

An Analysis of Intellectual Capital and Firms' Profitability: with Reference to Indian It Companies

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Abstract

The emergence of the quaternary sector has given rise to the knowledge-based economy, which has led to a huge market for intangible assets or Intellectual Capital (IC). The purpose of the study is to explore the effect of Value Added Intellectual Coefficient (VAIC) on IT firms' profitability for the time period of 2011 to 2018. The data used in the study is collected from Capital IQ database and annual reports of companies. Correlation and multiple regression are applied to investigate the relationship between IC and firms' profitability. The results obtained show that Indian IT companies' intellectual capital has a positive effect on

firms' profitability. Further, human capital and structural capital have a significant and positive relationship with firms' financial performance whereas capital employed was found to be insignificant. Overall, structural capital has a vital effect on firms' profitability and therefore, should be given more emphasis by companies. This study contributes to the existing literature by providing a more generalized result in this field.

Keywords: VAIC, Profitability, India, ROA

Introduction

With the evolution of a knowledge-based economy, the foundation of organizations now includes not only tangible or financial assets, but also intangible assets or Intellectual Capital (IC). Both these kinds of assets can be used for the purpose of assessing firms' profitability. The fundamental assets of the organization incorporate not only tangible assets, but also intangible assets that are precious, uncommon, imperative and unending. The existing cut-throat competition has made companies increase their investment in IC, which is a blend of Employee Training and Development, Networking and Information Systems, Research and Development, Intellectual Property, etc. These days, globalization and development of technology have prompted changes in firms' performance. The reporting and accounting of these assets are considered integral and have become a dominant trait of organizations. Intellectual capital, knowledge, information, innovation and value creation have become the most critical resources in the economy. Innovation adds to the advancement of the organization and gives an edge to the commodity produced by the organization (Murthy, 2017). Studies have disclosed that 50 to 90 percent of the value created for firms in the modern economy is because of IC rather than production and sales (Ehrhardt, 2007). The reality is that companies' wealth, which is a significant source of competitive advantage for any investor, organization as well as nation, depends majorly on intangible assets (Wiig, 1997). Various authors such as Edvinsson (1997) and Seviby (1997) have focused on the importance of IC and the role it plays in creating value in the modern economy by giving models to measure intangible assets. IC is considered the most precious asset and an exceptional weapon for organizations.

Several empirical studies have earlier been conducted in various countries for exploring the significance of intellectual capital in firms' financial performance and

only a handful of these are done in India. Comprehension and advancement of ideas of IC in developing economies are still in the early stages. IC research suggests that analyzing, valuing, measuring IC is progressively critical for information-intensive companies (Edvinsson & Sullivan, 1996; Bontis, 1996; Roos & Roos, 1997). There is no distinctive model used for measuring companies' IC. However, Ante Pulic's (1998) value added intellectual coefficient model popularly known as VAIC has gained significant importance in the last few decades, as it quantifies the efficiency of value creation in companies' IC. VAIC components are capital employed or physical capital, human capital and structural capital. It is progressively being used in business and academic applications (Firer & Williams, 2003). This model is broadly used in the research to study the relationship between IC and firms' performance. Thus, this research contributes to the existing literature on IC by examining the relationship between Intellectual Capital and firms' profitability for Information Technology (IT) companies listed on the Indian stock exchanges. The business activities in the IT sector require a large amount of information and knowledge mostly in terms of skills, innovation, technological development and connection between employees and customers to produce a competitive advantage in the light of service provided to the customer. Hence, it is important for the sector to invest in the training and development of human capital, their expertise and skills to sustain in a dynamic environment. Basic factors of IC such as innovation, knowledge, and information are considered for developing competitive advantage for achieving unrivalled business performance. This study explores the relationship between VAIC and its components as a proxy of IC on the profitability of IT companies in India. India is a noteworthy worldwide player in the IT business with a large number of Indian IT organizations significantly adding to fiscal expansion (Prusty & Kumar, 2017).

Motivation for the study

According to the neo-classical approach, financial or tangible assets are the essential capital in assessing a firm's profitability. The school of thought supporting the substitute approach consider that intangibles or intellectual capital are equally critical for firms' profitability. As a matter of fact, IC is a fundamental element for organizations' success, whether it is manufacturing or service. There is a deficiency of research on the utilization of IC data in estimating the value of a firm. Also, there is a need to build the importance of IC in reporting practices and its contribution in the profitability of the firm. This study is unique with respect to its sample selection and scope, which generates a favourable position for IT companies in developing economies like India and will help stakeholders to invest in IC accordingly. Also, it examines the association between VAIC and firms' profitability.

The paper is organized as follows: Section 2 outlines the conceptual framework, hypothesis development and relevant review of literature pertaining to IC. Section 3 outlines the research methodology followed by Section 4, which shows the analysis and discussion. Section 5 concludes the study and Section 6 discusses the limitations of this study and scope for future study.

Conceptual framework and Hypothesis Development

Definition of Intellectual Capital

The word "Intellectual capital" has no structured definition and has been defined by various researchers differently. According to Stewart (1994), "Intellectual capital is the total stocks of the collective knowledge, information, technologies, intellectual property rights, experience, organization learning and competence,

team communication systems, customer relations and brands that are able to create value for a firm". Another explanation by Lev (2000) for intangible assets which closely fits with an exposition of IC is "intangible assets are non-physical sources of value (claims to future benefits) generated by innovation, unique organizational designs, or human resource practices".

In general, the word "IC" is referred to as "intangible assets" that significantly affect the execution and achievement of business goals, even though they are not expressly recorded in companies' balance sheet.

Value added intellectual coefficient (VAIC)

Ante Pulic (1998, 2000) developed VAIC to explore and measure the IC of organizations and stated that VAIC specifies "corporate value creation efficiency or corporate intellectual ability. This method is easy and possible to perform as it is calculated from the audited financial statements (Balance sheet and Income Statement) of the company. It measures how much value addition has been created over per unit of investment done in resources". VAIC is the summation of two indicators namely, Intellectual Capital Efficiency (ICE) and Capital Employed Efficiency (CEE). Intellectual Capital Efficiency consists of Human Capital Efficiency (HCE) and Structural Capital Efficiency (SCE).

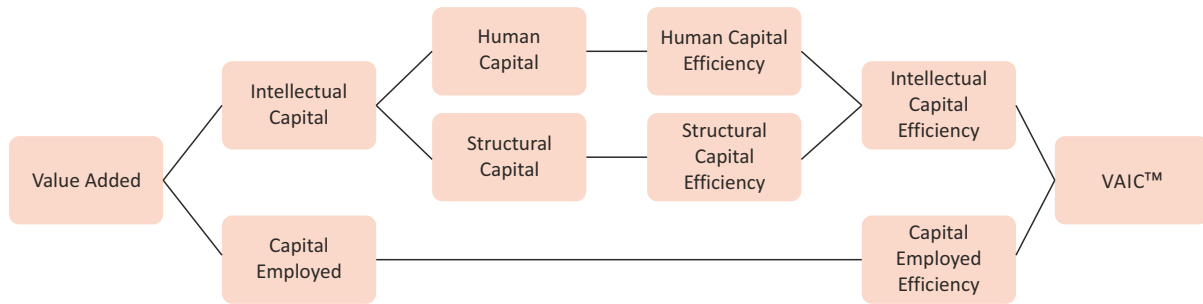


Figure 1. VAIC™ Conceptual Framework

Source: Researchers' Compilation

VAIC™ integrates intangible and tangible assets in making an appraisal of the organizations' value creation. This model has several advantages supported by various researchers. VAIC™ model extends a systematic and simple measurement base as compared to other models of IC (Firer & Williams, 2003). The method can be easily applied to different firm sizes and structures, can be calculated by internal and external stakeholders, has a straightforward approach, and is easy to understand (Tseng & Goo, 2005).

VAIC™ increases the usefulness of financial statements by consolidating the measures of IC. Moreover, it treats Human Capital consistently, which makes the method appropriate to measure IC in any organization (Goh, 2005; Joshi, Cahill, & Sidhu, 2010).

Components of VAIC™

The components of VAIC™ are *Human capital*, *Structural capital* and *Capital Employed*. The value creation is done through appropriating investments in these three components.

Human capital. It is the sum of a person's intellect and expertise that the company uses to achieve its long-term goals. It is the capital that gives businesses the opportunity to make more money. Human capital is a prerequisite to achieve any business goals or to create any type of capital. As we move deeper into the knowledge-based economy which depends on ability,

skills and aptitude, human capital will become increasingly important. The experience of employees can impact the IC of organizations, and employees' dedication and commitment would build up the intellectual capital and enhance the firms' productivity (Ulrich, 1998). Human capital consists of five major attributes - *employees' productivity*, *employees' competence*, *quality of employees*, *teamwork*, and *managers' motivation for employees* (Johnson, 1999; Bontis, 2001; Bozbura, 2004).

Several studies done in the last few years have revealed that human capital has shown mixed results in enhancing a firms' performance. Laing, Dunn, & Hughes-Lucas (2010) investigated the effect of IC on profitability for two companies operating in the Australian hotel industry for the period of 2004 to 2007 and found that Human capital increases over the years and positively influences firms' profitability. Another research (Joshi, Cahill, Sidhu, & Kansal, 2013) done in the context of Australia found that IC performance is highly influenced by human capital, but it does not greatly affect financial performance. Hang Chan (2009) has found that human capital has a significant negative influence on market valuation and productivity, and that it is associated with firm's profitability. Firer & Williams (2003) applied a similar model and found that human capital is negatively associated with firms' profitability.

Therefore, to widen the range of this study, the effect

of human capital on the firm's profitability must be analyzed.

Structural capital. The learning by the organization can be achieved by the application of knowledge and experience; this is known as structural capital. This requires organizing and bundling the ability with the assistance of innovation, processes, systems, etc. to guarantee that capability will stay inside the organization when the employees quit or retire (Stewart, 1999). It consists of hierarchical structures, methods, schedules, frameworks, technologies, databases and so on that stay within the company. Seviby (1997) defined it as the capital that includes patents, trademarks, intellectual property, networking and information systems, models, infrastructure assets, etc. It gives an atmosphere for employees to enhance themselves by creating value and knowledge. Moreover, it shows a structure that creates learning and advancement, comprising of skills and capabilities of employees in the organization (Pablos, 2005). The studies have revealed that structural capital has shown diverse results in building up firms' performance. Ting & Lean (2009) investigated the relationship of IC with financial performance. The results show that structural capital shows a negative association with firms' profitability. Further, Maditinos, Chatzoudes, Tsairdis, & Theriou (2011) also presented that structural capital does not significantly affect the firm's performance. Alipour (2012) analysed the impact of IC on the firm's financial performance of 39 Iranian insurance companies for the period of 2005 to 2007. The results have displayed that structural capital has a positive relationship with firms' financial performance.

Capital Employed. It is also recognized as funds employed and shows the tangible or physical assets of a company. It is the amount of capital used for the acquisition of profits. It refers to the amount of all assets employed in the organization. A company

deems these assets as very important and makes investments in them to improve its value. Although the term 'capital employed' is used frequently, it is difficult to define it, as it is used differently in different contexts. The most common context is that investment in capital is necessary for an organization to function. In simple terms, it means employing capital to generate value within the organization.

Various research studies have measured the role of capital employed on the firm's performance to study the contribution of tangible assets to the firm's performance. Joshi, Cahill, Sidhu, & Kansal (2013) established that capital employed is the only capital that positively influences the firm's performance. On the contrary, according to Firer & Williams (2003), capital employed does not impact firms' financial performance significantly.

Review of Literature

Due to the rising importance of IC in assessing firms' performance, the focus of research in this area has attracted the attention of many researchers. These investigations have demonstrated that IC is fundamentally adding to the value created by a company, and thus is positively related to the firm's profitability. Ante Pulic (1998) measures the correlation between Value Added (VA), IC and capital employed (Physical capital) of Austrian companies. The results conclude that VA and IC are highly correlated and that the correlation between VA and CEE is low. This proposes that IC is becoming the origin of value creation for the company. Similarly, Riahi-Belkaoui (2003) explored the impact of IC on 84 MNCs' in the US and concludes that the relationship between IC and firms' performance is positively significant.

Mavridis (2004) used the same model for 141 Japanese banks and concluded that human capital is highly correlated with firms' performance. Also, Chen,

Cheng, & Hwang, (2005) examined the association between VAIC and two measures, market value and profitability, of companies listed in Taiwan. The study concluded that VAIC has a positive correlation on both these measures and shows evidence that R&D expenditures have a positive impact on a firm's profitability and value. In another study examining Thailand's manufacturing sector, Phusavat, Comepa, Sitko-Lutek & Ooi (2011) studied the impact of IC on employee productivity, sales growth and profitability. The results show a significant positive correlation between IC and firms' performance.

Kamath (2008) investigated the Indian pharmaceutical sector and established a vital impact of Human capital on ROA; however, he found no significant relationship of human capital with productivity and market value. Similarly, Vishnu & Gupta (2014) established that HCE and SCE have a significant and positive association with ROA and return on sales in the same sector. In another study on Indian banks, Mondal & Ghosh (2012) established a relationship of IC with productivity and profitability. The study concluded that IC plays a vital role in companies' competitive advantage. Smriti & Das (2018) studied the effect of IC on Indian firms' (listed in CMIE Overall Share Price Index) performance and observed that human capital has a significant impact on firms' productivity, and that SCE and CEE contribute equally to firms' sales growth and market value. These studies reveal insights about the Indian information-based sector and stakeholders recognize that firms' performance is based on intangible assets rather than tangible assets.

However, Firer & Williams (2003) have given mixed results while exploring 75 South African listed companies and disclosed that firms' performance is negatively influenced by IC. However, CEE is the only indicator that positively impacts firms' performance. This study shows that South African companies' capital employed (physical capital) has a significant role in

firms' performance.

In order to broaden the horizon of IC in the context of Indian IT companies, the study formulates the following hypotheses to explore the effect of VAIC and its components on firms' profitability.

H₁: There exists a significant positive relationship between Value Added Intellectual Coefficient (VAIC) and firms' profitability.

H₂: There exists a significant positive relationship between Human Capital Efficiency (HCE) and the firm's profitability.

H₃: There exists a significant positive relationship between Structural Capital Efficiency (SCE) and the firm's profitability.

H₄: There exists a significant positive relationship between Capital Employed Efficiency (CEE) and the firm's profitability.

Research Methodology

It is assumed that IC is the means for generating competition, and therefore, it can have an association with ideas of value creation and profitability, and subsequently, IC plays a significant part in developing the worth and enhancing the profitability of the firm. This study investigates the impact of IC on profitability of IT companies in India. To analyze the relationship between profitability (dependent variable) and IC (components of VAIC as independent variables) multiple regression analysis has been applied. This section discusses the data, sample selection, variables and models under the study.

Data and sample selection

Yearly data for a sample of 25 Indian IT companies listed in NSE-500 has been considered for the study over the time period 2011-2018. The data used for the study is collected from published annual reports of companies and S&P Capital IQ database. In this study, we have applied correlation and multiple regression analysis.

Variables and Model

This section deals with the measurements of the dependent, independent and control variables used for the study.

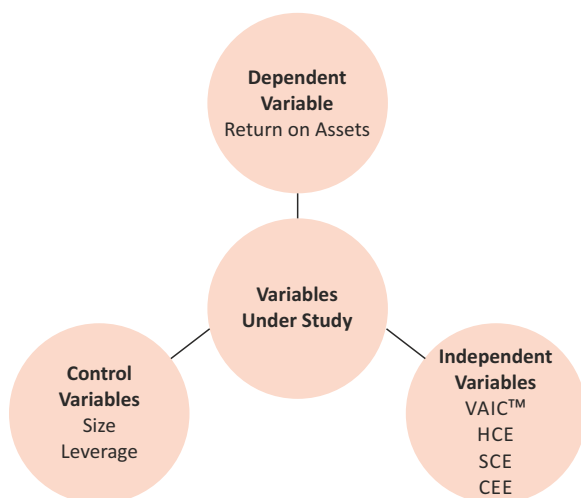


Figure 2. Variables under the study
Source: Researchers' Compilation

Dependent Variable

As a proxy to measure the profitability of the firm, Return on Assets (ROA) is used as the dependent variable. It measures the amount of profit that the company produces as a percentage of its total assets. ROA is calculated by dividing the net profit of the firm by total assets for a particular period of time. This ratio assesses the firm's performance and effectiveness in engaging the resources to achieve benefits for the future (Chen, Cheng, & Hwang, 2005).

Independent Variables

In this study, four independent variables are used:

- 1) HCE, the indicator of Human Capital Efficiency
- 2) SCE, the indicator of Structural Capital Efficiency
- 3) CEE, the indicator of Capital Employed Efficiency
- 4) VAIC, the sum of the above three components

Steps for calculating VAIC™ are as follows:

Step 1: Calculate Value Added (VA) of the company, which is the difference between the output and input of the company.

$$VA = OUTPUT - INPUT$$

Where output is the total earnings and input are the expenses incurred on manufacturing the products or providing services. The following equation helps to calculate VA.

$$VA = I + DP + D + T + MI + RE + EC$$

Where, I = interest expenses; DP = depreciation expenses; D = dividends; T = income taxes; MI = minority interest; RE = retained earnings and EC = employees costs.

Step 2: Calculate the human capital efficiency which is the ratio of VA divided by the total employees' cost of the company.

$$HCE = VA/HC$$

Where, HCE = human capital efficiency; VA = value added and HC = Human capital i.e. the total employees' cost.

Step 3: Calculate the structural capital efficiency. For this model, structural capital equals VA less the human capital.

$$SC = VA - HC$$

Pulic (1998) stated that there is an inverse relationship between SC and HC i.e. the less the HC the more the SC is associated in value creation of the firm.

The equation for calculating structural capital efficiency is as follows:

$$SCE = SC/VA$$

Where, SCE= Structural capital efficiency, SC = Structural capital and VA = Value added.

Step 4: Calculate the capital employed efficiency which is the ratio of VA divided by capital employed (CE).

$$CEE = VA/CE$$

Where, CEE = capital employed efficiency; VA = value added and CE = capital employed i.e. book value of total assets minus intangible assets.

Step 5: Finally, calculate the Value Added Intellectual Coefficient (VAICTM) which summarises the model.

$$VAICTM = HCE + SCE + CEE$$

Control Variables

For analysis, multiple regression model and correlation have been employed.

We have integrated the following control variables:

1. Size of the firm (SIZE): calculated using the natural log of total assets. It is used to control the effect of the firm's size on the firm's performance (Riahi-Belkaoui, 2003; Mondal & Ghosh, 2012; Pandey & Kumar, 2016).
2. Financial Leverage (LEV): is the proportion of total debt by the book value of total assets. It is used to control the effect of debt on the firm's performance (Riahi-Belkaoui, 2003; Mondal & Ghosh, 2012).

Regression Models

For analysis, a multiple regression equation has been tested for estimating the effect of IC on firms' profitability. To measure the effect of IC on firms' profitability, two regression models have been formulated. Model 1 examines the relationship

between ROA and the aggregate measure of intellectual capital of the firm i.e. VAICTM. To enhance the robustness of the study, model 2 examines the relationship between ROA and three major components of VAICTM i.e. HCE, SCE, and CEE. This study uses return on assets (ROA) as a proxy of firms' profitability as discussed earlier and uses the size of the firm and financial leverage as the control variables to remove its effect from the equations.

$$\text{Model 1: } ROA_{it} = \alpha + \beta_1(VAICTM_{it}) + \beta_2(SIZE_{it}) + \beta_3(LEV_{it}) + \epsilon_{it}$$

$$\text{Model 2: } ROA_{it} = \alpha + \beta_1(HCE_{it}) + \beta_2(SCE_{it}) + \beta_3(CEE_{it}) + \beta_4(SIZE_{it}) + \beta_5(LEV_{it}) + \epsilon_{it}$$

Where ROA is net income by total assets, α is constant, β_1 β_5 are coefficients calculated for firm $i(1, 2, \dots, 25)$ for the time period $t(2011, 2012, \dots, 2018)$, ϵ is the error term and other variables are discussed in section 3.

Results and Discussion

Descriptive statistics

Table I exhibits the number of observations, mean, standard deviation, median, minimum and maximum of all the variables in the study. The mean value of ROA is 11.4 percent, showing that the companies have earned a huge amount of profits. The sample companies have created the highest value from HCE i.e. 3.553, followed by SCE and CEE as 0.494 and 2.560 respectively. The summation value of HCE and SCE also known as ICE is 4.047, which is more than the value of CEE indicating that the companies create more value from its intangible assets than from its tangible assets.

Table I. Descriptive Statistics of Variables

Variables	N	Mean	Std. Dev.	Median	Minimum	Maximum
ROA	200	0.114	0.067	0.106	-0.046	0.290
HCE	200	3.553	7.462	2.192	0.211	64.676
SCE	200	0.494	0.412	0.544	-3.734	0.985
CEE	200	2.560	6.263	2.085	-16.602	65.922
VAIC ^Ô	200	6.647	9.593	5.330	-15.121	67.589
SIZE	200	10.284	1.642	10.018	5.867	13.877
LEV	200	0.221	0.554	0.0344	0.000	5.225

Source: Researchers' Calculations

Correlation matrix

The association between the dependent and independent variables is analyzed by using correlation matrix and the results are depicted in Table II. The results from the study depict that VAIC, HCE, and SCE are positively related with ROA, significant at 0.05 level. Accordingly, these results support the significant positive relationship between the firm's profitability and VAIC, HCE, and SCE and hence, H₁, H₂, and H₃ respectively are accepted. On the other hand, CEE is not found to be significant. Therefore, H₄ is not supported.

Among the three components of IC, SCE has a significant positive and highest correlation (SCE= 0.348) with ROA.

Table II. Correlation matrix

Variables	ROA	CEE	HCE	SCE	VAIC ^Ô	SIZE	LEV
ROA	1						
CEE	0.016	1					
HCE	0.234**	-0.050	1				
SCE	0.348**	0.002	0.261**	1			
VAIC ^Ô	0.208**	0.614**	0.756**	0.247**	1		
SIZE	0.119	-0.037	0.047	0.284**	0.025	1	
LEV	-0.451**	0.064	-0.031	-0.253**	0.007	-0.081	1

Notes: **, Correlation is significant at the 0.01 level (2-tailed).

Source: Researchers' Calculations

Multiple Linear Regression analysis

The study now tests the hypothesis through a multiple regression model. The study includes two control variables (size of the firm and financial leverage) that influence firms' profitability. In the study, multi-collinearity has been checked through *Variance Inflation Factor* (VIF) and the highest value of VIF is 1.241. Hence, it confirms that multi-collinearity does not exist in the data. Table III presents the results of regression model 1 on the dependent variable, ROA. The results show that in model 1, the coefficient of VAICTM (0.001) is significantly positive and the explained variance is 24.3 percent.

Table III. Regression Results - Model 1: ROA and VAIC™

Independent Variables	Coefficient (b)	t-statistics	Significance	VIF
Constant		3.114	0.002	
VAIC	0.209	3.384	0.001	1.001
SIZE	0.078	1.266	0.207	1.007
LEV	-0.446	-7.213	0.000	1.007

Notes: Dependent Variable - ROA, Adjusted $R^2 = 0.243$, F-Value = 22.271, p-value > 0.05

Source: Researchers' Calculations

Table IV depicts the results for model 2 on dependent variable ROA. Two components of VAIC™ i.e. HCE (0.007) and SCE (0.004) are significantly positive. However, one component as CEE (0.400) fails to show a significant result and the explained variance in this model is 27.3 percent.

Also, it has been observed that the Adjusted R^2 has increased from 0.243 in model 1 to 0.273 in model 2. Therefore, model 2 has a significantly greater explanatory power than model 1. In addition, model 2 helps in determining the importance of VAIC™ components separately. Thus, the companies can be benefited by paying attention to the components which have a significant positive impact on firms' profitability.

Table IV: Regression results - Model 2: ROA and VAIC™ components

Independent Variables	Coefficient (b)	t-statistics	Significance	VIF
Constant		3.467	0.001	
HCE	0.172	2.743	0.007	1.079
SCE	0.195	2.891	0.004	1.241
CEE	0.051	0.843	0.400	1.009
SIZE	0.026	0.409	0.683	1.091
LEV	-0.398	-6.350	0.000	1.075

Notes: Dependent Variable - ROA, Adjusted $R^2 = 0.273$, F-value = 15.960, p-value > 0.05

Source: Researchers' Calculations

Model 2 results have shown that intellectual capital efficiency (ICE), which is the summation of HCE and SCE, has a significant positive relationship with the profitability of the firm (ROA). The results support the acceptance for H_1 , H_2 , and H_3 i.e. there exists a significant positive relationship between firms' profitability and VAIC, HCE, and SCE. However, the study fails to support the significant positive

relationship between firms' profitability and CEE and therefore, H_4 is not accepted. Likewise, this recommends that it is essential for organizations to utilize human and structural capital effectively to create higher productivity. Remarkably over all models, adjusted R^2 rises when VAIC™ is divided into its components.

The results state that IC plays a significant role in value creation and profitability of firms. Moreover, the findings are in line with the previous studies (Firer & Williams, 2003; Chen, Cheng, & Hwang, 2005; Shiu, 2006; Zhang, Zhu, & Kong, 2006; Ting & Lean, 2009; Zeghal & Maaloul, 2010; Rahman, 2012; Nimtrakoon, 2015) which confirms that companies' IC has a positive relationship with firms' profitability.

Although both the models have a low Adjusted R^2 , they are significant at the 0.05 level. Thus, we conclude that both the models have significant explanatory power. As CEE (physical capital) is the only VAICTM component which is insignificant, it recommends that essential efficiencies for developing firms' performance are HCE (human capital) and SCE (structural capital). Though IC is still in its early stages in India, it could become powerful in future.

Conclusion

IC is progressively being considered as a value creator of a firm and with a specific end goal to gain a competitive edge in business, particularly for those working in the information-based sector. IC is acknowledged as an essential resource for maintaining an advantage in the industry. This study confirms the same by investigating the relationship between IC and firms' profitability in the IT sector. The study gives evidence that firms with higher IC generate higher profits, thus underlining the significance of IC in improving firms' performance. The choice of an ideal ownership structure appears to impact organizations' ingenuity, technology, and innovation. Firms' value depends not only on tangible assets, but also on intangible assets. Intangible assets or IC have existed for long but have come into book-keeping only in recent times. Several studies have explored the relationship of IC on firms' performance using many statistical tools. This study uses VAICTM model as a proxy of IC and measures its effect on firms'

profitability. This model is easy to use, as it is based on the audited financial statements of companies.

The study is based on a sample of 25 IT companies forming part of the NSE-500 index for the period of 2011-2018.

Using VAICTM, this study explores four hypotheses concerning the relationship between IC and profitability. The first hypothesis explores the positive relationship between total IC and firms' profitability. The results of the study support the hypothesis and show a significant relationship between the two. The second hypothesis explores the relationship between Human Capital Efficiency (HCE) and firms' profitability. Here, the relationship between the two is significantly positive and hence, the hypothesis is supported. This infers that the economic value that employees generate from their skills, innovation, knowledge, and abilities directly influences the firm's profitability. The third hypothesis explores the positive relationship between Structural Capital Efficiency (SCE) and the firms' profitability. The results support the hypothesis and find a significant positive relationship between the two. This entails that the learning in the organization is achieved by the application of knowledge and experience, and appears to directly impact firms' profitability. On the other hand, Capital Employed Efficiency (CEE) is not significantly related to firms' profitability and hence, does not support the fourth hypothesis of the study. This shows that companies' tangible assets do not significantly contribute toward firms' profitability.

Overall, the results of the study specify that companies can increase their profitability by properly managing the IC of the firm. Finally, it can also be stated that intellectual capital is a recently developed idea, and until now, it is not understood by most organizations.

Applicability and Generalizability

Intellectual Capital is an important field for various stakeholders such as investors, institutional financial specialists, researchers, policymakers and shareholders. The source of data for the study is published annual reports of companies and S&P Capital IQ database over the time period of 2011-2018 for 25 Indian IT companies forming part of the NSE-500 index. This paper expands the existing research on IC and gives evidence on the importance of IC on firms' profitability. The results will motivate organizations to spread learning and knowledge among their human resources and mark the variables that influence IC so as to create maximum value for the company. The results will motivate the top management to improve the administration of IC. The research on IC has gone through various stages, from initial recognition to characterization of IC, and to pursuit for a correct measure of IC. As per the results, IC variables - Human capital and Structural capital - are the most significant variables and companies should concentrate on investing more in these fields. Also, the study would likewise deliver part of information to investors to evaluate the capacities of IT companies to generate value from IC.

Limitation and future research

The main limitation of the study is that the importance of IC is assessed on firms' profitability taking only one variable - ROA - into consideration. Other variables can also be taken into account to check the efficiency of IC such as return on equity and return on capital, so that beneficial conclusions can be drawn. Also, this study has considered only the IT industry; other industries can also be taken into consideration and cross country analysis can also be done.

Moreover, a more developed and structured model for IC that works in accordance with the International Accounting Standards (IAS) can be proposed, which will be useful to both the external and internal management of the company.

References

- Alipour, Mohammad. "The effect of intellectual capital on firm performance: an investigation of Iran insurance companies." *Measuring Business Excellence* 16, no. 1 (2012): 53-66.
- Bharathi Kamath, G. "Intellectual capital and corporate performance in Indian pharmaceutical industry." *Journal of Intellectual Capital* 9, no. 4 (2008): 684-704.
- Bontis, Nick. "There's a price on your head: managing intellectual capital strategically." *Business Quarterly* 60 (1996): 40-78.
- Bontis, N. "Managing organizational knowledge by diagnosing intellectual capital: framing and advancing the state of the field". In World Congress on Intellectual Capital readings, 2001: 13-56.
- Chen Goh, Pek. "Intellectual capital performance of commercial banks in Malaysia." *Journal of Intellectual Capital* 6, no. 3 (2005): 385-396.
- Chen, Ming-Chin, Shu-Ju Cheng, and Yuhchang Hwang. "An empirical investigation of the relationship between intellectual capital and firms' market value and financial performance." *Journal of Intellectual Capital* 6, no. 2 (2005): 159-176.
- Edvinsson, Leif. "Developing intellectual capital at Skandia." *Long range planning* 30, no. 3 (1997): 366-373.
- Edvinsson, Leif, and Patrick Sullivan. "Developing a model for managing intellectual capital." *European Management Journal* 14, no. 4 (1996): 356-364.
- Ehrhardt, Lothar. "Intellectual capital: the new competitive advantage." *Management Today* 23, no. 9 (2007): 50-52.
- Firer, Steven, and S. Mitchell Williams. "Intellectual capital and traditional measures of corporate performance." *Journal of Intellectual Capital* 4, no. 3 (2003): 348-360.
- Hang Chan, Kin. "Impact of intellectual capital on organisational performance: An empirical study of companies in the Hang Seng Index (Part 1)." *The Learning Organization* 16, no. 1 (2009): 4-21.
- Johnson, William HA. "An integrative taxonomy of intellectual capital: measuring the stock and flow of intellectual capital components in the firm." *International Journal of Technology Management* 18, no. 5 (1999): 562-575.
- Joshi, Mahesh, Daryll Cahill, and Jasvinder Sidhu. "Intellectual capital performance in the banking sector: An assessment of Australian owned banks." *Journal of Human Resource Costing & Accounting* 14, no. 2 (2010): 151-170.
- Joshi, Mahesh, Daryll Cahill, Jasvinder Sidhu, and Monika Kansal. "Intellectual capital and financial performance: an evaluation of the Australian financial sector." *Journal of Intellectual Capital* 14, no. 2 (2013): 264-285.
- Laing, Gregory, Jillian Dunn, and Susan Hughes-Lucas. "Applying the VAIC™ model to Australian hotels." *Journal of Intellectual Capital* 11, no. 3 (2010): 269-283.
- Lev, Baruch. *Intangibles: Management, measurement, and reporting*. Brookings Institution Press, 2000.
- Maditinos, Dimitrios, Dimitrios Chatzoudes, Charalampos Tsairidis, and Georgios Theriou. "The impact of intellectual capital on firms' market value and financial performance." *Journal of Intellectual Capital* 12, no. 1 (2011): 132-151.
- Mavridis, Dimitrios G. "The intellectual capital performance of the Japanese banking sector." *Journal of Intellectual Capital* 5, no. 1 (2004): 92-115.

- Mondal, Amitava, and Santanu Kumar Ghosh. "Intellectual capital and financial performance of Indian banks." *Journal of Intellectual Capital* 13, no. 4 (2012): 515-530.
- Murthy, J. J. "Managing Innovation and exploring its impact on a Patent Portfolio". *NMIMS Journal of Economics and Public Policy* 2, no. 2 (2017): 37-43.
- Nimtrakoon, Sirinuch. "The relationship between intellectual capital, firms' market value and financial performance: Empirical evidence from the ASEAN." *Journal of Intellectual Capital* 16, no. 3 (2015): 587-618.
- Ordenez de Pablos, Patricia. "Intellectual capital reports in India: lessons from a case study." *Journal of Intellectual Capital* 6, no. 1 (2005): 141-149.
- Pandey, Shri Narayan, and Alok Kumar. "Exploring the Association between Environmental Cost and Corporate Financial Performance: A Study of Selected NIFTY Companies." *NMIMS Management Review* 32 (2016): 12-21.
- Phusavat, Kongkiti, Narongsak Comepa, Agnieszka Sitko-Lutek, and Keng-Boon Ooi. "Interrelationships between intellectual capital and performance: Empirical examination." *Industrial Management & Data Systems* 111, no. 6 (2011): 810-829.
- Prusty, T., & Kumar, S. "Empirical Evidence of Corporate Governance Disclosures and Board Size Modular with Financial Performance in select IT Companies in India". *NMIMS Journal of Economics And Public Policy* 2, no. 1(2017): 36-46.
- Pulic, Ante. "Measuring the performance of intellectual potential in knowledge economy." In *2nd McMaster World Congress on Measuring and Managing Intellectual Capital by the Austrian Team for Intellectual Potential*, pp. 1-20. 1998.
- Pulic, Ante. "VAIC™—an accounting tool for IC management." *International Journal of Technology Management* 20, no. 5-8 (2000): 702-714.
- Rahman, Sheehan. "The role of intellectual capital in determining differences between stock market and financial performance." *International Research Journal of Finance and Economics* 89, no. 1 (2012): 46-77.
- Riahi-Belkaoui, Ahmed. "Intellectual capital and firm performance of US multinational firms: a study of the resource-based and stakeholder views." *Journal of Intellectual Capital* 4, no. 2 (2003): 215-226.
- Roos, Göran, and Johan Roos. "Measuring your company's intellectual performance." *Long range planning* 30, no. 3 (1997): 413-426.
- Shiu, Huei-Jen. "The application of the value added intellectual coefficient to measure corporate performance: evidence from technological firms." *International Journal of Management* 23, no. 2 (2006): 356.
- Smriti, Neha, and Niladri Das. "The impact of intellectual capital on firm performance: a study of Indian firms listed in COSPI." *Journal of Intellectual Capital* 19, no. 5 (2018): 935-964.
- Stewart, Thomas A. "Your company's most valuable asset-intellectual capital." *Fortune* 130, no. 7 (1994): 68.
- Stewart, T. A. "The case for managing structural capital." In *Health Forum Journal*, vol. 42, no. 3, pp. 30-32. 1999.
- Sveiby, Karl Erik. *The new organizational wealth: Managing & measuring knowledge-based assets*. Berrett-Koehler Publishers, 1997.
- Tseng, Chun-Yao, and Yeong-Jia James Goo. "Intellectual capital and corporate value in an emerging economy: empirical study of Taiwanese manufacturers." *R&D Management* 35, no. 2 (2005): 187-201.
- Tunc Bozbura, F. "Measurement and application of intellectual capital in Turkey." *The Learning Organization* 11, no. 4/5 (2004): 357-367.

- Ulrich, Dave. "Intellectual capital= competence x commitment." *Sloan Management Review* 39, no. 2 (1998): 15-27.
- Ulum, Ihyaul, Imam Ghozali, and Agus Purwanto. "Intellectual capital performance of Indonesian banking sector: a modified VAIC (M-VAIC) perspective." *Asian Journal of Finance & Accounting* 6, no. 2 (2014): 103-123.
- Vishnu, Sriranga, and Vijay Kumar Gupta. "Intellectual capital and performance of pharmaceutical firms in India." *Journal of Intellectual Capital* 15, no. 1 (2014): 83-99.
- Wei Kiong Ting, Irene, and Hooi Hooi Lean. "Intellectual capital performance of financial institutions in Malaysia." *Journal of Intellectual Capital* 10, no. 4 (2009): 588-599.
- Wiig, Karl M. "Integrating intellectual capital and knowledge management." *Long range planning* 30, no. 3 (1997): 399-405.
- Zeghal, Daniel, and Anis Maaloul. "Analysing value added as an indicator of intellectual capital and its consequences on company performance." *Journal of Intellectual Capital* 11, no. 1 (2010): 39-60.
- Zhang, Ji-jian, Nai-ping Zhu, and Yu-sheng Kong. "Study on intellectual capital and enterprise's performance - empirical evidence from the Chinese securities market." *Journal of Modern Accounting and Auditing* 2, no. 10 (2006): 35-39.

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