	In 2012 from 2011	
<i>Public</i>							
1	Deposits	3,692,019	4,372,449	5,001,743	18	14	
2	Investments	1,215,598	1,336,076	1,504,077	10	13	
3	Advances	2,701,019	3,304,433	3,878,312	22	17	
4	Total assets	4,440,872	5,294,006	6,037,982	19	14	
5	Net NPA	29,644	36,055	59,162	22	64	
6	Total income	354,876	414,099	535,098	17	29	
7	Operating profit	76,861	99,981	116,344	30	16	
8	Net profit	39,257	44,901	49,514	14	10	
<i>Private</i>							
1	Deposits	822,801	1,002,759	1,174,587	22	17	
2	Investments	354,117	422,020	525,982	19	25	
3	Advances	632,441	797,944	966,418	26	21	
4	Total assets	1,150,736	1,398,217	1,677,801	22	20	
5	Net NPA	6,506	4,432	4,401	-32	-1	
6	Total income	103,229	117,586	158,478	14	35	
7	Operating profit	29,173	32,831	38,348	13	17	
8	Net profit	13,112	17,712	22,718	35	28	

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Table II.
Comparison of
bank sectors

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Table II.
Comparison of
bank sectors

organizations in the banking sector. Second, it uses new statistical tools not previously employed by researchers in the VAIC domain to relate the financial performance of the examined banks to their intellectual capital performance.

4. Literature review

The literature review for this study is informed by two streams of studies that used the VAIC model – studies in the banking sector and studies in the non-banking sector. The literature examined primarily employed the VAIC methodology to examine the intellectual capital performance of firms. Sections 4.1 and 4.2 provide a review of the literature from the banking sector and non-banking sector, respectively.

4.1 VAIC studies in the banking sector

The VAIC model has been commonly applied in the banking sector, as is evident from a number of studies published during the last decade. These studies have examined the correlation between intellectual capital and business performance by investigating banks in Japan (Mavridis, 2004), Austria (Pulic, 2000; Pulic and Bornemann, 1997), Croatia (Pulic, 2001), Malaysia (Goh, 2005), Greece (Mavridis and Kyrmizoglou, 2005), Italy (Puntillo, 2009), India (Kamath, 2007), and Australia (Joshi *et al.*, 2010, 2013).

In a study of Austria's 24 largest banks, Pulic and Bornemann (1997) examined three years of data from 1993 to 1995. They argued that intellectual capital efficiency is an optimal medium for achieving corporate success and sustainable development. Pulic (2001) examined the information coefficient (IC) performance of Croatian banks over a five-year period from 1996 to 2000. The results of the VAIC model showed wide variation in the IC efficiency and IC performance of Croatian banks. In a study of 141 Japanese banks, Mavridis (2004) found a significant positive correlation between value added and physical capital.

In a study from 2001 to 2003, Goh (2005) found that foreign banks were more efficient than domestic Malaysian banks. This study also found that the human capital efficiency (HCE) of commercial banks was a main contributor to banks' value creation. In a later study of the Malaysian finance sector, covering a nine-year period, Ting and Lean (2009) found a positive relationship between a firm's value added and ROA. Saenz (2005) examined the relationship of human capital indicators and market-to-book value in Spain, and found this relationship to be clearly positive. In a study of the Portuguese banking sector Cabrita and Vaz (2006) examined bank performance and intellectual capital and found a significant positive relationship. Kamath (2007) used the VAIC to examine the value added performance of Indian banks from 2000 to 2004. The public sector banks had the best performance in the capital employed efficiency (CEE) category, while foreign banks performed best in the HCE category.

Puntillo (2009) studied 21 banks listed on the Milan Stock Exchange and examined the relationship between a bank's financial performance and intellectual capital. This study also examined the relationship between value creation efficiency and the market-to-book value ratios of banks. With the exception of CEE, the study did not find any correlation between the other variables examined and different measures of bank performance. The relationship between CEE (value added capital employed coefficient) and different measures of a bank's performance was positive.

Joshi *et al.* (2010) examined the intellectual capital performance of 11 Australian-owned banks that controlled more than 90 percent of banking operations. They found that all banks performed better in the HCE category than in the CEE or structural capital efficiency (SCE) categories. Joshi *et al.* (2013) extended their 2010 study to the Australian financial sector and found that the human capital component significantly influenced value creation capability. They also found that the majority of companies had very low levels of intellectual capital efficiency.

Some previous studies have used the VAIC to analyze the intellectual capital performance of banks in India; however, none have specifically compared the two different sectors (public and private) in Indian banks. There are immense performance, efficiency, and asset-holding differences between these two sectors. For example, in a previous study, Kamath (2007) concluded that foreign banks exhibited better intellectual capital performance than did India's domestic banks.

In a recent study, Mondal and Ghosh (2012) analyzed the intellectual capital performance of Indian banks in general, and found that intellectual capital efficiency was vital for banks to gain a competitive edge, and emphasized banks' profitability and productivity. However, they did not compare the two sectors in Indian banks. Deol (2009) conducted a case study of Indian banks to analyze how different banks responded to deregulation and reforms in the industry in terms of developing their intellectual capital. They found that public sector banks responded differently to private and foreign banks when there were changes in the strategic environment. The response of banks was also found to be dependent on their history and initial endowment of intellectual capital.

4.2 VAIC studies in the non-banking sector

The VAIC has also been used in studies that did not focus primarily on banks. For example, in a Chinese study, Zhang *et al.* (2006) found that HCE had a greater effect on firm performance than did structural capital. They concluded that it was more efficient to conduct intellectual capital efficiency analysis on the basis of its three components than an overall intellectual capital efficiency analysis. Najibullah (2005)

discovered a positive relationship between intellectual capital and its three components using the market value of banks in Bangladesh.

A study by Shiu (2006) found a positive relationship between intellectual capital and the profitability and market valuation of firms in Taiwan. This study also found that firm productivity was negatively correlated with intellectual capital in high-tech companies. Clarke *et al.* (2011) studied publicly listed companies from Australia during 2004-2008 and found a direct relationship between firm performance and the VAIC. In a study of companies from Hong Kong, Chu *et al.* (2011) found that components of the VAIC are strong predictors of corporate financial performance, including profitability and return on equity.

Some previous studies have compared the intellectual capital performance of different sectors. For example, Pal and Soriya (2012) compared the IC performance of the textile and pharmaceutical industry sectors in India, and reported that IC performance and firm profitability have a positive relationship. In a Pakistani study, Makki and Lodhi (2009) examined cross industry data from the Lahore Stock Exchange over a six-year period. Interestingly, they revealed that the intellectual capital performance of Pakistani banks was average, and that the worst intellectual capital performance was that of public sector companies.

In a study of Indian pharmaceutical companies, Vishnu and Kumar Gupta (2014) discovered a positive relationship between intellectual capital and performance variables. Similarly, Celenza and Rossi (2014) examined 23 Italian listed companies to investigate the relationship between the VAIC and the performance of the firms in the sample. They found no statistically significant relationship between financial indicators and the VAIC, or between the return on investment, return on equity, and VAIC. The market-to-book value was not affected by the influence of intellectual capital and the VAIC was found to have ability to influence the movements of share capital in the Italian listed companies in the sample.

Morariu (2014) found that Romanian companies creating value from their intellectual, physical, and financial resources are not performing well in the capital market and exhibit a non-significant relationship between the VAIC, company size, and profitability. In a study of Brazilian real estate companies, Pitelli Britto *et al.* (2014) found that VAIC had a significant inverse relationship with market value and positive influence return on investment. This was inconsistent with the findings of Morariu (2014). Lee and Mohammed (2014), Veltri and Silvestri (2011), Piri *et al.* (2014), and Nassari and Nasab (2014) also used the VAIC approach to determine the intellectual capital performance of companies from different countries, presenting varied results.

5. Research objectives

This study had the following objectives:

- (1) to investigate the contribution of the different components of intellectual capital and identify the impediments in order to propose strategies to improve the role of these components;
- (2) to analyze whether public or private sector banks have created greater intellectual capital; and
- (3) to examine the degree of association and relationship between the intellectual capital performance and profitability of the selected banks.

6. Research methodology

This study applied the VAIC model and various statistical tools and benchmarks to analyze the intellectual capital performance of the Indian banking sector. It developed three hypotheses, which were tested against the findings. The following subsections discuss the employed research methodology.

6.1 VAIC

The VAIC provides a consistent basis to measure intellectual capital performance (Pulic and Bornemann, 1997). It uses information from companies' published annual reports, which is objective and verifiable (Pulic, 2000). Schneider (1998) emphasizes use of VAIC because it considers the value of employees, has easy accessibility of information, and is straightforward and understandable. Goh (2005) and Chan (2009) argued that the VAIC approach is currently the most suitable performance measurement tool. Veltri and Silvestri (2011) preferred the VAIC because it employs pre-existing accounting information, has a comparative and standardized method, considers human value, and measures the efficiency of firms.

It is also interesting to find that the application of VAIC model promises to increase in future. For example, Veltri and Silvestri (2011) stated that they used the VAIC because of the existence of literature in the financial industry, which assures the practical implications of using this model, including the studies by Mavridis (2004), Goh (2005), and Joshi *et al.* (2010, 2013). Chan (2009) stated that the VAIC index has been used in research in the area of IC in different countries; thus, the simplicity of the VAIC model and the ease of access to relevant accounting information promote its application in varied corporate situations. Measuring IC in actual corporate situations via this model leads to the efficient management of human capital and the enhanced disclosure of IC information, which may help develop organizational capabilities.

Applying this method entails the traditional limitations relating to use of financial statements. For example, historical cost and subjectivity can limit the usefulness of financial numbers (Joshi *et al.*, 2010). The VAIC method uses financial information supplied by income statements and balance sheets. This method ranks organizations based on their ability to create value via intellectual capital. The intangible nature of intellectual capital means that it is difficult to measure intellectual capital performance using traditional mediums of performance valuation. However, the VAIC is capable of measuring the intellectual capital of a firm using audited published financial figures. A firm's value creation is a function of both its intellectual and physical capital, which incorporates financial capital (Joshi *et al.*, 2010). Intellectual capital alone cannot create value because it is dependent on physical capital (Tseng and Goo, 2005).

The VAIC method uses three variables: HCE (value added coefficient of human capital); CEE (value added capital employed coefficient); and SCE (value added coefficient of structural capital). Other variables and terms used in the VAIC are explained as follows:

- $VAIC = HCE + CEE + SCE$
- Output is gross income of the bank (including interest income, insurance income, and other revenues).
- Input = interest expense + insurance costs + other operating expenses (excluding employee costs).
- Value added is the excess of output and input (output – input).
- CE is capital employed in the business, including both physical and human capital.

- CEE is calculated by dividing the value added by the capital employed (VA/CE).
- HC is human capital of the business (employee costs are considered an investment).
- HCE is calculated by dividing the value added by the human capital (VA/HC); it indicates value added by the human resources employed by the business.
- SC is structural capital of the company is calculated by subtracting the value of human capital from the value added (VA – HC).
- SCE is calculated by dividing the structural capital by the value added (SC/VA); i.e. value creation generated by its structural capital.

6.2 Analysis method

This study used the *t*-test to determine the significance of the sample mean compared to the population mean (the mean of all banks in the sector). Yule's coefficient of association [1] was used to examine the degree of association between the IC performance and profitability of the selected banks. A generalized Yule coefficient provides a correlation scale with a range from -1 to $+1$. To perform this analysis, all sample banks were categorized as "high" or "low" performers based on the total value added coefficient and ROA. Individual banks' ROA and VAIC were contrasted against the ROA and VAIC of their respective sector as benchmarks. The exponential growth rates[2] of VA, VAIC, ROA, capital employed, and various constituents of IC helped provide additional logic to justify the movements in VAIC, HCE, SCE, and CEE.

6.3 Hypotheses

This section presents the hypotheses explored in this study. For the first research objective, hypothesis testing was not required because this question involved calculating the VAIC and its components. Thus, *H1* relates to the second research objective, analyzing whether public or private sector banks have created more intellectual capital. *H2* is an additional hypothesis to examine any intra-sector variations in IC performance. *H3* tests the existence of any significant association between the intellectual capital performance and profitability of banks, which will help in achieving the third research objective:

H1. There is no variation among public and private sector banks regarding the creation of total intellectual capital.

All banks, irrespective of their sector, operate in a common regulatory and competitive environment. Although all banks are free to avail themselves of the same opportunities, some banks generate greater profits than others. *H1* was developed to test whether public and private banks exhibit any variation in their intellectual capital development:

H2. There is no significant intra-sector variation in the value added total intellectual coefficient among banks.

Public and private sector banks differ because of their ownership patterns. Although their environments and opportunities are common, their policies and functional approaches may vary. Hence, this study endeavored to explore whether there is a difference among banks in the same sector in terms of their creation of total intellectual capital:

H3. There is no significant association between intellectual capital and ROA.

Ideally, there should be a positive relationship between intellectual capital and ROA. In knowledge economies, it is expected that higher intellectual capital may create

higher ROA. Therefore, this study developed *H3* to test whether a positive and significant relationship exists between intellectual capital and ROA.

6.4 *Universe and sample size*

This study’s universe comprised all commercial banks in India. At present, in addition to foreign banks, there are 27 banks in the public sector and 22 in the private sector. The study sample consisted of a total of 20 banks, including ten public and ten private sector banks. The banks with the highest paid-up capital were included in the sample from both sectors. This study chose to select the sample based on the size of paid-up capital because this is the basis of the volume of the business, which ultimately affects interest earned and expended, and consequently affects the quantum of intellectual capital.

6.5 *Data collection*

Data related to the Indian banking sector was collected from the bulletins of the Indian Banks’ Association. Financial data were collected from the annual reports of the respective banks for five years, from 2007 to 2011. This study period was chosen to analyze the intellectual capital performance of Indian banks when the global economy declined in 2008, and subsequently recovered. This period was unique because it involved global financial turbulence and the study examined the performance of the leading Indian banks during that period.

7. **Analysis and findings**

The following section is based on an analysis and interpretation of Tables III-VI. Table III describes the VAIC and its components, while Table IV analyzes the growth

1 Bank/s	2 VA	3 SC	4 CE	5 CEE	6 HCE	7 SCE	8 VAIC
BOM	13.23	6.55	25.74	0.54	2.13	0.51	3.18
CBI	33.52	17.18	65.33	0.52	2.09	0.52	3.12
IB	33.31	22.22	65.96	0.51	2.96	0.66	4.12
SB	30.40	18.29	51.21	0.59	2.51	0.60	3.71
UCO	25.53	15.0	44.35	0.59	2.37	0.57	3.53
UBI	41.31	27.65	88.93	0.47	3.21	0.68	4.36
UNBI	16.60	9.93	34.16	0.50	2.47	0.59	3.56
VB	11.94	8.72	31.59	0.48	2.49	0.59	3.57
SBI	34.75	169.35	528.43	0.51	2.59	0.61	3.72
IDBI	27.23	21.18	102.54	0.25	4.39	0.77	5.41
Public sector	1,045.85	6,073.46	2,096.04	0.50	2.79	0.64	3.93
FEDERA	14.11	10.72	51.09	0.39	4.14	0.75	5.28
KARNAT	6.29	4.19	24.29	0.39	3.22	0.66	4.27
RATANA	0.59	0.28	10.85	0.16	2.25	0.48	2.88
AXIS	47.62	37.78	189.99	0.42	4.71	0.79	7.36
DCBL	1.65	0.72	6.19	0.30	1.76	0.42	2.49
HDFC	69.86	54.98	253.76	0.46	3.79	0.79	5.04
ICICI	423.90	103.08	550.91	0.27	5.76	0.82	6.85
INDUS	7.32	5.16	40.42	0.33	3.16	0.68	4.16
KOTAK	16.73	11.21	67.96	0.42	2.94	0.64	4.00
YES	8.52	6.21	37.94	0.40	3.45	0.69	4.55
Private sector	323.51	861.79	1,385.34	0.33	3.79	0.91	5.03

Table III.
Means of VAIC and
its components
(2007-2011)

Table IV.
Percentage of
growth rates of
VAIC and its
components from
2007-2011

1 Bank/s	2 VA (%)	3 SC (%)	4 CE (%)	5 CEE (%)	6 HCE (%)	7 SCE (%)	8 VAIC (%)
BOM	22	3	41	-14	-10	-15	-12
CBI	30	30	66	-21	0	0	-4
IB	44	55	64	-13	15	8	10
SB	29	28	38	-6	-1	-1	-2
UCO	36	46	55	-12	10	7	5
UBI	36	32	64	-17	-4	-3	-5
UNBI	27	32	36	-7	7	4	4
VB	33	23	59	-16	-11	-7	-11
SBI	47	61	66	-11	14	10	9
IDBI	101	103	21	66	4	1	6
Public Sector	43	51	50	-5	10	3	7
FEDERA	55	67	140	-35	22	7	13
KARNAT	27	12	33	-5	-18	-11	-16
RATANA	93	261	138	-19	61	87	57
AXIS	150	156	190	-14	9	2	24
DCBL	47	65	64	-11	9	12	7
HDFC	94	98	122	-13	-12	2	-10
ICICI	55	62	78	-13	22	5	18
INDUS	121	133	77	25	12	5	12
KOTAK	142	189	125	7	34	20	29
YES	152	193	131	9	36	16	30
Private sector	63	49	88	-13	4	-1	-6

1 Bank/s	2 Coefficient of correlation between VAIC and ROA	3 <i>t</i> -value of correlation between VAIC and ROA	4 <i>t</i> -value of sample mean VAIC performance
BOM	0.99	14.76*	2.42
CBI	0.22	0.39	9.96*
IB	0.19	0.33	1.02
SB	0.73	1.87	4.75*
UCO	0.66	1.54	2.54
UBI	0.13	0.23	1.18
UNBI	0.73	1.83	1.65
VB	0.50	1.01	2.18
SBI	0.05	0.08	1.73
IDBI	0.27	0.48	4.58*
Public sector	0.29	0.53	
FEDERA	0.13	0.23	0.94
KARNAT	0.97	6.62*	1.30
RATANA	0.94	4.91*	4.05*
AXIS	0.63	1.42	1.52
DCBL	0.69	1.66	17.62*
HDFC	-0.36	0.68	0.05
ICICI	0.80	2.30	3.04*
INDUS	0.98	8.66*	2.93*
KOTAK	-0.01	0.02	2.00
YES	0.80	2.32	1.14
Private sector	-0.68	1.59	

Table V.
Relationship between
VAIC performance
and profitability
individual banks

Table VI.
Association between
VAIC and
profitability

	Return on assets	
	High	Low
VAIC		
High	2	1
Low	1	6
Yule's coefficient of association for public sector	0.85	
VAIC		
High	4	0
Low	2	4
Yule's coefficient of association for private sector	1.00	

rates of various capitals, CEE, HCE, SCE, and VAIC over a period of five years, including the period of the global financial crisis.

7.1 Value added capital coefficients, growth rates, and future strategies

Table III demonstrates that mean CEE was higher among the public sector banks. The overall creation of value added per rupee of capital employed was 0.5 in the public sector, compared to 0.33 in the private sector. The range of average CEE varied from 0.25 to 0.59 in the public sector banks, in contrast to 0.16-0.46 in the private sector banks. It is evident that, although all selected banks registered positive and substantially high growth in value added, CEE recorded negative growth rates in 16 sample banks (column 5 of Table IV) during the same period. Enormous increases in the capital employed for all banks were found to be the major cause of this downward trend in CEE. Column 4 of Table IV shows that all banks increased their capital employed significantly over the period of study. Capital employed strengthened by 88 percent in the private sector banks, and by 50 percent in the private sector banks. However, some private sector banks also increased their CE more than 2.5 times. The banks had no option but to increase their capital employed to comply with the capital adequacy requirements of the Basel Accord – an agreement that aims to enhance banks' capital corresponding to global exposure and risk-weighted assets in their respective countries. Therefore, the banks in India were gradually obliged to undertake progressive capital enhancements, thereby further intensifying capital resource management concerns. The estimates of the Reserve Bank of India state that banks need a total equity of Rs 1.75 trillion and non-equity of Rs 3.25 trillion, taking the overall requirement for Basel III to Rs 5 trillion (Subarao, 2012). Other factors may also contribute to the massive decline in CEE, which requires further investigation, but is beyond the scope of this study.

All banks need to maximize their CEE by strategizing their advances/loans to: first, facilitate higher interest income; and second, generate more revenue from contemporary fee-based income. In the public sector, the state bank has taken the lead in this direction by placing greater emphasis on fee-based income. Sanghvi (2012) advised that heightened emphasis on fee-based income would provide a sizable value addition to the bank. Alternatively, banks may downgrade their inputs by imposing significant cuts on expended interest and operating costs. The innovative strategy of "CASA" (banking customers' "current accounts and savings accounts") with low cost of funds can facilitate cost reductions. For example, Kapoor (2012) quoted the Chairperson of Yes Bank stating that, "We have very specific strategies, like attracting corporate

salary accounts. Our savings accounts have become anchor product because it is low-cost and high-value product.”

7.1.1 Value added coefficient of human capital, growth rates, and future strategies. Column 6 in Table III summarizes the management of human capital to generate value added for the banks examined in this study. The overall mean of the value added coefficient of human capital (HCE) for all private sector banks (3.79) was more than that for public sector banks (2.79). Table IV indicates that HCE is growing at a rate of 10 percent for public sector banks, compared to 5 percent for private sector banks. The Table IV shows that some of the studied banks could not achieve a positive growth rate of HCE. During the period studied, the salaries paid to employees grew more than 50 percent in all banks. Public sector banks should pursue strategies adopted by private sector banks, such as adopting more technology to manage low HCE. According to a survey by *The Economic Times*, technology-enabled innovations lead to improvements in efficiency and product delivery in the banking sector.

Two strategies could help public sector banks augment their HCE:

- (1) rationalizing employees' costs; and/or
- (2) introducing a strategy of fixed pay plus variable pay.

Employees should be incentivized to share the variable pay that results from additional value generated. Retaining and attracting talent has always been a challenge for the banking sector in India, and Mehta (2012) cautioned that private and multinational banks may experience attrition similar to public sector banks. However, public sector banks are far more disadvantaged than private sector banks as they are unable to match the market-related salaries offered by the private sector. Fortunately, banks have started to better manage their human capital. Shetty (2012) reported the findings of the Boston Consultancy Group study about the attrition rate of public sector banks at 12 percent, compared to 20 and 22 percent of old and new private sector banks. This was mainly attributed to relatively good compensation policies at the junior level of management.

7.1.2 Value added coefficient of structural capital, growth rates, and future strategies. Besides financial capital, a business can multiply wealth by enhancing its processes, networks, and structures by investing in product innovations and process re-engineering. Banks need to undertake extensive business process re-engineering (Gupta, 2004). Table III indicates that the overall mean of the SCE of private sector banks (0.91) is higher than the SCE mean of public sector banks (0.64). While this signifies better efficiency in the private sector, the growth rate of SCE is dismal. Column 7 in Table IV indicates that the foremost cause of declining SCE is expeditious growth in structural capital (a rate of 3 percent) in the public sector, while the private sector recorded a decline of 1 percent. Column 3 in Table IV reveals that nine public sector banks registered higher growth rate than the overall SC growth rate of the private sector banks. In the public sector, only three banks achieved a higher growth rate than the overall SC growth rate for the public sector. This calls for review and revival strategies among public sector banks, especially given the large unbanked population and the Indian Government's goal of financial inclusion.

Public sector banks will need to keep pace with their counterparts. For example, Yes Bank in the private sector saw innovation led growth (Ghosh, 2009). The challenges of inclusive banking and a vast unbanked population offer ample scope for branch expansion in a country where 60 percent of the population does not have access to a bank

account. While there are more than 500 million mobile telephone subscribers, data from the inter-ministerial group suggests that 40 percent of these subscribers do not have a bank account (*The Economic Times*, 2009). There is abundant scope for improvement in SCE since the Reserve Bank of India's policy guidelines allow existing no-frills accounts to be converted into basic savings accounts (Meena, 2012). With greater technology and innovation, private banks seem to better manage their SCE. However, banks in both sectors must revisit their strategies regarding using structural capital.

7.1.3 Value added coefficient of intellectual capital, growth rates, and future strategies. The mean total value added coefficients for the private and public sector were 5.03 and 3.93, respectively (column 8 in Table III). This indicates better efficiency on behalf of private sector banks in building higher value added than public sector banks. A higher VAIC provides a cushion to absorb operating expenses, and implies increased returns for different stakeholders. It is notable that most private sector banks have gained free entry to the banking sector in the post-liberalization and reform period of 1991. On a sectoral basis, the analysis shows that the VAIC registered 7 percent growth in the public sector, in contrast to a decline of 6 percent in the private sector.

7.2 Inter-sector variations in VAIC

The mean of the value added total coefficient of the banks indicated the relative total intellectual capital created by the banks in both sectors. The range varied from 3.12 to 5.41 in the public sector, and from 2.88 to 7.41 in the private sector (column 8 in Table III). In order to test *H1* *F*-test was applied. The computed value of 5.26 was higher than the table value of 3.17, at a 5 percent level of significance; thus, *H1* was rejected. This clearly signifies that private sector banks, as relatively new entrants to the market, have been more effective in creating high value than have the traditional public sector banks. Thus, it is recommended that public sector banks redesign their strategies to generate sufficient value to at least keep pace with the new generation of private sector banks. As an extended analysis, a *t*-test was applied to investigate intra-sector variations in the creation of intellectual capital, and to test *H2* on intra-sector variation in the VAIC among banks.

As presented in column 4 in Table V, three banks in the public sector (the Central Bank of India, SBI, and IDBI) and four banks in the private sector (Ratana Bank, Development Credit Bank Ltd, ICICI Bank, and IndusInd Bank) displayed significantly higher VAIC from their sector VAIC means. The remaining 70 percent of banks in the public sector and 60 percent of banks in the private sector could not demonstrate any significant difference in the overall VAIC means of their sector performance. These banks should focus on the individual VAIC components to improve their IC performance by benchmarking their performance against these leading banks.

7.3 Relationship between the intellectual capital performance and profitability

This study used Yule's coefficient of association to determine the association between VAIC and ROA, and test *H3* which hypothesized that there is no significant correlation between VAIC and ROA.

Table V shows that the public and private sector banks had a Yule's coefficient of association of 0.85 and 1.00, respectively, signaling a relatively high degree of association between VAIC and ROA. This study proposes that the Indian banking industry make earnest endeavors to augment the VAIC because it had a significant effect on the profitability of the studied banks. These results align with previous

research in which a higher VAIC was found to lead to higher ROA (Ting and Lean, 2009; Ghosh and Mondal, 2009; Pal and Soriya, 2012). Finally, this study conducted a bank-level analysis to determine the degree of correlation between IC performance and ROA at the individual bank level. Column 2 in Table VI shows that all public sector banks and 80 percent of private sector banks exhibited a positive correlation between total intellectual capital and ROA. In four banks – the BOM, Karnataka Bank, Ratana Bank, and IndusInd Bank – this correlation was found to be statistically significant.

8. Conclusion, limitations, and implications

Based on the analysis, this study concluded that, irrespective of sector, there is ample scope for banks to improve their VAIC performance. The CEE (as per Table III) was highest (0.59) for the SBI and UCO Bank – two public sector banks. The HCE (5.76) and SCE (0.82) were both highest for the private sector bank, ICICI Bank. If all banks sought to achieve this level of excellence, the value added total coefficient could be highest at 7.17 ($0.59 + 5.76 + 0.82$) in all cases. Yule's coefficient of association was 0.85 and 1.00 in the public and private sector banks, respectively, which signifies that banks need to concentrate on the performance of their IC because ROA is intimately and highly associated with intellectual capital.

As per the accounting practices under the amended Banking Regulation Act 1949, in order to obtain net profit, operating profit (value added minus salaries paid to employees) is further reduced by provision for contingencies (such as NPAs and income tax). The ROA is defined as net income (profit) divided by total assets (Indian Banks' Association, 2011). Therefore, the reduced ROA can be improved by decreasing NPAs, which will strengthen the correlation between intellectual capital and ROA. The menace of ever-burgeoning NPAs has been acknowledged by the Reserve Bank of India, which has instructed public sector banks to manage them effectively (Meena, 2012).

The fact that inter- and intra-sector variations also exist in the value added total coefficient signals that some of the studied banks have taken advantage of the existing opportunities. Their capital employed has grown at a higher rate, which has culminated in a reduced value added capital coefficient, and a decreasing rate of return. This indicates that this growth has both positive and negative aspects.

Although the capital adequacy norms require bank management to inject additional doses of capital, and the mobilization of additional capital should be undertaken with diligence – opportunities must be explored to proportionately enhance the value adding. At present, the growth rate in capital employed for all the banks is much higher than the growth rate in value added, leading to higher coefficients of capital employed in comparison to the coefficients of value added. The growth rates of capital employed reveal that, in most banks, capital employed increased more than the benchmark (overall growth rate of 50 and 88 percent in public and private sector banks, respectively). Irrespective of sector, all banks had experienced a double-digit decline in the capital-added coefficient.

8.1 Limitations

This study suffers from some limitations, including the growing criticisms of the basic assumptions of the VAIC model used to measure intellectual capital performance. The VAIC model's efficiency and capacity has been scrutinized and criticized. For example, studies by Chang (2007), Maditinos *et al.* (2011), and Stahle *et al.* (2011) have contested the notion that the VAIC model is an ideal medium to measure the

intellectual capital efficiency of a firm. In an early study, Chang (2007) challenged the VAIC model and suggested including research and development expenditure in the model. Chang found that research and development expenditure and VAIC have a positive correlation with market value and firm profitability.

Chu *et al.* (2011) indicated that the VAIC model may not be able to identify the synergetic effects for value creation from interactions of different forms of capital. They also indicated a fundamental problem in the VAIC model, arguing that it fails to generate the desired results for companies that have higher input than output values. Further, Chu *et al.* suggested that the VAIC model depicts how components of intellectual capital (human capital, structural capital, and capital employed) contribute to the value added. They claimed that components may interact and contribute to value added, yet the VAIC fails to records any such value addition. Despite these limitations, they noted that the VAIC has been widely used by a number of research projects because it offers an objective and financial figures-based measurement of IC, and is easy to calculate (Chan, 2009; Chu *et al.*, 2011).

This research project used the VAIC model because recent criticisms of this model have not been able to provide, either an extended version, or a replacement. Maditinos *et al.* (2011) proposed that studies using the VAIC can be replicated for other knowledge-intensive economies, although they agreed with its limitations. They argued that if the VAIC fails to measure the effect of intellectual capital on the business performance of companies in those countries, then its criticism is unavoidable.

8.2 Practical implications

Despite the limitations of the VAIC model and other practical difficulties in measuring the performance of the banking sector, the findings of this study have significant implications for banking companies. The findings provide banks with an opportunity to critically analyze the contribution of human and intellectual capital to their organization, and may help in the design of corporate strategies for enhanced performance in the future. The following dimensions of this study are significant for managers in the banking sector in general, and in India in particular.

First, banks can improve their performance by combating NPAs and using gold bonds. In many cases, NPAs mean a reversal of interest income as bad loans (Mehta, 2012). This study's findings should motivate bankers to design aggressive strategies to recover the surging volume of NPAs, which lead to a loss of interest earned and a loss of capital. This study suggests that banks should enhance loans against gold in order to minimize bad loans. Some banks have already gone in this direction, such as for example, the increase in gold loan offices by SBI. The SBI has the largest branch network, yet ranked eighth in terms of paid-up capital in the studied banks. Therefore, this study recognizes the need for all banks to expand their network to enhance their growth. The Indian Government has recently focused on inclusive banking in its policy guidelines, with the Indian banking system expected to accept 400 million new customers during the next ten years (Pai, 2009).

Second, this study's results indicate that Yule's coefficient establishes a strong association between the total intellectual coefficient and ROA. This means that banks specifically, and other organizations in general, would benefit from building a higher quantum of intellectual capital.

Third, this study suggests that, in order to enhance the overall value of intellectual capital in the banking sector, companies must analyze all the constituents of their intellectual capital performance in order to diagnose the variables hindering their

performance. Identifying problematic factors will facilitate remedial measures and the formulation of suitable strategies to enable an appropriate level of corporate growth and value creation.

Finally, this study suggests that; although favorable value added has been created, further efforts are required to gain the positive benefit of all the resources – specifically, intellectual capital and human capital. To achieve this, either the disproportionate increase in salaries (investment in human capital) must be curtailed, or the increased investment in human capital must be linked to growth in the value added. Similarly, Joshi *et al.* (2010) suggested that factors such as the skills, attitudes, and knowledge of personnel play an important and decisive role in determining the competitiveness of the financial sector. The quality of human resources determines the ability of banks to deliver value to customers, thereby enhancing value creation. Capital and technology are replicable, but human capital is not. Therefore, human capital must be viewed as a valuable resource for the achievement of competitive advantage.

Notes

1. Yule's coefficient $Q = ((AB)(\alpha\beta) - (A\beta)(\alpha B)) / ((AB)(\alpha\beta) + (A\beta)(\alpha B))$.
2. Exponential growth rate: $g = \{\log(1+r) = b_1$.

References

- Abhayawansa, S. and Guthrie, J. (2014), "Importance of intellectual capital information: a study of Australian analyst reports", *Australian Accounting Review*, Vol. 24 No. 1, pp. 66-83.
- Barney, J.B. (1991), "Firm resources and sustainable competitive advantage", *Journal of Management*, Vol. 17 No. 1, pp. 99-120.
- Bontis, N. (2001), "Assessing knowledge assets: a review of the models used to measure intellectual capital", *International Journal of Management Reviews*, Vol. 3 No. 1, pp. 41-60.
- Cabrita, M. and Vaz, J. (2006), "Intellectual capital and value creation: evidence from the Portuguese banking industry", *Electronic Journal of Knowledge Management*, Vol. 4 No. 1, pp. 11-20.
- Celenza, D. and Rossi, F. (2014), "Intellectual capital and performance of listed companies: empirical evidence from Italy", *Measuring Business Excellence*, Vol. 18 No. 1, pp. 22-35.
- Chan, K.H. (2009), "Impact of intellectual capital on organisational performance: an empirical study of companies in the Hang Seng Index (part 1)", *Learning Organization*, Vol. 16 No. 1, pp. 4-21.
- Chang, S.L. (2007), *Valuing Intellectual Capital and Firms' Performance: Modifying Value Added Intellectual Coefficient (VAICTM) in Taiwan IT Industry*, Golden Gate University, San Francisco, CA.
- Chu, S.K.W., Chan, K.H. and Wu, W.W.Y. (2011), "Charting intellectual capital performance of the gateway to China", *Journal of Intellectual Capital*, Vol. 12 No. 2, pp. 249-76.
- Clarke, M., Seng, D. and Whiting, R.H. (2011), "Intellectual capital and firm performance in Australia", *Journal of Intellectual Capital*, Vol. 12 No. 4, pp. 505-530.
- Curado, C., Guedes, M.J. and Bontis, N. (2014), "The financial crisis of banks (before, during and after): an intellectual capital perspective", *Knowledge and Process Management*, Vol. 21 No. 2, pp. 103-111.
- Deol, H.S. (2009), "Strategic environment and intellectual capital of Indian banks", *Journal of Intellectual Capital*, Vol. 10 No. 1, pp. 109-120.

- Edvinsson, L. and Malone, S. (1997), *Intellectual Capital: Revealing Your Company's True Value by Finding its Hidden Roats*, HarperCollins, New York, NY.
- Ghosh, S. (2009), "Lending the tech edge", *The Economic Times*, December 21, p. 11.
- Ghosh, S. and Mondal, A. (2009), "Indian software and pharmaceutical sector intellectual capital and financial performance", *Journal of Intellectual Capital*, Vol. 10 No. 3, pp. 369-388.
- Goh, P.C. (2005), "Intellectual capital performance of commercial banks in Malaysia", *Journal of Intellectual Capital*, Vol. 6 No. 3, pp. 385-396.
- Gupta, S.C. (2004), "Banking industry: vision 2010", *Indian Banking Bulletin*, Vol. XXVI No. I, pp. 11-12.
- Indian Bank Association (2011), available at: www.iba.org.in/ (accessed July 10, 2013).
- Jardon, C. and Martos, M. (2009), "Intellectual capital and performance in wood industries of Argentina", *Journal of Intellectual Capital*, Vol. 10 No. 4, pp. 600-616.
- Joshi, M., Cahill, D. and Sidhu, J. (2010), "Intellectual capital performance in the banking sector: an assessment of Australian owned banks", *Journal of Human Resource Costing & Accounting*, Vol. 14 No. 2, pp. 151-170.
- Joshi, M., Cahill, D., Sidhu, J. and Kansal, M. (2013), "Intellectual capital and financial performance: an evaluation of the Australian financial sector", *Journal of Intellectual Capital*, Vol. 14 No. 2, pp. 264-285.
- Kamath, G.B. (2007), "The intellectual capital performance of Indian banking sector", *Journal of Intellectual Capital*, Vol. 8 No. 1, pp. 96-123.
- Kamath, K.V. (2012), "It is not so difficult to fire up the animal spirits", *The Economic Times*, August 13, p. 9.
- Kapoor, R. (2012), "Indian banking's paradigm shift: funding ways change", *The Economic Times*, August 8, p. 9.
- Kujansivu, P. and Lönnqvist, A. (2007), "Investigating the value and efficiency of intellectual capital", *Journal of Intellectual Capital*, Vol. 8 No. 2, pp. 272-287.
- Kumar, S. and Gulati, R. (2009), "Measuring efficiency, effectiveness and performance of Indian public sector banks", *International Journal of Productivity and Performance Management*, Vol. 59 No. 1, pp. 51-74.
- Lee, S.P. and Mohammed, S. (2014), "Intellectual capital on listed agricultural firms' performance in Malaysia", *International Journal of Learning and Intellectual Capital*, Vol. 11 No. 3, pp. 202-221.
- Lev, B. (2003), "Intangibles: gestione, valutazione e reporting delle risorse intangibili delle Aziende", Edizione italiana a cura di Summit, Milano, Etas.
- Maditinos, D., Chatzoudes, D., Tsairidis, C. and Theriou, G. (2011), "The impact of intellectual capital on firms' market value and financial performance", *Journal of Intellectual Capital*, Vol. 12 No. 1, pp. 132-151.
- Makki, M.M. and Lodhi, S.A. (2009), "Impact of intellectual capital on return on investment in Pakistani corporate sector", *Australian Journal of Basic and Applied Sciences*, Vol. 3 No. 3, pp. 2995-3007.
- Mavridis, D.G. (2004), "The intellectual capital performance of the Japanese banking sector", *Journal of Intellectual Capital*, Vol. 5 No. 1, pp. 92-115.
- Mavridis, D.G. and Kyrmizoglou, G.P. (2005), "Intellectual capital performance drivers in the Greek banking sector", *Management Research News*, Vol. 28 No. 5, pp. 43-62.
- Meena, N.N. (2012), "Euro zone crisis to have limited impact on banks", *The Tribune*, August 31, p. 15.
- Mehta, S. (2012), "NPA surge points to a rough ride ahead", *The Economic Times*, August 15, p. 9.

- Mohan, T.T.R. (2012), "West needs India's bank model", *The Economic Times*, July 5, p. 8.
- Mondal, A. and Ghosh, S.K. (2012), "Intellectual capital and financial performance of Indian banks", *Journal of Intellectual Capital*, Vol. 13 No. 4, pp. 515-530.
- Morariu, C.M. (2014), "Intellectual capital performance in the case of Romanian public companies", *Journal of Intellectual Capital*, Vol. 15 No. 3, pp. 392-410.
- Najibullah, S. (2005), "An empirical investigation of the relationship between intellectual capital and firms, market value and financial performance in context of commercial bank of Bangladesh", Independent University, Dhaka.
- Nassari, Y.P. and Nasab, S.A.M. (2014), "Analysis of the effects of intangible assets on corporate financial value", *International Journal of Learning and Intellectual Capital*, Vol. 11 No. 4, pp. 273-285.
- Organisation for Economic Co-operation and Development (1996), *The Knowledge-Based Economy*, Organisation for Economic Co-operation and Development, Paris.
- Pai, T.V.M. (2009), "Managing change with technology", *The Economic Times*, December 21, p. 11.
- Pal, K. and Soriya, S. (2012), "Intellectual capital performance of Indian pharmaceutical and textile industry", *Journal of Intellectual Capital*, Vol. 13 No. 1, pp. 120-137.
- Piri, P., Alghyani, M. and Sadaghiani, S. (2014), "A study on the effects of intellectual capital efficiency on economic performance", *Management Science Letters*, Vol. 4 No. 5, pp. 985-992.
- Pitelli Britto, D., Monetti, E. and da Rocha Lima, J. Jr (2014), "Intellectual capital in tangible intensive firms: the case of Brazilian real estate companies", *Journal of Intellectual Capital*, Vol. 15 No. 2, pp. 333-348.
- Pulic, A. (2000), "VAIC™: an accounting tool for IC management", *International Journal of Technology Management*, Vol. 20 Nos 5-8, pp. 702-714.
- Pulic, A. (2001), "Value creation efficiency analysis of Croatian banks 1996-2000", available at: www.vaic-on.net (accessed January 14, 2014).
- Pulic, A. and Bornemann, M. (1997), "The physical and intellectual capital of Austrian banks", available at: www.vaic-on.net (accessed January 14, 2014).
- Puntillo, P. (2009), "Intellectual capital and business performance: evidence from Italian banking industry", *Journal of Corporate Finance*, Vol. 4 No. 12, pp. 96-115.
- Sáenz, J. (2005), "Human capital indicators, business performance and market-to-book ratio", *Journal of Intellectual Capital*, Vol. 6 No. 3, pp. 374-384.
- Sanghvi, M.D. (2012), "We expect a 25% growth in fee-based income this year", *The Economic Times*, August 10, p. 13.
- Sanyal, P. and Shankar, R. (2011), "Ownership, competition, and bank productivity: an analysis of Indian banking in the post-reform period", *International Review of Economics and Finance*, Vol. 20 No. 2, pp. 225-247.
- Sathye, M. (2003), "Efficiency of banks in a developing economy: the case of India", *European Journal of Operational Research*, Vol. 14 No. 3, pp. 662-671.
- Schneider, U. (1998), "The Austrian approach to the measurement of intellectual potential", paper presented at the National Business Conference, Hamilton, January.
- Shetty, M. (2012), "New private banks see seven out of ten sales offices quit each year", *The Times of India*, September 30, available at: <http://timesofindia.indiatimes.com/business/india-business/New-private-banks-see-seven-out-of-ten-sales-offices-quit-each-year/articleshow/16237591.cms> (accessed June 20, 2014).
- Shiu, H.J. (2006), "Application of the value added intellectual coefficient to measure corporate performance: evidence from technological firms", *International Journal of Management*, Vol. 23 No. 2, pp. 356-265.

- Singh, S. (2006), "Performance of commercial banking sectors in post liberalisation period", *Effective Management*, Vol. 23 No. 1, pp. 45-50.
- Singh, S. and Kansal, M. (2011), "Voluntary disclosure of intellectual capital: an empirical analysis", *Journal of Intellectual Capital*, Vol. 12 No. 2, pp. 301-317.
- Stahle, P., Stahle, S. and Aho, S. (2011), "Value added intellectual coefficient (VAIC): a critical analysis", *Journal of Intellectual Capital*, Vol. 12 No. 4, pp. 531-551.
- Stewart, T.A. (1997), *Intellectual Capital: the New Wealth of Organizations*, Doubleday, New York, NY.
- Subarao, D. (2012), "Government can dilute stake to help PSBs meet Basel-III norms", *The Business Line*, September 5, p. 6.
- Sveiby, K. (1997), *The New Organizational Wealth: Managing and Measuring Knowledge Based Assets*, Berrett Koehler, San Francisco, CA.
- The Business Line* (2012), "Public sector banks able to retain new hires better than private sector banks", *The Business Line*, September 4, p. 6.
- The Economic Times* (2009), "Finmin hangs up on mobile banking", *The Economic Times*, November 27, available at: http://articles.economictimes.indiatimes.com/2009-11-27/news/28437580_1_mobile-banking-banking-system-home-ministry (accessed September 7, 2013).
- Ting, I.W.K. and Lean, H.H. (2009), "Intellectual capital performance of financial institutions in Malaysia", *Journal of Intellectual Capital*, Vol. 10 No. 4, pp. 588-599.
- Tseng, C. and Goo, J. (2005), "Intellectual capital and corporate value in an emerging economy: empirical study of Taiwanese manufacturers", *R&D Management*, Vol. 35 No. 2, pp. 187-201.
- Veltri, S. and Silvestri, A. (2011), "Direct and indirect effects of human capital on firm value: evidence from Italian companies", *Journal of Human Resource Costing & Accounting*, Vol. 15 No. 3, pp. 232-254.
- Vishnu, S. and Kumar Gupta, V. (2014), "Intellectual capital and performance of pharmaceutical firms in India", *Journal of Intellectual Capital*, Vol. 15 No. 1, pp. 83-99.
- World Bank (2003), "Lifelong learning in the global knowledge economy: challenges for developing countries", World Bank, Washington, DC.
- World Bank (2011), "The state of World Bank knowledge services: knowledge for development", World Bank, Washington, DC, available at: <http://documents.worldbank.org/> (accessed January 13, 2014).
- Zhang, J., Zhu, N. and Kong, Y. (2006), "Study on intellectual capital and enterprise's performance: empirical evidence from the Chinese securities market", *Journal of Modern Accounting and Auditing*, Vol. 2 No. 10, pp. 35-39.

Further reading

- Gan, K. and Saleh, Z. (2008), "Intellectual capital and corporate performance of technology intensive companies: Malaysia evidence", *Asian Journal of Business and Accounting*, Vol. 1 No. 1, pp. 113-130.
- World Bank (2012), "Knowledge assessment methodology 2012", World Bank, available at: www.worldbank.org.kam (accessed January 20, 2014).

Appendix

Intellectual
capital
performance of
Indian banks

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Sl. no.	Bank name	Abbreviation	Capital as at 31 March 2011 (Rs, billions)
	Public sector banks	Public sector	
1.	UCO Bank	UCO	24.5052
2.	Central Bank of India	CBI	20.2114
3.	Vijaya Bank	VB	16.7267
4.	United Bank of India	UBI	11.4442
5.	Bank of Maharashtra	BOM	10.6971
6.	IDBI Bank Ltd	IDBI	9.8457
7.	Indian Bank	IB	8.2977
8.	Union Bank of India	UNBI	6.3533
9.	State Bank of India	SBI	6.35
10.	Syndicate Bank	SB	5.7329
	Private sector banks	Private sector	
11.	ICICI Bank Ltd	ICICI	11.5182
12.	INDUSIND Bank Ltd	INDUS	4.6597
13.	HDFC Bank Ltd	HDFC	4.6523
14.	Axis Bank Ltd	AXIS	4.1055
15.	Kotak Mahindra Bank Ltd	KOTAK	3.6844
16.	Yes Bank Ltd	YES	3.4715
17.	Development Credit Bank Ltd	DCBL	2.0017
18.	The Ratnakar Bank Ltd	RATANA	2.1495
19.	The Karnataka Bank Ltd	KARNAT	1.8820
20.	The Federal Bank Ltd	FEDERA	1.7105

Source: Compiled from Indian' Banks Association (2011)

Table AI.
Bank names,
abbreviations used
and capital

Corresponding author

Mahesh Joshi can be contacted at: mahesh.joshi@rmit.edu.au

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