

The Role of Intellectual Capital in Creating Value in Indian Companies

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Abstract

Intellectual capital is becoming the pre-eminent resource for creating value and competitive advantage. The aim of this study is to investigate whether the performance of a company's intellectual capital can explain productivity and corporate financial performance or not. This study is conducted on 75 listed companies operating in India for the period 2004 to 2009. Annual reports, especially the Profit & Loss account and balance sheet of the company have been used to obtain the data. Necessary data also collected from Capitaline Database. Value Added Intellectual Coefficient (VAIC™) method is applied for measuring the Intellectual Capital performance of the company. Corporate performance measures used in this analysis are (1) Profitability and (2) productivity. The intellectual capital and physical capital of selected companies have been analyzed and their impact on corporate performance has been measured using multiple regression technique. Findings from the empirical analysis indicate that the relationships between the performance of a company's intellectual capital and corporate performance are informative. The empirical findings suggest that the efficient management of company's intellectual capital can explain corporate value creation. In this paper a new performance indicators is used which the Indian managers can use in order to evaluate the corporate performance and benchmark it with the global standards.

Keywords: Intellectual Capital, human Capital, Structural Capital, VAIC™, Profitability and Productivity.

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1. Introduction

The early resource-based theorist (Penrose, 1959) addressed that firm's success was wholly determined by its external environment. Later Wernerfelt (1984), Dierickx and Cool (1989), and Prahalad and Hamel (1990)'s contribution to resource-based theory suggest that competitive advantage of companies' is rooted inside a company by assets that are valuable and inimitable. According to them, internal resources include company's capabilities or competencies and management philosophy, culture etc. Experts also noted that company's links to its external environment add depth and breathe to this internal view. By supporting this concept Barney (1986) propagated that external resource analysis alone cannot lead to corporate success. But, by nurturing internal competencies and applying them to an appropriate external environment, a company can produce competitive advantage leading to superior performance.

The resource-based view, therefore, connects the link between 'what a firm has the ability to do' and 'what it has the opportunity to do' (Russo & Fouts, 1997). The business house must be capable enough to utilize its resources to exploit the market opportunities. But a resource that is valuable in a particular industry or at a particular time might fail to have the same value in a different industry or in different context.

Corporate resources are classified in the resource-based theory as tangible assets and intangible and personnel based (Grant, 1991). Tangible assets consist of financial resources and physical resources such as plant, property and equipment. Intangibles Intellectual resources include technology, reputation, relation to stakeholders

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and employee capabilities and competencies. These Intellectual resources are not productive on their own. They generally create value in association with tangible assets. The firm must be able to assemble, integrate and manage these bundles of resources.

In our paper, intangibles assets or intellectual capital is the central object of discussion. At present it seems that knowledge, information and technology, whether embodied in human capital or organizational structures, are become primary production factors. Manufacturing or Producing companies use these vital assets to gain superior competitive advantage. But in service companies like Google, Microsoft etc, intellectual resources are the main basis of enhancing sales revenue and the profitability also. They use intellectual resources as a capital to their production system. Bornemann et al. (1999) have found that enterprises, which have been able to manage their intellectual capital better, have achieved stronger competitive advantage than other competing enterprises. He also claimed that intellectual capital management plays an important role on the long-term business performance of an enterprise

In recent years, companies, especially those in the service industry, have experienced a dynamic and competitive environment. Competition at a cross-border scale compels domestic companies to adjust their competitive position by achieving sustainable financial performance. In the knowledge-intensive industries Intellectual Capital (IC) generally represents the critical resource in the value creation process.

The present study is the modest attempt of the researchers to investigate the association between intellectual capital and productivity and profitability of Indian traditional companies. In other words the objective of the study is to search the link between intellectual capital and corporate financial performance.

2. Intellectual Capital in Literature

The term ‘intellectual capital’ generally includes inventions, ideas, general know-how, design approaches, computer programs and publications. Thomas Stewart (1997), who makes the term popular, describes intellectual capital as “something that cannot be touched, although it slowly makes you rich”. According to Jacob Ben-Simchon (2005) the term ‘intellectual capital’ is used to enclose all of the non-tangible or non-physical assets

and resources of an organization, as well as its practices, patents and the implicit knowledge of its members and their network of partners and contracts. Stewart (1997) defines it as the sum of its human capital (talent), structural capital (intellectual property, methodologies, software, documents and other knowledge artifacts) and customer capital (client relationship). It is the ability to transform knowledge and intangibles assets into wealth creating resources by multiplying human capital with structural capital.

IC experts try to segregate all elements of intellectual capital into different groups like human, organizational/ structural and customer or relation resources. One of the most popular models for classifying intellectual capital(IC) is the Saint-Onge, H. (1996) model developed in the early 1990s. It divides intellectual capital into three parts: Human capital, Structural capital; and Customer capital. Dr. Nick Bontis (2000) re-states customer capital as relational capital to include relationships with suppliers.

Human capital is recognized as the largest and the most important intangible asset in an organization. Ultimately it provides the goods or services that customers require or the solutions to their problems. It includes the collective knowledge, competency, experience, skills and talents of people within an organization. It also includes an organization’s creative capacity and its ability to be innovative. Although investment in human capital is growing, there is still no standard measure of its effectiveness in companies’ balance sheets.

Structural capital is the supportive infrastructure for human capital—it is the capital which remains in the factory or office when the employees leave at the end of the day. It includes organizational ability, processes, data and patents. Unlike human capital, it is company’s property and can be traded, reproduced and shared by, and within, the organization.

Relational capital is a company’s relationship with its customers and with its network of suppliers, strategic partners and shareholders. The value of these assets is determined by the company’s reputation or image (MERITUM guidelines).

Value is derived from the combinatorial use of these three categories of resources with the physical and monetary resources. Therefore correct models of physical,

organizational and relationship resources are necessary for human resources to create value. An individual can have a high level of competence, but if the organization is poorly structured and lacks tools to facilitate the deployment of this competence, the overall value creation from the intellectual capital will not be maximized (Goran Roos, 2003)

3. Development of Hypotheses

Intellectual capital management becomes the core of the enterprise operation in knowledge era. Companies which manage their intellectual capital better own the superior competitive advantage than the general enterprise (Bornemann et. al., 1999). For the knowledge-based companies, in particular, value creation by the firm is very likely to be governed by this type of assets, leaving a very little scope for the tangible ones. According to Pattern (2007), the productivity of a firm lies more on its Intellectual Capital and system capabilities. Similar views hold by Bontis (2000), that leveraging intellectual assets is the key to enhance firm's productivity. Productivity acts as an important mediator between intellectual capital management and financial performance. Better utilization and management of company's intellectual capital can enhance productivity. Productive company may have sufficient profit which, in turn, leads the company to increase the intellectual base of the company. Study results of Riahi-Belkaoui (2003) on selected multinational companies of USA suggest that intellectual capital is positively associated with financial performance. **Saudah Sofia (2005)** examines the impact of the degree and form of IC on management accounting practices, specifically, performance measurement and corporate performance. Results of this study suggest that IC has countable influence on the corporate performance. In an empirical study Chen et al., (2005) have tried to examine the relationship between the value creation efficiency and firm's market valuation and financial performance in the context of Taiwan. They have found that the intellectual capital has a positive influence on the market value and the financial performance. In an interesting study conducted by Paula Kujansivu and Antti Lönnqvist (2005) finds that the value of IC and the efficiency of IC are somehow related. Syed Najibullah's (2005) investigation in the value creation efficiency of Intellectual Capital and market valuation and financial performance of 22 Bangladesian Banks listed on Dhaka Stock Exchange reveal the positive role of intellectual Capital in creating corporate value. Norma Juma (2006) tries to find the

relationship between intellectual Capital and New Venture Performance in high tech ventures of U.S.A. The findings of this study suggest that for predicting operating performance of high-tech ventures, human capital appears to be the most critical component of IC. For predicting market-based performance, however, the intellectual property is seems to be the most useful component. Hong Pew Tan et al., (2008) have also reported a positive association between intellectual capital of the firms and their respective financial performances. Flavio L. Richieri (2007) investigates the association among IC stock (CIA), IC efficiency (ICE) and corporate financial performance as measured by ROA, ROE and ROS of 1000 biggest Brazilian companies. The evidences of this study argue in favor of the existence of a positive relation between both CIV and ICE and the dependent variables ROE, ROA and ROS. In a recent study B.A Ranjith Appuhami (2007) investigates the impact of value creation efficiency of Intellectual Capital on investors' capital gain for the shares of listed companies in Thailand Stock Exchange.

Empirical research studies show that Intellectual Capital is an important factor for banks also. The Yalama and Coskun's (2007) research on Turkish banking industry for the period 1995 to 2004 is based on the impact of VAIC on banks' profitability. The results show that annual IC efficiency is not stable. It also found that some Turkish banks are stable to transfer intellectual capital value to banks' profitability but some are not. Saengchan's (2007) study on Thailand's bank industry shows that there is strong relationship between efficiency of intellectual capital and banks financial performance. The research results confirmed that intellectual capital acts as a major source of corporate advantages of Thailand banks as efficiency of IC strongly associated with the profitability of banks. Another study in the context of Italian banking industry by Pina Puntilo (2009) shows different results. Banks' intellectual ability, measured by VAICTM, financial performance and market to book value ratio is analyzed using multivariate linear regression analysis. The study results reveal that intellectual capital and business performance as measured by ROA and ROE are not strongly related. However, market to book value ratio negatively related with intellectual capital. Maheran, N., Muhammad, N., Ismail, M. (2009) examine the relationship between VAICTM and organizational performance of 18 Malaysian companies under financial sector for the year 2007. In a recent study it reveals that the contribution of intellectual capital on organizational performance is

greater on Malaysian banks as compared to insurance and security brokerage companies. However, authors also concluded that the good financial performance of the banks is not highly determined by intellectual capital efficiency. The study results of Australian banks show that Australian banks have relatively higher human capital efficiency than capital employed efficiency and structural capital efficiency. Banks' size, number of employees and total shareholders equity has little or no impact on the IC performance of the Sample banks (Joshi, M., Cahill, D., Sidhu, J. 2010). These empirical research studies conclude that firms' intellectual capital has a significant positive relationship with the investors' capital gain on shares.

The studies mentioned above clearly established that intellectual capital acts as an important determinant of corporate financial performance and this motivates the present researchers to undertake an empirical study to re-examine such relationship in the Indian context. Empirical results show that Indian knowledge companies like Software and Pharmaceutical Companies (Ghosh & Mondal, 2009), Banks (Ghosh & Mondal, 2009) and Finance and Hotel companies (Ghosh & Mondal, 2011) use intellectual capital as a vehicle to maintain their existence. Present empirical study is undertaken to investigate how efficiently manufacturing companies use their intellectual capital to the corporate value creation.

Thus, we predict a positive relationship between financial performance as measured by profitability and the intellectual capital performance of the India listed Companies. We, therefore, hypothesize that,

- H₁: The greater the performance of a company's Intellectual capital, the greater will be the company's financial performance. Alternatively,
- H_{1a}: The greater the performance of a company's Intellectual capital, the greater will be the company's return on assts.
- H_{1b}: The greater the performance of a company's Intellectual capital, the greater will be the company's return on equity.
- H_{1c}: The greater the performance of a company's Intellectual capital, the greater will be the company's assets turnover ratio.

4. Research Method

The first part of this section describes the proxies used to measure dependable variables, independent variables and

control variables. The multiple regression equations are outlined in the last part of this section.

4.1 Measure of Dependent Variables

For the purpose of conducting the analysis in the present study three traditional financial indicators are used as dependent variables and served as proxy measures of profitability and productivity. These are Return On Assets (ROA), Return On Equity (ROE) and Assets Turnover Ratio (ATO) which have been widely used in earlier studies (Williams & Firer, 2003, Chen et al., 2005). Consequently, the proxy measures for the dependent variable are defined below:

1. Profitability (ROA): Profitability shows the degree to which a firm's revenues exceed over cost. It is the ratio of the net income (less preference dividends) divided by the book value of total assets as reported in the annual reports; (Williams and Firer, 2003; Chen, Cheng and Hwang, 2005;). It is a typical and widely used profitability measure.
2. Return on equity (ROE): It shows the earnings available to equity shareholders. It is the ratio of the net income (less preference dividends) divided by the book value of total equity as reported in the annual reports. ROE represents returns to shareholders of common stocks, and is generally considered an important financial indicator for investors. (Syed Najibullah, 2005).

Here, two different measures of profitability are used to consider profit earning capability of sample companies from two different angles. Return on assets (ROA) is used to measure profit earning capability of sample companies from managerial perspective whereas return on equity (ROE) is used from the shareholders point of view.

3. Assets Turnover Ratio (ATO): Assets Turnover ratio is used to measure the productivity of our sample companies. There is numerous different productivity measurement methods presented in the literature. In this study, the productivity of a company is measured by dividing revenue income of sample companies by Total funds employed. It is not a valid measure of total productivity. However, the measure is comparable between different empirical studies and is well suited to this study.

4.2 Measurement of Independent Variables

The Value Added Intellectual Coefficient™ (VAIC™) methodology developed by Ante Pulic (1998) forms the underlying measurement basis for the independent variable in the present study. In his words VAIC™ is an analytical procedure designed to enable management, shareholders and other relevant stakeholders to effectively monitor and evaluate the efficiency of VA by a firm's total resources and each major resource component. VAIC™ is the sum of three indicators. These are: (i) Capital Employed Efficiency (CEE) –the indicator of VA efficiency of capital employed; (ii) Human Capital Efficiency (HCE) – the indicator of VA efficiency of human capital; and (iii) Structural Capital Efficiency (SCE) – the indicator of VA efficiency of structural capital.

Following equation (1) formalizes the VAIC™ relationship algebraically:

$$VAIC^{TM}_i = CEE_i + HCE_i + SCE_i \quad (1)$$

Where:

$VAIC^{TM}_i$ = VA intellectual coefficient for company i ;

CEE_i = capital employed efficiency coefficient for company i ;

HCE_i = human capital efficiency coefficient for company i ; and

SCE_i = structural capital efficiency for company i .

The first step in calculating VAIC™ is to determine firm's total VA. This computation may be done with the help of the following algebraic equation:

$$VA_i = I_i + DP_i + D_i + T_i + M_i + R_i + WS_i \quad (2)$$

Where: VA for firm i is computed as the sum of interest expenses (I_i); depreciation expenses (DP_i); dividends (D_i); corporate taxes (T_i); equity of minority shareholders in net income of subsidiaries (M_i); and profits retained for the year (R_i) and the wages and salaries (WS_i).

Alternatively VA can be calculated by deducting operating expenses (materials, maintenance, other external costs) from operating revenues. (Pulic 1998).

According to Pulic (1998), CEE is the ratio of total VA divided by the total amount of capital

Employed (CE) where capital employed is defined as the book value of a firm's net assets. Equation (3) presents the

CEE relationship algebraically:

$$CEE_i = VA_i / CE_i \quad (3)$$

Where:

CEE_i = capital employed efficiency coefficient for company i ; VA_i = VA for firm i ; and

CE_i = book value of the net assets for firm i .

Consistent with the views of other leading IC researchers (for example, Edvinsson, 1997; Sveiby, 2001, 2007), Pulic (1998) argues total salary and wage costs are an indicator of a firm's human capital (HC). HCE, therefore, is calculated as the ratio of total VA divided by the total salary and wages spent by the firm on its employees. Equation (4) shows this relationship algebraically:

$$HCE_i = VA_i / HC_i \quad (4)$$

Where:

HCE_i = human capital efficiency coefficient for company i ; VA_i = VA for firm i . and

HC_i = total salary and wage costs for firm i .

In order to calculate SCE, it is first necessary to determine the value of a firm's structural capital (SC). Pulic (1998) proposes a firm's total 'VA less its human capital' is an appropriate proxy of a firm's SC. That is:

$$SC_i = VA_i - HC_i \quad (5)$$

Where:

SC_i = Structural capital for company i ; VA_i = VA for firm i and HC_i = total salary and wages spent by the firm i .

Based on prior empirical research findings, Pulic (1998) argues that there is a proportionate inverse relationship between HC and SC in the value creation process. According to him, the less Human Capital participates in value creation, the more Structural Capital is involved. Consequently, Pulic (1998) suggests the following formula for calculating SCE which is the ratio of a firm's SC divided by the total VA: $SCE_i = SC_i / VA_i$ (6)

Where:

SCE_i = structural capital efficiency coefficient VA for company i ; SC_i = Structural capital for company i ; and VA_i = VA for firm i .

4.3 Control Variables

For the purpose of empirical analysis this study uses correlation and multiple regressions as the underlying

statistical tests. In conducting the liner multiple regression analysis following control variables are included to the model which helped to reduce the effect of unknown variables.

1. Size of the Firm (SIZE): Size of the firm as measured by the natural log of total sales is used to control for the impact of size on wealth creation through economies of scale, monopoly and bargaining power (Chandler, 1990; Porter, 1980, Riahi-Belkaoui, 2003). Large organizations are more likely to have the resources needed to adopt new innovations (Subramaniam and Youndt, 2005; De Luca and Atuahene-Gima, 2007) and to exploit existing knowledge (Yli-Renko et al., 2001)
2. Leverage (DER): Financial leverage and debt structure as measured by total debt divided by book value of total assets is used to control for the impact of debt servicing on corporate performance and wealth creation (Riahi-Belkaoui, 2003).
3. Physical capital intensity (PC): Physical capital intensity as measured by a ratio of a company's fixed assets to its total assets (Firer and Stainbank, 2003; Firer & Williams, 2003 ;) is used to control for the impact of fixed assets on corporate performance. The assumption is that company's fixed assets have significant impact on company's financial performance.

4.4 Linear Multiple Regression

To analyze the respective relationships defined in prior sections linear multiple regressions analysis is performed based on the following general models:

Model 1:

$$ROA = \alpha + \beta_1(VAIC^{TM}) + \beta_2(PC) + \beta_3(SIZE) + \beta_4(DER) + \beta_5(ATO) + \varepsilon$$

Model 2:

$$ROE = \alpha + \beta_1(VAIC^{TM}) + \beta_2(PC) + \beta_3(SIZE) + \beta_4(DER) + \beta_5(ATO) + \varepsilon$$

Model 3:

$$ATO = \alpha + \beta_1(VAIC^{TM}) + \beta_2(PC) + \beta_3(SIZE) + \beta_4(DER) + \varepsilon$$

Where

ROA	Company profitability as measured by the company's return on assets.
ROE	Company profitability as measured by the company's return on shareholders fund.
VAIC TM	Intellectual capital performance as measured by the Value Added Intellectual Capital Coefficient TM .
SIZE	Company size as measured by the natural log of total sales of the company
DER	The risk profile of the company as measured by the debt-equity ratio.
ATO	Company productivity as measured by the asset-turn over ratio.
PC	Physical capital intensity i.e, proportion of fixed assets in the total assets of the company.

5. Data

The data used in this empirical study are collected from published annual reports of respective company and from Capitaline Database. The study confined to 75 Indian companies for the period 2004 to 2009. The companies taken in this study are leader in their respective businesses and are listed in the Indian stock market.

6. Discussion of Results

6.1 Descriptive Statistics

Table 1 presents the mean and standard deviation of the dependent variables, independent variables and control factors for each of the year investigated.

The overall financial performance of the sample companies is moderate as they earn profit at 14% to 18% between the years 2004 to 2009. Shareholders of the sample companies are getting returns at a rate of 22% to 25% from their investment. From the mean value of profitability (return on assets and return on equity) it reveals the sound financial performance of sample companies during the study period. The mean value of assets turnover ratio remains more or less same during the study period. The average amount of intellectual capital performance is very high and upward rising for the year 2004 and 2005; thereafter a drastic fall occurred in the value creation efficiency of intellectual capital performance. The mean of sample companies' intellectual capital performance suggests that sample companies are generally effective in generating value from their intellectual investment. From the average value of physical capital intensity it can say that total assets of sample companies contain 50% or more fixed

Table 1 Descriptive Statistics of Dependent, Independent and Control Variables

Variable Names	Year 2004 N = 44		Year 2005 N = 44		Year 2006 N = 75		Year 2007 N = 75		Year 2008 N = 75		Year 2009 N = 75	
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
ROA	0.1539	0.1379	0.1453	0.1363	0.1466	0.1408	0.1453	0.1431	0.1827	0.2079	0.1753	0.1961
ROE	0.2546	0.1963	0.2239	0.2780	0.2363	0.16607	0.2325	0.1757	0.2415	0.3214	0.2553	0.2049
ATO	1.6134	1.329	1.876	1.389	1.9224	1.4380	1.6627	1.25621	1.8024	1.6127	1.6798	1.4479
SIZE	22.85	1.716	22.86	1.882	23.169	1.622	23.462	1.5857	23.889	1.694	24.0469	1.4909
VAICTM	28.96	154.66	48.452	264.62	6.358	4.859	6.2077	4.4409	6.9967	8.9018	8.2579	8.298
PC	0.514	0.2152	0.8736	0.7843	0.5935	0.2238	0.5881	0.2456	0.5531	0.2568	0.5541	0.3074
DER	0.564	0.4724	0.2484	0.1753	0.8713	0.7841	0.8571	0.8473	0.9418	1.3774	0.7875	0.7427

assets. Therefore, there are significant investments in the fixed assets base of the companies under study. Finally the risk level of sample companies is moderate between the study periods.

6.2 Linear Multiple Regression Results

Table 2 contains multiple regression results of profitability of 75 (manufacturing and diversified) companies for the year 2004 to 2009. The results show that independent

Table 2 Multiple Regression Results of Profitability [Dependent Variable – ROA]

Independent and Control Variables	Year 2004		Year 2005		Year 2006		Year 2007		Year 2008		Year 2009	
	t-Value	Signi	t-Value	Signi	t-Value	Signi	t-Value	Signi	t-Value	Signi	t-Value	Signi
Constant	0.539	0.593	-0.420	0.677	-1.869	0.067	-1.489	0.142	-3.889	0.000	-0.735	0.465
						*				***		
VAIC TM	0.300	0.766	0.243	0.809	1.857	0.069	2.409	0.019	1.006	0.019	4.512	0.000
						*		**		**		***
ATO	4.601	0.000	3.519	0.001	6.672	0.000	7.487	0.000	6.794	0.000	8.353	0.000
		***		***		***		***		***		***
DER	-1.675	0.101	11.739	0.000	-3.133	0.003	-2.397	0.020	-0.702	0.485	-2.194	0.033
				***		***		**				**
PC	-0.168	0.867	-4.087	0.000	2.135	0.037	0.610	0.544	0.132	0.895	-0.208	0.836
				***		**						
SIZE	-0.189	0.851	0.388	0.700	1.850	0.070	1.523	0.134	4.032	0.000	0.697	0.489
						*				***		
F-VALUE	8.607	0.000	65.810	0.000	18.131	0.000	21.158	0.000	18.699	0.000	23.038	0.000
		***		***		***		***		***		***
Adjusted R ²	0.453		0.883		0.584		0.627		0.573		0.651	

Here, ***, ** & * represent 1%, 5% & 10% significance level respectively.

variables collectively explain 45.3% to 88.3% of the variance in return on assets which are statistically significant. From the results it is also seen that VAICTM and few control variables significantly influence

profitability as measured by ROA. Above table clearly shows that VAICTM has significant positive influence over profitability in four out of six years. The relationship between asset turnover ratio and return on assets is

positive and significant in all study periods. Therefore, profitability of the sample companies depends much more on the utilization of total assets and the value creation efficiency of intellectual capital. Use of debt capital and profitability shows a negative and significant relationship in three study periods out of six study periods. In case of company size and use of physical capital, no consistent relationship with profitability over the study period is found.

Table 3 contains the multiple regression results of profitability where ROE is the dependent variable an alternative measure of profitability, of sample companies over the study periods. From the empirical results it is shown that independent variables and control variables collectively explain 22 to 61.9 percentage of variance in the dependent variable. From the table it is shown that VAICTM, measure of value creation efficiency of intellectual capital, and ROE is significantly and positively related in 2006 to 2009 study periods. Therefore, statistical results of the study support our hypothesis. Assets turnover ratio

also significantly influences ROE in the year 2004, 2006, 2007, 2008 and 2009.

So, corporate value creation can be enhanced by judicious management of companies' intellectual capital base.

Table 4 contains multiple regression results of assets turnover and intellectual capital performance as measured by VAICTM.

The results are statistically insignificant except in one isolated case. Regressions results of the year 2008 show that intellectual capital performance significantly and positively influence company performance when measured by assets turnover ratio. But results of other years are not significant. Therefore, it is very difficult to conclude that the present empirical results support the hypothesis that intellectual capital performance is positively related to a company's performance (productivity) when measured by asset turnover ratio. There is negative relationship between debt-equity ratio and assets turnover ratio.

Table 3 Multiple Regression Results of Profitability (Dependent Variable-ROE)

Independent and Control Variables	Year 2004		Year 2005		Year 2006		Year 2007		Year 2008		Year 2009	
	t-Value	Signi	t-Value	Signi	t-Value	Signi	t-Value	Signi	t-Value	Signi	t-Value	Signi
Constant	1.112	0.273	-1.295	0.203	-1.333	0.188	0.179	0.859	-0.477	0.635	-0.720	0.475
VAIC TM	0.791	0.434	0.625	0.535	2.055	0.045	2.074	0.043	1.284	0.004	4.523	0.000
					**		**		***		***	
ATO	3.584	0.001	1.458	0.153	5.606	0.000	4.985	0.000	3.772	0.000	8.038	0.000
		***			***		***		***		***	
DER	0.737	0.466	5.744	0.000	-0.574	0.568	-0.360	0.720	1.952	0.056	0.130	0.897
			***						*			
PC	-1.112	0.273	-2.081	0.044	1.695	0.096	0.913	0.365	3.266	0.002	-1.010	0.317
				**		*			***			
SIZE	-0.751	0.457	1.316	0.196	1.369	0.177	0.115	0.909	-0.423	0.674	0.794	0.430
F-VALUE	3.595	0.009	14.960	0.000	9.809	0.000	7.095	0.000	7.571	0.000	16.923	0.000
		***		***		***		***		***		***
Adjusted R ²	0.220		0.619		0.419		0.337		0.332		0.574	

Here, ***, ** & * represent 1%, 5% & 10% significance level respectively.

Table 4 Multiple Regression Results of Productivity [Dependent Variable – ATO]

Independent and Control Variables	Year 2004		Year 2005		Year 2006		Year 2007		Year 2008		Year 2009	
	t-Value	Signi	t-Value	Signi	t-Value	Signi	t-Value	Signi	t-Value	Signi	t-Value	Signi
Constant	1.895	0.065 *	4.594	0.000 ***	1.484	0.143	0.788	0.434	-1.296	0.200	2.078	0.043 **
VAIC TM	-0.699	0.489	-0.505	0.616	-0.118	0.907	0.534	0.597	2.349	0.022 **	-1.616	0.112
DER	-2.993	0.005 ***	3.936	0.000 ***	-2.135	0.037 **	-2.257	0.028 **	-0.570	0.571	-3.099	0.003 ***
PC	4.229	0.000 ***	-3.025	0.004 ***	0.380	0.705	1.006	0.319	2.517	0.014 **	1.089	0.281
SIZE	-1.777	0.083 *	-3.911	0.000 ***	-0.792	0.431	-0.137	0.891	1.794	0.078 *	-1.395	0.169
F-VALUE	7.139	0.000 ***	10.472	0.000 ***	1.212	0.316	1.459	0.227	4.550	0.003 ***	3.954	0.007 ***
Adjusted R ²	0.348		0.468		0.014		0.030		0.177		0.167	

Here, ***, ** & * represent 1%, 5% & 10% significance level respectively.

7. Conclusions

The principal purpose of the present study is to investigate the relationship between performance of intellectual capital in Indian companies mainly reliant on fixed capital and two dimensions of financial performance. The two dimensions of company financial performance are profitability and productivity. Intellectual capital performance of companies is measured by means of using VAICTM methodology. Present analysis is conducted on data of a sample of 75 Indian companies. Overall empirical findings, which are based on multiple regression analysis between intellectual capital performance and conventional corporate financial performance measures, clearly indicate that intellectual capital is an important determinant of profitability but not productivity. This finding suggests that companies can enhance their profitability to a significant extent by means of managing its intellectual ability in an appropriate manner. But, in so far as the present study is concerned, the intellectual capital performance does not have a consistent positive influence on the assets turnover ratio. In our study assets turnover ratio is used to measure the productivity of the sample companies. There are other measures of productivity like per employee sales or profit, employee cost to gross margin. Here we use assets turnover ratio as a measure of productivity to compare the present study with the other studies. It is found that

intellectual capital is equally important to manufacturing and fixed assets based companies as compared to service companies.

Intellectual capital has been increasingly gaining popularity in the matter of ensuring sustainability of the business in the knowledge economic context. The results obtained in the present study clearly establish the importance of intellectual capital in enhancing the companies' value creation. It may, therefore, be argued that developing intellectual capital base is no less important than investment of monetary capital.

References

- Barney, J. (1986). Firm Resources and Sustained Competitive advantage. *Journal of Management*, 17, 771-792.
- Bontis, N., Chua, W. and Richardson, S. (2000). Intellectual Capital and the Nature of Business in Malaysia. *Journal of Intellectual Capital*, 1, 85-100.
- Bornemann, M. (1999). Empirical analysis of the intellectual potential of value systems in Austria according to the VAIC. *International Journal of Technology Management*, 18, 463-475.
- B.A Ranjith Appuhami (2007). The Impact of Intellectual Capital on Investors' Capital Gain On Shares: An Empirical Investigation In Thai Banking, Finance

- & Insurance Sector. *International Management Review*, 3, 14-25.
- Chandler, A.D. (1990). *Scale and scope*. Cambridge, MA: Harvard University Press.
- De Luca, L. M. and Atuahene-Gima, K. (2007). Market knowledge dimensions and cross-functional collaboration: Examining the different routes to product innovation performance. *Journal of Marketing*, 71, 95-112.
- Dierickx, I., & Coo], K. (1989). Asset stock accumulation and sustainability of competitive advantage. *Management Science*, 35, 1504-1511.
- Edvinsson, L. and Malone, M.S., (1997). *Intellectual capital: The proven way to establish your company's real value by measuring Its hidden brainpower*. London: Judy Piatkus.
- Firer, S., and Stainbank, L., (2003). Testing the relationship between intellectual capital and a company's performance: Evidence from South Africa. *Meditari Accountancy Research*, 11, 25-44.
- Jacob ben-simchon (2005). *Reporting of intellectual capital in research intensive SME, Final Dissertation*. The University of Inholland.
- Ghosh and Mondal, (2009). Indian software and pharmaceutical sector IC and financial performance. *Journal of Intellectual Capital*, 10, 369-388.
- Ghosh and Mondal, (2009). *Intellectual Capital and Financial Performance: Evidence from Indian Banking Industry*. Paper presented in ECIC-2009 (28-29 April), InHolland University, Netherlands.
- Ghosh and Mondal, (2011). 'Intellectual Capital and Value Creation: Evidence from Indian Hotel and Finance Companies.' *Journal of Management Research in Emerging Economies*. Vol. 1, No. 2. (forthcoming).
- Grant, R. M. (1991). The resource-based theory of competitive advantage. *California Management Review*, 33, 114-135.
- Hong P. T., David P., Phil H., (2008). The evolving research on intellectual capital. *Journal of Intellectual Capital*, 9, 585 – 608.
- 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, 151 – 170.
- Kujansivu, P. & Lönnqvist, A. (2005). The Value and Efficiency of Intellectual Capital in Finnish Companies. *Journal of Intellectual Capital*, 8, 272 – 287.
- Karl-Erik Seiby (2001, 2007). *Methods for Measuring Intangible Assets*. Retrieved from <http://www.sveiby.com/articles/IntangibleMethods.htm>
- Maheran, N., Muhammad, N., Ismail, M. (2009). Intellectual capital efficiency and firm performance: study on Malaysian financial sectors. *International Journal of Economics and Finance*, 1, 206-212.
- Ming- Chin Chen et al., (2005). An empirical investigation of the relationship between intellectual capital and firm's market value and financial performance. *Journal of Intellectual Capital*, 6, 159-176.
- Norma Juma (2006). *The Relationship between Intellectual Capital and New Venture Performance: An empirical investigation of the moderating role of the environment*. Retrieved from http://econpapers.repec.org/article/wsijitmx/v_3A03_3Ay_3A2006_3Ai_3A04_3Ap_3A379-405.htm
- Penrose, E. (1959). *The theory of the growth of the firm*. New York: Wiley.
- Patton, J. R. (2007). Metrics for knowledge-based project organizations. *Academy Management Journal*, 72, 33-43.
- Porter, M.E. (1980). *Competitive Strategy: Techniques for analyzing industries and competitors*. New York: Free Press.
- Prahalad, C. K., & Hamel, G. (1990). The core competence of the corporation. *Harvard Business Review*, 68, 79-91.
- Puntilo, P. (2009). Intellectual capital and business performance: Evidence from Italian banking industry. *Journal of corporate finance*, 12, 97-115.
- Pulic, A. (1998). VAICTM- An accounting tool for IC management. *International journal of technology management*, 20, 702-714.
- Riahi-Belkaoui (2003). Intellectual Capital and Firm Performance of U.S. Multinational Firms. *Journal of Intellectual Capital*, 4, 215-226.
- Richieri, Flavio L., (2007). *Intellectual Capital and the Creation of Values in the Brazilian Companies*. Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1081849
- Roos, G., (2003). *An Intellectual Capital Primer*, Centre for Business Performance, Cranfield University.
- Russo & Fouts, (1997). A Resource-based perspective on corporate environmental performance and profitability. *Academy of Management Journal*, 40, 534-559.

- Reeds, K., (2000). The dynamics of intellectual capital. Ph.D. Dissertation, The University of Connecticut.
- Saengchan, S. (2007). The role of intellectual capital in creating value in banking industry. *Journal of Knowledge Management*, 3, 15-25.
- Saint-Onge, H. (1996). Tacit knowledge: the key to the strategic alignment of intellectual capital. *Strategy & Leadership*, 24, 10-16.
- Saudah Sofian, Mike Tyles, Richard Pike, (2005). The implications of intellectual capital on performance measurement and corporate performance. Retrieved from http://eprints.utm.my/1281/1/Saudahsofian2006_TheImplicationsofIntellectualCapital.pdf
- Stewart, T.A., (1997). Intellectual capital - The new wealth of organizations. London: Nicholas Brealey.
- Subramaniam, M. and Youndt, M. A. (2005). The influence of intellectual capital on the types of innovative capabilities. *Academy of Management Journal*, 48, 450-463.
- Syed Najibullah (2005). An Empirical Investigation of the Relationship Between Intellectual Capital and Firms' Market Value and Financial Performance in Context of Commercial Banks of Bangladesh. Retrieved from <http://sb.iub.edu.bd/internship.autumn2005/0220175.pdf>
- Yalama, A., Coskun, M. (2007). Intellectual capital performance of quoted banks on the Istanbul stock exchange market. *Journal of Intellectual Capital*, 8, 256-271.
- Yli-Renko, H., Autio, E. and Spaienza, H. J. (2001). Social capital, knowledge acquisition and knowledge exploitation in young technology-based firms. *Strategic Management Journal*, 22, 587-613.
- Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, 5, 171-180.
- Williams, S.M., and Firer, S., (2003). Intellectual Capital and Traditional Measures of Corporate Performance. *Journal of Intellectual Capital*, 4, 348-360.

