

Does Intellectual Capital effect Corporate Performance: A Study on Pharmaceutical Companies in India

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Abstract

This study examined how intellectual capital (IC) affected the corporate performance of Indian pharmaceutical sector enterprises using Public's Value-added intellectual capital coefficient (VAICTTM) model. To measure a firm's corporate performance, the study employed returns on equity (ROE), productivity (ATO), and profitability (ROA). The top 31 Pharmaceutical firms were chosen for the study based on market capitalization. According to the findings, IC efficiency has no effect on productivity and but a considerable and favorable link with the return on equity (ROE) and return on assets (ROA) profitability of the Indian Pharmaceutical sector. While human capital efficiency (HCE) solely affects all proxies of financial performance. Similarly, capital employed efficiency (CEE) has a substantial effect on all corporate performance measures. Additionally, the study discovered that structural capital efficiency (SCE) had no bearing on the return on assets, Asset turnover ratio and return on equity of the Indian Pharmaceutical sector.

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Introduction

'Information based economy' sees information as a significant component in distinguishing an organization's ability and enhance competitive advantage from their rivals. The idea of valuing the assets of institutions has progressively moved from the traditional view of focusing only on the tangible value of assets to a new approach that value of invisible knowledge development and

integration capability. All these components will determine the human, structural and consumer capital of an organization (Shih, Chang & Lin, 2010). Knowledge is considered a strategic tool, so it must be managed to promote the competitive performance of the organization. Therefore, one would assume that in order for companies to be efficient, they must use their information assets systematically (Bolisani & Bratianu, 2017). This information assets or intangible assets are collectively known as intellectual capital.

The basis for early studies on intellectual capital was the enormous gap between the market value and book value of companies. Traditional financial reporting only takes into account the tangible assets, neglects the intangible assets, and understates the true value of businesses (Goh, 2005). The intellectual capital of the institutions serves to overcome the discrepancy between book value and market value. By improving the effectiveness of value creation from human innovation, organisational structure, and customer-supplier connections, businesses can pursue greater competitive gains

According to Bontis (1998), IC is the common knowledge that surrounds a company's personnel, daily operations, and network connections. It included three parts: human capital elements, structural capital elements, and capital employed. Skills, competencies, training, and motivation of employees are together referred to as "human capital". Databases, organisational diagrams, procedure manuals, strategies, processes, and everything else that has a higher economic worth for the corporation are all considered structural capital (Bontis, 2000). Simply put, it refers to all of an organization's non-human knowledge stores. All of the company's assets, both financial and non-financial, are included in capital employed (Kamath, 2007). Due to the objectivity, dependability, and simplicity of the data on which it is based, the Value Added Intelligence Coefficient (VAIC) is one of the most often used job models in the field of IC. Additionally, it is frequently utilised to look into the connection between IC, company performance, and market value.

The Indian pharmaceutical industry attracted considerable attention on a global scale. India is the largest exporter of generic medications in the world, contributing 20% of the total volume of these exports. The pharmaceuticals market is anticipated to develop at a CAGR of 9.4% in 2013 and 23.9 CAGR by 2020 (IBEF, 2014). By 2020, India is projected to rank as the sixth-largest pharmaceutical market and one of the top three countries in terms of growth (IBEF, 2014). The government has introduced Pharma Vision 2020, with the goal of elevating India to the top of the world drug production league. In India, the pharmaceutical industry is automatically eligible for

100% FDI. Since the cost of producing Indian pharmaceuticals is roughly 60% less than that of the USA and about 50% less than that of Europe, the Indian pharmaceutical industry is efficient in terms of manufacturing costs (IBEF, 2014). India sells medications to almost 200 nations throughout the world, with the USA serving as its largest market. India is quickly becoming a top destination for those seeking affordable medical care with more than 70% of Indians residing in rural areas, pharmaceutical businesses have several opportunities to gain market share.

In the current study, the impact of IC on corporate performance of Indian pharmaceutical sector companies is longitudinally examined using the VAIC model.

Literature Review

The VAICTM created by Pulic, is the most widely used way of evaluating the effectiveness of intellectual capital and connecting it to an organization's value (1998). Using the link between the three main IC components includes human, structural and capital employed. VAIC assesses the effectiveness with which intellectual capital generates value. Bontis (2000) found that staff training (Human Capital), investment in advertising (Relationship Capital), and research and development (Innovation Capital) activities all contributed significantly to strong performance in his study of 45 NBFC's listed on the Madrid Stock Exchange (1990–1994).

In the New England region of the United States, Reed (2000) examined the connection between IC and firm performance. A questionnaire was employed as a survey technique. The findings show that having a high level of intellectual capital is a reliable indicator of good performance. Juma (2004) concluded that HC is the most significant element in predicting the performance of high-tech firms and that intellectual property is the crucial factor in predicting performance on the basis of the market.

Chen Goh (2008) discovered that every bank has considerably more HC efficiencies than SC and Capital employed in commercial banks in Malaysia during the year 2001 to 2003. He also stating that Compared to domestic banks, foreign banks are more efficient. The authors discovered that investments in human capital provide relatively larger returns than investments in physical and structural capital using the Pulic VAIC and data from the companies' annual reports.

The effect of value-added capital efficiency on stock prices in the banking, finance, and insurance industries on the Thailand Stock Exchange is examined by Shaneeb (2021). The findings demonstrated a substantial correlation between a company's IC and its share price increase.

Although there was a positive relationship between HCE and investor capital gains, he was unable to uncover a substantial connection. Performance and structural capital efficiency are rarely shown to be significantly correlated.

In a study focusing on the Iraqi economy, Ahangar (2011) investigated the connection between intellectual capital and economic success. Consumer, human, structural, and relational capitals are all considered to be parts of intellectual capital. Innovation, new product development pace, customer satisfaction, customer retention, and operating expenses are all aspects that affect how well a business performs. The authors showed a strong correlation between IC and business performance using a quantitative survey for data collecting and regression analysis.

Methodology

The study used data's of 30 pharmaceutical companies listed on the NSE (National stock exchange) between 2010 and 2021. The study collected secondary data from annual CMIE Data base. The study used pharmaceutical sector because it is considered as one of the most growing sector and representative of the invisible assets.

This paper discusses the effect of IC on firm performance on evidence from the pharmaceutical companies in India. Based on that the following research questions are framed:

- I. Will intellectual capital affect the firm performance?
- II. Will the components of intellectual capital affect firm performance?

Variables

Dependent Variables

Three dependent variables—Return on Asset (ROA), Assets Turnover (ATO), and Return on Equity (ROE)—were used in the study as proxies to assess the financial performance of the organisations. For the purpose, The researcher employed market-to-book valu (MB)e, the physical capital intensity (PC), and the debt equity ratio (DER) as controlled variables . These terms describe these variables:

Return on assets (ROA) is a metric for gauging a company's profitability. Return on assets is calculated using the following formula: $\text{ROA} = \frac{\text{Operating income}}{\text{Total assets}}$

Asset turnover ratio (ATO): it's a metric for gauging business productivity. Assets turnover ratio is calculated using the following formula: $\text{ATO} = \frac{\text{Revenue}}{\text{Total assets}}$

Return on equity (ROE) is a measure of a company's performance that determines how much profit was made utilizing outside capital, such as shareholders' funds.

$ROE = \text{Net income} / \text{Average net worth}$

Control Variables

Physical capacity (PC) is a metric for gauging a company's physical intensity. The physical capacity measurement formula = Fixed assets/ Total assets:

The debt equity ratio (DER) is a tool used to gauge a company's amount of borrowing. It refers to the ratio of the firm's total assets to its debt and equity. The equation for calculating the debt-to-equity ratio by $DER = \text{Total debt} / \text{Total equity}$.

is a metric used to assess the firm's market worth. Utilizing this formula, it was calculated. , $MB = \text{Total market capitalization of 365 days} / \text{Book value of common stock}$.

Independent variables

The Value Added Intellectual Coefficient (VAICTM) approach developed by Pulic is used to calculate intellectual capital. The VAICTM technique states that the combined values of human capital efficiency, capital employed efficiency and structural capital efficiency are used to measure the value of intellectual capital.

$VAICTM = \text{human capital efficiency} + \text{capital employed efficiency} + \text{structural capital efficiency}$

Knowledge, ability, skill and information held by employees are referred to as human capital. Organizations encourage transforming this Knowledge, ability, skill and information into priceless assets that help with valuation, though. The institutions won't be able to handle it if the transition fails, making the knowledge and information meaningless to them. (Abdulsalam, Al-Qaheri & Al-Khayyat (2010)

$HCE = \text{Value added} / \text{Human capital}$

Where; HC = Human Capital; VA = Value Added; and HCE = Human Capital Efficiency and Structural Capital Efficiency (SCE): It calculates the value added brought about by the application of structural capital. Here, SC is calculated as $VA - HC$.

Other firm assets that support the development of new goods and staff ideas are included in structural capital. Liu (2009) asserts that the firm can transform those ideas into a form of currency for trade by correctly controlling them. He emphasised how structural capital works with human capital to boost an organization's success.

Then,

$$\text{SCE} = \text{Structural Capital} / \text{Value added}$$

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

Another component of intellectual capital (VAIC^{TM}) is the CAPITAL EMPLOYED EFFICINCY that used by a firm. Capital employment efficiency refers to the value gained by firms from the netbook value of assets.

$$\text{CEE} = \text{Value added} / \text{Capital employed}$$

Where;

VA= Value added, CE= Capital employed, CEE= Capital employed efficiency

Research Hypothesis

The study formulated following hypothesis to achieve the objectives:

H1: Return on assets and the intellectual capital efficiency (VAIC) are significantly correlated.

H1a: Return on assets and the human capital efficiency (HCE) are significantly correlated.

H1b: Return on assets and the structural capital efficiency (SCE) are significantly correlated.

H1c: Return on assets and the capital employed efficiency (CEE) are significantly correlated.

H2: Asset turnover ratio and the intellectual capital efficiency (VAIC) are significantly correlated.

H2a: Asset turnover ratio and the human capital efficiency (HCE) are significantly correlated.

H2b: Asset turnover ratio and the structural capital efficiency (SCE) are significantly correlated.

H2c: Asset turnover ratio and the capital employed efficiency (CEE) are significantly correlated.

H3: Return on Equity and the intellectual capital efficiency (VAIC) are significantly correlated.

H3a: Return on Equity and the human capital efficiency (HCE) are significantly correlated.

H3b: Return on Equity and the Structural capital efficiency (SCE) are significantly correlated.

H3c: Return on Equity and the capital employed efficiency (CEE) are significantly correlated.

Analysis and Interpretation

Table 1										
Descriptive statistics										
	ROA	ROE	ATO	VAIC	HCE	SCE	CEE	PC	DER	MB
Mean	0.042	0.089	1.05	6.21	5.31	0.68	0.22	0.31	1.65	1.89
Median	0.39	0.072	0.98	5.14	4.32	0.51	0.18	0.26	1.55	1.77
Maximum	0.78	0.121	3.32	24.21	20.98	0.98	1.23	0.98	20.21	31.25
Minimum	-0.11	0.013	0.001	0.0123	-2.12	-0.12	0.003	-1.26	-18.6	-22.1
Std. Devi	0.99	0.65	0.412	1.26	2.56	1.98	0.89	0.99	1.56	2.01
N	31	31	31	31	31	31	31	31	31	31

The mean, median, and standard deviation of the dependent, independent, and control variables used in this analysis are displayed in Table 1. The ROA, ROE, and Productivity Ratio (ATO) profitability ratios are 0.042, 0.089, and 1.05 percent, respectively. In the period from 2017 to 2018, ROA had a lowest average value of (-0.11). This might be because the Indian government abruptly implemented the Goods and Services Tax (GST) in July 2017. The outcome indicates that intellectual capital has an average value of 6.21. According to the components-wise outcome of intellectual capital, a firm's value-added is not derived from working capital and structural capital but rather from human capital resources rather than from the structural components and capital employed.

OLS regression analysis

MODEL >						
INDEPENDENT VARIABLES	MODEL I ROA	MODEL II ROA	MODEL III ATO	MODEL IV ATO	MODEL V ROE	MODEL VI ROE
INTERCEPT	0.1536	0.1123	1.897*	1.9821	-	-0.163*

	*	**	*	**	0.045	(.0487)
	(0.0631	(0.033	(0.317	(0.316	**	
	)	7)	8)	2)	(-	
					0.495)	
VAIC	0.0057		0.0079		0.002	
	**		(0.005		6*	
	(0.0026		9)		(0.289	
	)				)	
HCE		0.0725		0.0432		0.0221
		**		**		*
		(0.031		(0.167		(0.0198
		4)		0)		)
SCE		0.0052		-		0.3146
		(0.002		0.0033		(0.0214
		1)		(0.006		)
				1)		
CEE		0.0421		0.0881		0.0496
		**		*		**
		(0.029		(0.060		(0.0612
		6)		8)		)
DER	-	0.0029	-	-	-	-0.0041
	0.0049	(0.062	0.0043	0.0051	0.007	(0.0086
	*	1)	*	**	9	)
	(0.0024		(0.002	.(0.136	(-	
	)		5)	)	7.221)	
PC	0.0862	0.0839	0.1307	0.0148*	0.089	0.0792
	(0.0448	**	*	*	6*	*
	)	(0.028	(0.132	(0.163	(-	(0.1985
		9)	1)	1)	0.223)	)
MB	-0.417*	-	-	-	-	-
	(0.025)	0.0141*	0.396*	0.0749*	0.249*	0.1496*

		(0.0653)	* (0.142)	(.0179)	(- 0.0965)	(0.0545)
R ²	0.412	0.3921	0.189	.3156	0.196	0.2566
F-stat	45.17*	35.14*	21.33 *	33.11*	19.67 *	24.025 *

Table2: OLS Regression result

The effect of ICon financial performance is shown in Table 2 using OLS regression. Unit root test, as data are of a panel type. Prior to executing the OLS regression, the unit root test was used to ensure that the data were stationary. The findings show that the unit root assumption is rejected. Table 3 displays the study's panel data regression results. To evaluate the hypothesis H1, Model 1 is employed. According to the regression model I results, ROA and IC efficiency (VAIC) are significantly and favorably correlated at the 5% significance level. As a result, hypothesis H1 is accepted, and the findings support the idea that the effectiveness of the firm's intellectual capital contributes significantly to its increased

Model II displays the findings of a regression analysis in which the elements of intellectual capital were treated as independent variables and ROA as a dependent variable. The H1a, H1b, and H1c hypotheses were tested using this model. At a 5% level of significance, the results suggest that HCE and CEE are strongly and favorably related to the profitability (ROA) of Indian pharmaceutical companies, whereas SCE have negligible effects on ROA. The empirical findings of model 2 reject hypotheses H1b while accepting the hypothesis H1a and H1c. PC and MB have a significant inverse relationship with profitability among the controls.

Model III yields the conclusion that the Indian pharmaceutical industry's IC has no discernible effect on its productivity (ATO). The regression's findings did not support the second hypothesis, H2. All of the indicators, including PC, MB, and DER, among the control variables, exhibit a substantial negative connection with asset turnover ratio.

Model IV displays the results of a regression in which ROA was treated as the dependent variable and various components of intellectual capital were treated as independent factors. The H2a, H2b, and H2c hypothesis were tested using this model. At a 1% level of significance, the results demonstrate that capital employed efficiency and human capital efficiency is strongly and favorably correlated with the asset turnover ratio (ATO) of Indian pharmaceutical companies, although

structural have no significant correlation with ATO. In light of this finding, the hypothesis H2a and H2c is accepted while the hypotheses H2b are rejected. According to Model V data, the Indian pharmaceutical industry's IC has a considerable beneficial impact on a company's return on equity (ROE). The regression's findings lend support to the H3 hypothesis. Thus, the outcome demonstrates that intellectual capital efficiency plays a substantial role in raising the firm's return on equity. Among the control variables, PC and MB significantly lower the firm's return on equity. In model VI, the three VAIC components are employed as a dependent variable for ROE. The H3a, H3b, and H3c hypothesis were tested using this model. According to this model's regression results, HCE, CEE and SCE have a significant and favorable impact on the Return on Equity (ROE) of the Indian pharmaceutical sector.

Conclusion

IC components including human capital, relational capital, and structural capital are viewed as competitive assets for a company in the modern knowledge-based economy. Therefore, every firm has a tendency to devote a sizeable percentage of their income to knowledge investment in order to create these strategic assets. The combined term for these tactical assets is intellectual capital (IC). The purpose of this study is to ascertain how the Indian pharmaceutical industry's IC has an impact on corporate performance. 31 pharmaceutical enterprises were chosen at random as a sample for the public's VAIC technique. ATO, ROA, and ROE are used to assess the companies' financial success.

According to the study's findings, that IC efficiency is important to the profitability and return on assets of the pharmaceutical companies while increasing productivity is still unimportant. This suggests that companies should pay more attention to their intellectual capital if they want to increase their profitability and return on investment. HCE and CEE is discovered to be the most essential component accelerating the financial performance of the Pharmaceutical sector in India among the intellectual capital components. These show that traditional PC and HC are both important contributors to the financial performance of the Indian pharmaceutical businesses. By providing adequate training and employee development, the business may maintain its human capital efficiency and manage expenses.

REFERENCE

1. Chen, Y. S. (2008). The positive effect of green intellectual capital on competitive advantages of firms. *Journal of Business Ethics*, 77(3), 271–286. <https://doi.org/10.1007/s10551-006-9349-1>

2. SUMATHY, D. M. (2021). Impact of Intellectual Capital on Firm Performance in Indian It Companies. *Journal of Contemporary Issues in Business and Government*, 27(2), 4335-4340. <https://doi.org/10.47750/cibg.2021.27.02.459>.Journal
3. Chowdhury, L. A. M., Rana, T., Akter, M., & Hoque, M. (2018). Impact of intellectual capital on financial performance: evidence from the Bangladeshi textile sector. *Journal of Accounting and Organizational Change*, 14(4), 429–454. <https://doi.org/10.1108/JAOC-11-2017-0109>
4. Bontis, N. (1999). Managing Organizational Knowledge by Diagnosing Intellectual Capital: Framing and Advancing the State of the Field. *International Journal of Technology Management*, 18(5–8), 433–446.
5. Bontis, N. (1998). Intellectual Capital: An Exploratory Study that Develops Measures and Models. *Management Decision*, 36(2), 63-76.
6. Bontis, N., W. C. C. Keow & S. Richardson (2000). Intellectual capital and business performance in Malaysian industries. *Journal of Intellectual Capital*, 1(1), 85-100.
7. Ahangar, R. G. (2011). The relationship between intellectual capital and financial performance: An empirical investigation in an Iranian company. *African Journal of Business Management*, 5(1), 88–95. <https://doi.org/10.5897/AJBM10.712>
8. Alazzawi, A. A., Upadhyaya, M., El-Shishini, H. M., & Alkubaisi, M. (2018). Technological capital and firm financial performance: Quantitative investigation on intellectual capital efficiency coefficient. *Academy of Accounting and Financial Studies Journal*, 22(2), 1–10.
9. Kamath, G. B. (2015). Impact of Intellectual Capital on Financial Performance and Market Valuation of Firms in India. *International Letters of Social and Humanistic Sciences*, 48(1997), 107–122. <https://doi.org/10.18052/www.scipress.com/ilshs.48.107>
10. Reed, K. K. (2000). The dynamics of intellectual capital. University of Connecticut.
11. Abdulsalam, F., Al-qaheri, H., & Al-khayyat, R. (2011). The Intellectual Capital Performance of Kuwaiti Banks : An Application of VAIC TM 1 Model. 2011(March), 88–96. <https://doi.org/10.4236/ib.2011.31014>
12. Shaneeb, P., & Sumathy, M. (2021). Impact of Intellectual Capital on Financial Performance in Indian Textile Industries. *Academy of Accounting and Financial Studies Journal*, 25(4), 1-14.
13. M.Sumathy., & Shaneeb, P. (2018). Investors perceptions towards Mutual Funds: A Study

- among the selected House Holds from Coimbatore. RESEARCH REVIEW International Journal of Multidisciplinary, 03(11), 411–413. <http://doi.org/10.5281/zenodo.1492716>
14. Shaneeb, P., & Mazoor, K. (2019). Prospects of Wellness Tourism in Puducherry with Special reference to Auroville. International Journal of Research and Analytical Reviews (IJRAR), 6(2), 50–60.
 15. Sumathy, M., & Shaneeb, P. (2018). Effect of E Governance in Quality of Higher Education. International Journal of Scientific Engineering and Research, 6(9), 91–99.
 16. Shaneeb, P., & Sumathy, M. (2020). Role of Intellectual Capital on Organisational Performance. Our Heritage, 68(1), 12502–12511.
 17. Shaneeb, P. (2021). financial inclusion through business correspondents. ANVESAK. 51(1(VII)), 109-112.
 18. Shaneeb, P., & Sumathy, M. (2022). Role of Knowledge Management Practices in Indian Financial Sector. International Journal of Advanced Research in Science, Communication and Technology, 2(3), 473–478. DOI: 10.48175/IJARSCT-3294
 19. Sumathy, M., & Shaneeb, P (2022). Impact Of Online Banking On Firm Performance; A Study On Indian Public Sector Bank . Technoarete Transactions on Advances in Social Sciences and Humanities. 2(1), 6-10. doi.org/10.36647/TTASSH/02.01.A003.
 20. Shaneeb, P., & Sumathy, M. (2022). Intellectual Capital Practices in Higher Education System: A Theoretical Framework. International Journal of Scientific Research and Engineering Development. 5(4), 377-385
 21. M. sumathy & Jisha tp. (2022). Awareness and Perception of Investors towards. International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
 22. M. sumathy & Jisha tp. (2022). Monetary policy and profitability of bank; with special reference to State Bank of India. RVIM Journal of Management Research , 36-40.
 23. Sumathy, M., & Mohammed Nabeel, K. (2020). A study on influence of behavioral factors on investment satisfaction of individual investors in kerala. International Journal of Scientific and Technology Research, 9(3), 4193-4198.
 24. Sumathy, M. Augmenting Financial Inclusion: Role of Cooperative Banks in India.
 25. Mohammed Nabeel, K., & Sumathy, M. Crypto Currency-Investor's Awareness in India.
 26. T.S, S., M, S., P, S., & K, M. N. (2022). Sustainability Of Over the Top (OTT) Video Platforms in India: Examining the TAM Model on the Adoption of OTT Video Streaming

- Platform among Millennial Consumers. *International Journal of Biology, Pharmacy and Allied Sciences*, 11(1), 628–640. <https://doi.org/10.31032/IJBPAS/2022/11.1.1077>
27. T.S, S., & C.D, J. (2018). Environmental accounting : A conceptual study. *International Journal of Applied Research*, 4(12), 147–149.
 28. T.S, S., & M. Sumathy. (2021). User Perception Towards OTT Video Streaming Platforms in Kerala (With Special Reference to Thrissur). *Analytical Commerce and Economics*, 2(September), 27–32.
 29. Sujith, T. S., & Jisha, M. K. (2017). Tourism in India: Opportunities and Challenges. *Imperial Journal of Interdisciplinary Research (IJIR)*, 3, 2454-1362.
 30. Sumathy, M., & Sujith, T. S. (2018). Effect of Brand on Customer Loyalty among SBI Banking Customers. *International Journal of Scientific Engineering and Research*, 6(9), 2015–2018.
 31. Sujith, T. S., & Sumathy, M. (2023). The Mediating Role of Customer Satisfaction on Brand Loyalty in Relation to Service Quality and Price Among Telecommunication Companies. In *Promoting Consumer Engagement Through Emotional Branding and Sensory Marketing* (pp. 86-98). IGI Global.
 32. Sreenivasa Rao VeerankI, "A Hybrid Cloud and Cluster Computing Paradigm for Life Science Applications", *International Conference on Soft Computing and Intelligent Technologies [ICSCIT– 2021]*, ISBN: 978-93-91535-15-5, 24 December 2021, sreeni.bi@gmail.com, <http://proceeding.conferenceworld.in/ICSCIT2021/44.pdf>
 33. TS, S., & Sumathy, M. (2022). Application of Technology Acceptance Model (TAM) on Adoption of Food Delivering Applications (Apps.) among University students in Tamil Nadu. *RVIM Journal of Management Research*, 14(1), 22-25.