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The Impact of Intellectual Capital on Corporate Performance

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ABSTRACT

In today's world organisations are learning that the true source of their competitive advantage lies not in assets such as machinery or land; rather, it lies in the knowledge and skills of its employees, the nature of its operational/business systems, and the depth of its networking and customer connections. This research explores the impact of intellectual capital (IC) on a company's corporate performance by utilising the value-added intellectual coefficient (VAIC) framework to evaluate the performance of IC in two of India's most globally integrated sectors - IT and Pharmaceuticals. The study uses data for five years from companies listed on the Nifty IT and Nifty Pharma indices between FY 2021 - 22 to FY 2025 - 26 and analyses human capital efficiency (HCE), structural capital efficiency (SCE), capital employed efficiency (CEE), return on assets (ROA), and market value (Tobins Q). This study found differences in the Intellectual Capital profile of the two sectors, with pharmaceuticals having higher average composite VAIC scores (7.50 for pharma) compared to IT (5.48). The main reason for this larger composite VAIC score in pharmaceuticals is that their scientific workforce generates disproportionately high levels of value per rupee spent on employee cost. Conversely, the CEE associated with IT firms (2.41 for IT; 1.01 for pharma) reflects their lighter operating model and lower overall capital intensities compared to pharmaceutical firms. Overall, the results from multiple regression analysis show that in the case of IT firms, the totality of VAIC's sub-components accounted for 73% of market value variance, while in the case of pharma the composite VAIC is a better predictor of overall market valuation. These findings will provide managers with practical recommendations for better deployment of Knowledge Capital, and they will also help policymakers to foster sectors requiring significant investment in Knowledge Capital.

***Keywords**: Intellectual Capital, Corporate Performance, ROA, HCE, CEE.*

Introduction

In the last few years, there has been a significant and significant change to the way business works globally. In the past, companies used to be judged based on their physical infrastructure and finance, which was the majority of what was valued as when defining a company's worth. Now these elements have been replaced by intangible forms of assets that have been collected or developed over a company's existence such as the knowledge a company has acquired, the systems it has developed, and the relationships that have been formed with people within and outside of the company. It has been referred by economists and strategists as intellectual capital and there is a growing belief of the value and importance of using this asset when determining a company's long-term success.

The IT sector in India is one such sector, with companies such as TCS and Infosys achieving great success by leveraging their employees' skills/knowledge. At the same time, pharmaceutical companies such as Laurus Labs and Divis Laboratories have achieved success through employees' specialized skills/knowledge. In general, although intellectual capital is considered to be extremely important, there does not appear to be a large body of research on intellectual capital in the Indian

context. Most of the prior studies have either been singleindustry or singletype capital-related investigations. Therefore, this research investigation focuses on two industries, the IT Industry and the Pharmaceutical Industry, and examines how they utilize their intellectual capital resources. The unique aspect of this research investigation is that it examines the impact of intellectual capital on performance in India. Moreover, the research utilizes a measure of intellectual capital efficiency known as Value Added Intellectual Coefficient (VAIC). The study indicates that pharmaceutical companies are more efficient in the utilization of intellectual capital than are IT companies in India.

The specific contribution of this research is first, it applies the VAIC model to a wide framework for quantifying intellectual capital efficiency across 10 IT and 19 pharmaceutical companies for five years. Second, it examines the relationship between VAIC components and two corporate performance components ROA and Tobin's Q. Third, it compares sector-level which shows the different ways IT and pharma firms influence their knowledge assets. The findings carry both theoretical significances reinforcing the resource-based view of the firm in the Indian context and practical relevance for managers, investors, and policymakers.

Conceptual Framework and Literature Review

Intellectual capital (IC) is a term used to represent all the knowledge that an organization has and can use to add value. In recent times, researchers have come to agreement on a three-part model of IC: Human Capital (HC), Structural Capital (SC), and Relational Capital (RC). HC includes things such as employee education, skills, creativity, and problem-solving abilities. SC includes all the internal systems, databases, patents, processes, and technology that exist within an organization that do not depend on individual people. RC includes the value we receive from the organization's external relationships with customers, partners, regulators, and anyone else who may have an interest in an organization.

This model is in alignment with the Resource Based View (RBV) of the firm, which holds that long-term competitive advantage will occur when an organization possesses resources that are: 1) valuable, 2) rare, 3) inimitable, and 4) non-substitutable. Knowledge assets are by their very nature difficult to create again, making IC a source of competitive advantage that is very easy to protect.

The Value Added Intellectual Coefficient (VAIC) Model proposed by Pulic (1998) provides a structured means to quantify the efficiency with which an organization is converting its intellectual and physical capital into value. The VAIC Model produces three metrics for measuring efficiency: Human Capital Efficiency (HCE = Value Added / Personnel Costs), Structural Capital Efficiency (SCE = Structural Capital / Value Added), and Capital Employed Efficiency (CEE = Value Added / Capital Employed).VAIC scores above 5.0 shows strong management of intellectual capital, 3.5-5.0 indicate moderate management efficiency and below 3.5 show weak management efficiency. The VAIC has been used in research cross-country and cross-industry, and validated to be a reliable proxy for measuring the intensity of an organisation’s intellectual capital.

A growing number of empirical studies reinforce the relationship between intellectual capital and the performance of the corporation. Gupta and Sharma (2020) found that in knowledge-based industries, corporations that manage their intellectual resources effectively experience superior operational efficiencies and competitive advantages when compared to their peers. In 2022, Xu and Liu extended this research to technology-based companies, establishing that intellectual capital can significantly impact a company’s financial growth, and how it is able to share knowledge with others. Asutay and Ubaidillah (2023) found a statistically significant positive relationship between the level of intellectual capital and profitability in the banking sector and that human capital was identified to be the primary driver. Recently, Mohapatra and Pattanayak (2024) conducted a panel data analysis and determined there to be a statistically significant predictive relationship between a company’s level of intellectual capital efficiency and its financial performance; the relationship was determined to be non-linear. Suciati et al. (2024), who conducted a bibliometric synthesis, established that intellectual capital represents a key research focus in current management research, as it relates to value creation and competitive advantage. These studies shows the theoretical of presentation of research and the need for sector specific investigation in the Indian context.

Research Methodology

Using a secondary data source, this analysis employs a descriptive and a analytical research design to assess the varied dimensions of intellectual capital across selected organizations based on its descriptive characteristics as well as the analytical relationship between efficiency of intellectual capital and levels of corporate performance. Exploratory will also be made of emerging trends in knowledge management as well digital transformation, for the time period of investigation.

The selected sample will include 10 organizations from Nifty IT index and 19 organizations from Nifty Pharma Index who have met the data requirements and have been members of the selected index in years FY 2021 - 22 to FY 2025 - 26. Primary data sources for this research will consist of the audited annual reports and the financial statements of all companies included in the study to add to the robustness of the research results. Secondary data sources will be acquired by using National Stock Exchange (NSE) disclosures, sector reports derived from leading commercial databases, and credible academic research journal articles. All financial data utilized in the study will be reported in Indian Rupees (₹Crore) unless specified otherwise.

To summarize, the independent variables of the study will consist of the three VAIC sub-components of HCE, SCE, and CEE along with the combined VAIC score and the dependent variables for the study will be represented by the Return on Assets (ROA) as a measure of financial profitability and Tobin's Q (i.e., Market Capitalisation + Total Liabilities) used as a measure of market valuation. The descriptive statistics, trend analysis through time periods, and comparative analysis by sector along with multiple regression models will be employed as the primary analytical tools used throughout the study. The regression analysis tests two models per sector: Model 1 uses VAIC sub-components as predictors, Model 2 uses composite VAIC as the sole predictor

Data Analysis and Key Findings

The IT sector's mean VAIC of 5.48 places it comfortably in the "moderate-to-good" performance zone. The low standard deviation (0.54) reflects remarkable consistency across companies and years a sign of structural stability in the sector's knowledge utilisation practices. The mean HCE of 2.47 indicates that for every rupee spent on employee compensation, approximately ₹2.47 of value is generated a hallmark of the skilled, billable-hours-driven IT delivery model. The mean SCE of 0.59 suggests that structural systems capture roughly 59% of the value generated by human capital, implying a residual dependence on talent rather than institutionalised processes. The mean CEE of 2.41 underscores the sector's remarkable asset-light efficiency high revenues delivered from a comparatively lean physical capital base. Tobin's Q (mean: ₹3,45,520 Cr) signals that markets place an enormous premium on IT firms' future earning potential, far exceeding the book value of their assets.

The pharmaceutical sector's mean VAIC of 7.50 substantially exceeds that of IT, driven overwhelmingly by an exceptional mean HCE of 5.67. This means that every rupee invested in pharma employees generates approximately ₹5.67 of value nearly 2.3 times the IT sector's rate. This gap reflects the concentrated, specialised nature of pharma workforces imposing excessively high value from R&D and formulation expertise. The mean SCE of 0.82 is also considerably higher than IT's 0.59, confirming that pharma organisations retain approximately 82% of created value within their institutional structures patents, regulatory approvals, proprietary processes that persist independently of any individual scientist. In contrast, the mean CEE of 1.01 is markedly lower than IT's 2.41, reflecting the capital-intensive reality of pharmaceutical manufacturing: large factory investments, cold-chain logistics, and laboratory infrastructure dilute physical capital efficiency even as intellectual capital thrives. The higher standard deviation in VAIC (0.89) reflects the broad spectrum of companies in the sample, ranging from pure innovators to generics manufacturers.

There are two fundamentally different ways of approaching intellectual capital within industry by sector. The first people-dependent but lean in terms of systems component, IT businesses generate significant returns on their investment in asset terms (CEE: 2.41) whilst having large market capitalisations (Tobins Q: ₹3,45,520 Cr). However, they have historically had inadequate structural capital as that creates a high need for retaining their people. The second sector-pharmaceutical companies-are rich in structure and concentrated on talent. Pharmaceutical companies have a high level of institutionalisation for Core Intellectual Capital (0.82) and have a high amount of Human Capital (5.67); as a result, there are high levels of developmental capital (CEE: 1.01); however, they generally have low amounts of return on investment(10.66% R.O.A. as an example) because they need substantial amount of funding to establish and sustain a pipeline process for innovation.

In 2019 to 2020, IT sector value increased, measured in value against physical assets as well as value added to Invested Capital large decreases in both times occurred to 2021-22 & were related to the global downturn in Tech spending due mainly to delays for COVID resulting in lost productivity from two years prior. Conversely, Pharmaceuticals experienced continual decline from both FY 2021-22 through FY 2025-26, primarily due to the rate of growth of employee resources driving down the total per-employee creation of value. Of particular importance, both sectors had constant increases in Tobin's Q from the first study period until the last; indicating long term positive investor sentiment for both Industries

independent of the short term fluctuations in either sector. On a Company level, the best IT sector value-added company was Coforge (mean VAIC - 6.21), with its asset-light mid-tier strategy significantly contributing to the Company's exceptionally strong CEE. The highest ROA for the IT sector was achieved by TCS (29.38%), along with the highest total market capitalisation; TCS's VAIC (5.89) demonstrates the cost efficiency to manage a large global delivery network for a substantial client base. Oracle Financial Services VAIC (3.80) is an outlier within the IT sector due to its IP-Licensing business model that inflates the capital base.

The regression results reveal a striking asymmetry between sectors. In the IT sector, Model 1 using HCE, SCE, and CEE as individual predictors achieves an R^2 of 0.73, meaning intellectual capital sub-components collectively explain 73% of the variance in market valuation. This is a remarkably high explanatory power for a parsimonious model and strongly affirms the role of knowledge assets in shaping investor perception of IT firms. HCE and CEE are the dominant positive predictors, while SCE shows a negative relationship suggesting that in IT, the market rewards firms that pass value to employees (lowering SCE) rather than those that retain it institutionally. Intriguingly, Model 2 using composite VAIC alone explains less than 2% of the variance for IT, confirming that the aggregate score masks the opposing directional effects of its sub-components.

In contrast to the other sectors, Model 1's individual components are not important on their own in pharmaceutical companies ($p=0.032$, low $R^2=0.09$). However, Model 2's aggregate of all of these components (VAIC) is statistically very valid at the one-percent (0.007) level, has a moderate correlation ($r=0.20$) with an $R^2=0.075$ indicating a moderate positive correlation to ROA. Therefore, in pharmaceuticals, the value of the intellectual capital is a composite of all three dimensions of the intellectual capital (human capital, structural capital and relational capital) rather than any individual dimension of efficiency creating a market value. This is consistent with the nature of pharmaceuticals as an innovative industry in which no single component of the intellectual capital model could produce a pharmaceutical without the contribution from its performing part: scientific talent needs R&D; R&D requires relational capital to create commercial products from scientific discoveries.

Findings

Multiple important aspects in regard to theory and practicality can be drawn from this study. From a theoretical perspective, the results of this study demonstrate that capital produced by a knowledge-based asset can serve as an indicator of how well firms will perform when viewed through the lens of the resource-based view of firms in the region. Additionally, the differences between the two sectors (IT and pharmaceutical) and among the various organisations within each sector that have different VAIC profiles indicate that there are multiple components that comprise intellectual capital, and that the various components of intellectual capital do not act independently; rather, their behaviour is a function of a firm's business model, competitive environment, and the stage of development of the firm.

The study also supports the notion that organisations should pursue separate strategies for managing their intellectual capital. For example, in the technology sector, companies that develop and sell information technology can generate value from the conversion of implicit knowledge in their human resources to formal organisational systems. Therefore, these organisations should invest in development of knowledge management systems, document their processes, and create laboratories that promote creativity, reduce their dependence on individual resources, and increase productivity per employee, which also results in increased employee satisfaction. At the same time, as the level of competition continues to increase and as customers demand increased value from their suppliers, organisations will need to invest wisely in their human resources to maintain and improve their profitability.

Conclusion

In this research we looked at how intellectual capital relates to corporate performance in two of the most globally connected sectors in India, namely IT and Pharma Industries. We examined a sample of 33 firms for 5 years (up to October 2023) and found that companies with completely developed, organized and used human, structural and relational capital typically have higher corporate performance than those without.

The VAIC model showed that while intellectual capital is important in both sectors, the actual impact of intellectual capital (and how it is developed) is different for each sector. Companies in the IT industry need to increase their ability to convert tacit human knowledge into scalable systems, while companies in Pharma will need to continue to develop and invest in their human resources while ensuring the return on investment from their innovation infrastructure remains strong.

Intellectual capital has gone from being a "side issue" to becoming an essential element of the battle between knowledge based businesses. Companies within the IT and pharmaceutical industries in India that will continue to grow their "global leadership" position will be those companies that can build, measure, and use their intellectual capital (assets) on a systematic, consistent and informed basis.

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