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THE INTERLINKAGE BETWEEN VALUE ADDED INTELLECTUAL CAPITAL AND CORPORATE PROFITABILITY: A STUDY ON INDIAN PHARMACEUTICAL COMPANIES

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Abstract

Intellectual capital (IC) is considered an essential means for increasing the worth of businesses and giving them a competitive edge in the industrialized world. Therefore, stakeholders must comprehend how it affects the profitability of companies. The present study analyses the effects of intellectual capital on Indian pharmaceutical businesses' profitability. The study examines the inter-relationship among the different aspects of intellectual capital, viz., human capital, structural capital, and physical capital, and their overall relation with the different profitability paraments like Operating profit (Profit before depreciation, interest, tax, and amortization), Net profit margin (NPM), Return on net worth (RONW), Return on capital employed (ROCE). For probing the impact of intellectual capital on the firm profitability of pharmaceutical companies' Descriptive statistics, Correlation analysis, Panel Regression analysis, and Principal Component Analysis have been applied. Appropriate hypothesis tests like Hausman's specification test, paired t-test, KMO test, Bartlett's test, etc., have been carried out as appropriate. The results indicate a significant positive relationship between intellectual capital and firms' profitability. Also, it is found that human capital, relational capital, and physical capital have a significant role in increasing the firms' profitability.

***Key Words**: Profitability, Indian Pharmaceuticals, Human Capital Efficiency, Capital Efficiency, Structural Capital Efficiency, Value Added Intellectual Capital, COVID 19*

JEL Code: P2, M41, D60

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Introduction

The measuring and reporting system for business intellectual capital has gained adhesion as the international economy has become more knowledge-demanding. Companies' traditional financial statements generally cover most of their tangible assets while disregarding intangibles to a more considerable extent. However, the widening discrepancy between a company's market and book values has prompted scholars to investigate its reasons. The lacuna may partially explain this discrepancy in accounting for intangibles in the financial statements. Kaufmann and Schneider (2004) opined that there is no universally accepted definition of intellectual capital, and categorizing it into a boundary is also very difficult. Researchers have attempted to define intellectual capital based on various factors to make measurement easier. Human capital, structural capital, and customer capital are the three essential components of intellectual capital, as stated by Miller et al. (1999). Seetharaman et al. (2004) replaced customer capital with relational capital. In their study, Huang et al. (2007) expanded intellectual capital from three to eight dimensions.

Intellectual capital is divided into three categories, viz. external capital, internal capital, and human capital [Yongvanich and Guthrie (2005), Abeysekera and Guthrie (2005)]. Villalonga (2004) demonstrated that while intangibles play a significant role, those can also keep businesses at a disadvantage for a long time. Researchers analyzed intellectual capital performance in the pharmaceutical sector as a knowledge-based and capital-demanding industry (Sharabati et al., 2010; Bollen et al., 2005). The pharmaceutical industry is typically considered innovative and knowledge-intensive; thus, measuring intellectual capital is critical for understanding the company's financial status. Different models for measuring intellectual capital have been developed by various researchers, among them Tobin's Q given by Tobin (1969), Stern &Stewart's EVA and MVA (1991), Skandia Navigator [Skandia (1994)], Kaplan and Norton's Balanced Scorecard (1996), Sveiby's Intangible Asset Score Sheet (1997), Pulic's VAIC™ (1998, 2000), Lev's Value Chain Scorecard (2001) etc. are noteworthy.

Review of Previous Literature:

In the present work, we have surveyed Indian as well as International Foreign studies in the field of Intellectual Capital and the performance of pharmaceutical companies. Some of the important studies are presented below.

International / Foreign Studies:

Chen and Chang (2009) in their paper explored the influence of quantitative and qualitative patent indicators on the market value of pharmaceutical companies in the US by artificial neural network technique. The authors found that patent citations of the American pharmaceutical companies had an inverse U-shaped effect on their market value. **Sharabati and Jawad (2010)** empirically examined the relationship between intellectual capital and

business performance within the pharmaceutical sector of Jordan. They surveyed 132 top-level and middle-level managers from all 15 members and applied Kolmogorov-Smirnov (K-S) test and Cronbach's alpha to test the reliability of the collected data. **Umar (2010)** assessed the linkage between rewards and individual performance and the types of rewards that brought out greater performance among salespeople. Applying Pearson's Chi-square statistic, the researcher found no significant relationship between demographic variables and performance. **Liu and Chen (2011)** examined the relationship between debt structure and corporate performance of pharmaceutical companies. The financial data of listed companies were used from 2005 to 2009, and financial ratios like ROE, ROA, EPS, ALR, QR, GROWTH, etc., were considered. They found a positive relationship. **Yan et al. (2012)** conducted a study on China's listed manufacturing pharmaceutical companies and biotech industry from 2003 to 2009. With time series data analysis, the study suggested that resource allocation was a key determinant of corporate performance when diversifying a firm. **Mao et al. (2014)** conducted Data Environment Analysis on the performance data of 34 listed pharmaceutical companies in China. They found that the companies' performance was not so good. Accord Pharmaceutical and Meheco remained efficient frontier by better input/output ratio because of benefits from the centralised resources, optimal managerial system, and excellent asset structure. In their study**, Zhaohui et al. (2016)** examined the financial performance of the technology-based merger and acquisition of the listed 42 Chinese pharmaceutical companies. They concluded that innovative technology, patent protection, market expansion, and diversification strategy were the primary motivations for Chinese pharmaceutical companies to undertake M&A. **Ayati et al. (2020)** investigated the short-term and long-term impacts of COVID-19 on the pharmaceutical sector. They had considered the short-term and long-term effects like demand change, supply shortage, panic buying and stocking, research and development process, approval delays, industry growth slow-down, and pharma-production supply chain changes on the health market. They concluded that the pandemic of COVID-19 posed a considerable crisis in the health markets, including the pharmaceutical sector. **Olorogun et al. (2020)** evaluated the symbiotic relationship between a healthy population and a sustainable economy and examined the financial performance of Julphar Gulf Pharmaceutical industries. Findings showed that the company's assets were underutilised and their productivity was not optimal.

Indian Studies:

Kumar and Singh (2008) studied the relationship between the degree of internationalisation and performance in the context of the Indian pharmaceutical industry. The study's findings stated that both the control variables, i.e., the age and firm size were significant throughout the models in the study and showed positive relation of firm performance measured by ROA and ROE, respectively. **Kiran and Mishra (2009)** explored the performance of the Indian Pharmaceutical Industry in the Post-TRIPS Period from 1998 to 2008. This study took some leading indicators of the pharmaceutical firms, *viz*. sales, net profit, R&D expenditure, ANDA,

and DMF, and compared them. In the post-TRIPS period, they found the most robust performance of the Indian pharmaceutical industry on several fronts. **Pal and Soriya (2012)** attempted to compare intellectual capital performance between 105 Indian pharmaceutical and 102 textile companies. Correlation and OLS regression models were used on panel data for the analysis. Results indicated that profitability and intellectual capital were positively associated, but no significant relationship was observed between intellectual capital with productivity and market valuation in both industries. **Akhtar (2013)** examined the significance of socioeconomic benefits generated by Indian Pharmaceutical companies to society by creating jobs, supply chains, and community development. The author compared the Indian companies with companies of other countries concerning technological innovation, R & D, drug development, patent protection, etc. also revealed that the domestic companies met 70% of the country's requirement in bulk drugs and almost all the demands for formulations. **Ghose and Chakraborti (2013)** estimated the total factor productivity growth of 18 Indian bio-pharmaceutical firms from 2000-2009 using Malmquist Productivity Index (MPI) and a non-parametric Data-Envelopment Approach. The study's findings revealed that most of the firms showed improved performance of productivity growth rate during the post-liberalisation period. **Mahajan et al. (2015)** examined the trade performance and revealed comparative advantage and trade specialisation indices of Indian pharmaceuticals in the post-modified Indian Patent Act. This study pointed out that India ranked third regarding the trade specialisation coefficient (TSC), far behind Ireland and Israel. **Rentala et al. (2017)** examined various determinants of the export performance of Indian pharmaceutical and automobile companies and their inter-relationship with different demographic variables. Data were analysed using descriptive statistics and CAGR for the five years from 2007-08 to 2011-12. The findings of this study suggested that firm characteristics and performance in export markets provide real potential to both public and private sector administrators. **Jafar and Sajna (2018)** examined India's experience with the new Patent Regime of the Indian Pharmaceutical Industry. The study used descriptive methods and found that Indian firms continue producing and consuming many non-essential medicines. As there was no rational use of medicines, many fixed dose combinations (FDCs) were available in the market, out of which many were non-essential or harmful. **Sharma and Modgil (2020)** empirically investigated the impact of total quality management (TQM) and supply chain management (SCM) practices of Indian Pharmaceutical companies on their operational performances and the interlinkage between them. The exploratory factor analysis showed that TQM practices directly impacted the companies' operating performance. **Behera and Rath (2021)** empirically investigated the effect of the ongoing COVID-19 pandemic on the stock returns of Indian pharmaceutical companies. The study's findings revealed that the abnormal and cumulative abnormal returns positively and statistically impacted the pharmaceutical industry's performance during the COVID-19 pandemic.

Research gap

It may be noted from the literature that India is still in the early stages of intellectual capital research. As a developing nation, India has a high potential for human capital efficiency and structural capital efficiency, opening up a wide range of opportunities for researching intellectual capital performance. Numerous studies have looked at the corporate profitability of Indian pharmaceutical companies. Some studies have also dealt with the research and development expenses of Indian pharmaceutical companies and their effect on performance. Very few studies have examined the impact of COVID-19 on the intellectual capital and profitability of Indian pharmaceutical companies. The study of the intellectual capital of Indian pharmaceutical companies from a value-added point of view is rare.

To that extent, the present study tries to usher light on the quantum of the intellectual capital of Indian pharmaceutical companies, its growth, and its impact on the profitability of the companies. In addition, the study also gives some light on the impact of COVID-19 on these aspects.

Objectives of the Study:

The objectives of the study are:

a) To calculate and analyse different value-added efficiencies, viz. capital employed efficiency, human capital efficiency, and structural capital efficiency of the selected pharmaceutical companies

b) To calculate and explore Value Added Intellectual Capital of the selected pharmaceutical companies

c) To calculate and analyse the profitability of the companies and the impact of Intellectual Capital on their financial performance

d) To examine the effect of COVID-19 on the profitability and Intellectual capital of Indian Pharmaceutical companies.

Research Methodology:

Selection of Data: In this study, the Indian Pharmaceutical companies, based on their market capitalisation, are considered. Here, our study is confined to the top 50 pharmaceutical companies according to their market capitalisation. By this criterion, our sample includes 3 large-cap, 15 mid-cap, and 32 small-cap companies with a minimum market capitalisation of INR 850 crore as of 31-03-2022 [list annexed].

Collection of data: The present study is based on secondary data collected from the companies' Annual Reports and the Prowess dataset provided by CMIE.

Study period: The study is conducted over ten years, from 2012-13 to 2021-22, which includes two years of COVID-19 period.

Tools and Techniques Applied: In this study, we first compute the value-added intellectual capital of the selected Indian Pharmaceutical companies. Here, the value-added concept is considered as the Accounting Value Added (AVA), calculated from the distribution side of value added. Then, the value-added intellectual capital is calculated from different efficiency measures of the companies. Three types of value-added efficiencies are computed and analysed here, *viz.* Capital Employed Efficiency (CEE), Human Capital Efficiency (HCE), and Structural Capital Efficiency (SCE). Profitability ratios viz. Profit before depreciation, interest, tax, and amortisation (PBDITA) to Sales, Net profit margin (NPM), Return on Net Worth (RONW), and Return on Capital Employed (ROCE) are also calculated for the selected companies over the study period.

Descriptive statistics, Correlation analysis, Panel Regression analysis, and Principal Component Analysis have been used to analyse the data. Appropriate hypothesis tests like Hausman's specification test, paired t-test, KMO test, Bartlett's test, etc., have been carried out on panel data to check the impact of intellectual capital on the firm's profitability of pharmaceutical companies.

Research Hypotheses:

The research hypotheses that will be tested in this study are as follows:

H_{01}: There is no significant growth of Capital Employed Efficiency, Human Capital Efficiency, Structural Capital Efficiency, and Intellectual Capital in Indian Pharmaceutical companies

H_{11}: Capital Employed Efficiency, Human Capital Efficiency, Structural Capital Efficiency, and Intellectual Capital of Indian Pharmaceutical companies are growing significantly

H_{02}: There is no significant impact of Intellectual Capital on the profitability of Indian Pharmaceutical companies

H_{12}: There is a significant positive impact of Intellectual Capital on the profitability of Indian Pharmaceutical companies

H_{03}: There is no significant impact of COVID-19 on the Intellectual Capital and profitability of Indian Pharmaceutical companies

H_{13}: There is a significant positive impact of COVID-19 on the Intellectual Capital and profitability of Indian Pharmaceutical companies

Performance Variables:

Here are the dependent variables:

1. Profit before depreciation, interest, tax and amortisation (PBDITA)
2. Net Profit Margin (NPM)
3. Return on Net Worth (RONW)
4. Return on Capital Employed (ROCE)

Independent Variables

Value Added Intellectual Capital (VAIC): Ante Pulic (1998,2000) developed the VAIC model to measure intellectual capital efficiency. Ante Pulic considered the concept of accounting value added (AVA), in which value-added may be calculated from the creation or the distribution side of value added from the financial statements. In our case, value-added has been calculated from the distribution side of value-added.

Value Added = (Compensation to employees + Interest expenses + Provisions + Depreciation + Corporate taxes + Total taxes + Cash outflow + Profit after tax + Retained profits + Dividends)

Further,

Value Added Intellectual Capital (VAIC) aggregates three types of efficiencies, viz. Capital Employed Efficiency (CEE), Human Capital Efficiency (HCE), and Structural Capital Efficiency (SCE) (Ante Pulic 1998, 2000).

$$VAIC = CEE + HCE + SCE$$

Capital Employed Efficiency (CEE) evaluates the effectiveness of capital utilised, comprising the firm's net worth, and represents both physical and financial capital.

CEE = VA/CE
Where:
CEE = Capital Employed Efficiency
VA = Value Added
CE = Capital Employed

Human Capital Efficiency (HCE) calculates the value added generated per monetary unit invested in human resources. Employee wages and salaries are considered in the models here as human capital.

HCE = VA/HC
Where:
HCE = Human Capital Efficiency
VA = Value Added
HC = Human Capital

Structural Capital Efficiency (SCE) evaluates the use of structural capital to add value within the firm. It is calculated as VA - HC.

Then: SCE = SC/VA
Where: SCE = Structural Capital Efficiency, SC = Structural Capital
VA = Value Added

Analysis and Findings

To understand the average positions of different performance parameters and their fluctuations over the period, we have considered the mean values and the standard deviations along with the minimum and maximum values. The descriptive statistics of different performance measures have been presented in the following table.

Table 1: Descriptive statistics of various performance parameters of the Indian pharmaceutical companies over the period 2012-13 to 2021-22

	Mean	Std. Deviation	Minimum	Maximum
CEE	0.695	0.663	-0.261	6.990
HCE	6.632	6.214	-17.367	69.382
SCE	0.790	0.314	-0.596	6.983
VAIC	8.117	6.735	-16.571	73.350
OPM (%)	22.536	11.149	-77.220	84.420
NPM (%)	10.413	18.279	-292.090	60.970
RONW (%)	16.202	22.977	-155.570	233.240
ROCE (%)	13.718	13.387	-24.450	170.420

Source: Authors' calculation

We have selected four profitability and four value-added efficiency variables for descriptive analysis. The results in Table 1 show that the mean VAIC amounts to 8.11 for the selected pharmaceutical companies over the period. That means companies are efficiently utilising Intellectual capital to improve their profitability. The average values of the three efficiency components of value-added intellectual capital, namely CEE, HCE, and SCE, are found to be 0.695, 6.632, and 0.790, respectively. Thus, human capital efficiency has contributed the most to generating VAIC among the three efficiency variables. The percentage of various profitability ratios is also good for Indian pharmaceutical companies. However, some of the companies in the sample suffer losses as computed by all the profitability measures.

Correlation Analysis

Below, Table 2 shows the correlation result among the various performance variables of pharmaceutical companies. Results show that VAIC and RONW are significantly and positively correlated, and the correlation value is the maximum among others. OPM is negatively correlated with CEE, but the relationship is statistically insignificant with CEE and SEC. Human capital efficiency and value-added intellectual capital significantly correlate with all the profitability variables. Structural capital has an insignificant relationship with all the profitability variables, and capital efficiency variables are insignificantly related to OPM and NPM but significantly related to RONW and ROCE.

Table 2: Pearson Correlation Coefficient of Different Performance Variables

	CEE	HCE	SCE	VAIC
OPM (%)	-.066 (.144)	.231*** (.000)	.042 .351	.209*** (.000)
NPM (%)	.059 (.190)	.075 (.093)	.059 (.185)	.078 (.082)
RONW (%)	.345*** (.000)	.373*** (.000)	-.029 (.512)	.377*** (.000)
ROCE (%)	.327*** (.000)	.363*** (.000)	.058 (.196)	.370*** (.000)

Source: Authors' calculation; Figures in parenthesis indicate sig. value; *** Sig. at 1% level

Principal Component Analysis (PCA) for data reduction

For estimating the effect of various efficiency variables on the profitability performance of Pharmaceutical firms, we have considered four prominent profitability ratios from the literature. For identifying the most prominent profitability ratio among the four profitability ratios, viz. operating profit margin, net profit margin, RONW, and ROCE, we have applied the principal component analysis (PCA) technique. Before applying principal component analysis, we have tested the data's fitness for PCA by Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's Test of Sphericity. We have found that KMO is more than 0.5, and Bartlett's test is highly significant at less than a .001 level. Thus, our data set is a good fit for applying PCA.

Table 3. a: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.645
Bartlett's Test of Sphericity	Approx. Chi-Square	1021.180
	df	6
	Sig.	.000

Source: Authors' calculation

The principal component analysis method extracted one significant component with an eigenvalue of more than one (eigenvalue 2.644), explaining about 66.11% of variations in the data set.

From the following Component matrix (Table 3c.), we found that ROCE has the maximum loading on the extracted component. Thus, we can say that ROCE is the strongest variable for explaining the profitability of Indian Pharmaceutical companies, and therefore we have considered ROCE for further analysis.

Table 3.b: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance Explained	Cumulative %	Total	% of Variance Explained	Cumulative %
1	2.644	66.110	66.110	2.644	66.110	66.110
2	.704	17.595	83.705			
3	.523	13.074	96.779			
4	.129	3.221	100.000			

Source: Authors' calculation; Extraction Method: Principal Component Analysis.

Table 3.c: Component Matrix

	Component
	1
OPM	.662
NPM	.773
RONW	.880
ROCE	.913

Extraction Method: PCA
Source: Authors' calculation

Panel regression results

For estimating the effect of different efficiency variables on profitability (represented by ROCE as per the results of PCA), we have applied the panel regression model considering ROCE as the dependent variable and the efficiency variables, namely, CEE, HCE, and SCE as independent variables. The panel consists of 50 pharmaceutical companies over ten years. Thus, our data set is for 500 firm-years and perfectly balanced for applying panel data regression estimate. Firstly, we have searched for a suitable panel data regression model from fixed or random effects models by applying Hausman's specification test. For this purpose, we have used a fixed effects panel model as well as a random effects panel model for estimating ROCE. Hausman's specification test hypothesized that the random effect model is suitable; thus, if the null hypothesis is accepted, then the random effects model is acceptable; otherwise, we should apply the fixed effects panel regression model.

The results of the Hausman Specification test (Table 4) show that the test rejects the null hypothesis that the random effects model is more suitable for estimating parameters from the given panel data having a chi-square value of 21.52, which is significant at less than 0.01% level, and accepts the alternative hypothesis that the fixed effect model is a better model for the present panel data. Thus, we have chosen a fixed effect panel model for estimating ROCE based on three efficiency variables CEE, HCE, and SCE and the results are presented in Table 5.

Table 4: Hausman's Specification Test Results

	Coefficients			
	(b)	(B)	(b-B)	Sqrt (diag (V_b-V_B))
	Fe	re	Difference	S. E.
CEE	-0.4418	0.3269	-0.7688	0.4299
HCE	0.9733	0.8979	0.0754	0.0280
SCE	0.0316	-0.1958	0.2274	0.1817

Source: Own Calculations

b = consistent under Ho and Ha

B = inconsistent under Ha, efficient under Ho

Test: Ho: difference in coefficients not systematic

Ch i-Sqr (3) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 21.52; Prob > chi2 = 0.0001

Table 5: Regression Results of Panel Data Fixed Effect Model

Fixed-effects (within) regression				Number of obs =	500
Group variable: co_id				Number of groups =	50
R-sq:				Obs per group:	
within = 0.1949					min = 10
between = 0.0664					avg = 10
overall = 0.1280					max = 10
Corr (u_i, Xb) = -0.1205				F (3,447)	= 36.08
				Prob > F	= 0.0000
roce	Coeff.	Std. Err.	t	P>|t|	[95% Conf. Interval]
cee |	-.4418471	1.229808	-0.36	0.720	-2.85877 1.975076
hce |	.9732673	.1127532	8.63	0.000	.7516751 1.194859
sce |	.031566	1.47012	0.02	0.983	-2.85764 2.920772
cons |	7.545076	1.407192	5.36	0.000	4.779542 10.31061
sigma_u	8.9928077				
sigma_e	9.3322593				
rho	.48148246 (fraction of variance due to u_i)				
F test that all u_i=0: F (49, 447) = 8.77				Prob > F = 0.0000	

Source: Own Calculations

The results in Table 5 show that the model is a good fit for estimating ROCE based on CEE, HCE, and SCE. The computed F statistic value of 8.77 is found to be highly significant at less than 1% level. Among the three efficiency variables, only HCE is found to be positively and significantly (at below 1% level) related in estimating ROCE but the other two efficiency variables, viz. CEE and SCE are not significant in estimating profitability (ROCE) of the Indian Pharmaceutical firms. Therefore, it can be said that human capital efficiency plays an important role in improving the profitability of Indian Pharmaceutical firms.

To compare the efficiency and profitability performance of selected 50 pharmaceutical

companies between pre- and post-COVID-19, we have applied a paired sample t-test on average values of performances in the pre-and post-COVID period. The results are depicted in the following table.

Table 6: Paired Sample Mean Test on Various Performance Variables between Post-COVID and Pre-COVID Period

Post vs Pre	Mean Difference	Paired t- value	Sig. level
CEE	-.21440	-3.037***	.004
HCE	-1.03093	-2.401**	.020
SCE	-.02176	-1.538	.130
VAIC	-1.26709	-2.643**	.011
OPM (%)	3.97658	3.752***	.000
NPM (%)	6.09130	4.048***	.000
RONW (%)	3.86563	1.425	.160
ROCE (%)	2.17582	1.529	.133

Source: Own Calculations; ** indicates sig. at 5% level; *** indicates sig. at 1% level.

[Note: CEE- Capital employed efficiency; HCE- Human Capital Efficiency; SCE- Structural Capital Efficiency; VAIC Value-added Intellectual Capital; OPM- Operating Profit Margin; NPM- Net Profit Margin; RONW- Return on Net Worth; ROCE- Return on Capital Employed.]

The above table shows that the efficiency of capital employed to value added decreased in the post-COVID period, and the decrease is statistically significant at 1% level. Human capital efficiency, measured by human capital price to value-added, has also decreased in post-COVID period and is significant at 5%. The change in structural capital in post-COVID period is found to be statistically insignificant. On the other hand, among the profitability ratios, there is a significant increase in the operating profit margin and net profit margin of the Indian pharmaceutical firms in the post-COVID period and for RONW and ROCE. However, there is some increase in the post-COVID period, which is not statistically significant. Thus, when we compare the performance from the efficiency point of view or the viewpoint of intellectual capital, considering accounting value added as the basis, we have found a significant decrease in such parameters post-COVID period. Still, comparing the profitability performance based on traditional accounting ratios, we found a significant increase in the post-COVID period. Thus, in a nutshell, we may say that although there have been some increases in firms' profitability in the post-COVID period, the efficiency in terms of value added has decreased.

Findings

The present study measures intellectual capital performance in Indian pharmaceutical companies. VAIC method has been applied to a sample of the top 50 Indian pharmaceutical

companies. Profitability is measured through PBDITA or Operating Profit margin, Net profit margin, Return on Capital Employed, and Return on Net Worth. The findings show that three types of intellectual capital—human capital, structural capital, and capital employed- act as the intermediary and directly influence the company's performance. The study also examined the impact of COVID-19 on firms' profitability and relationship with Intellectual capital.

In the case of measured profitability by ROCE, it indicates that the profitability of the companies is reflected through intellectual capital performance. Managers may organise and use intellectual capital in a better way to foster the profitability of firms. The results of the paper indicate a significant relationship between intellectual capital and firms' profitability. Also, it is found that human capital, relational capital, and physical capital have a significant role in increasing the firm's profitability. The analysis would help the administration and management of the Indian pharmaceutical companies in the composition and organisation of intellectual capital, stakeholders in the investment decisions, and financial specialists for enhancing intellectual capital efficiency and value creation for the firm. Human capital is found to be having a very significant impact on firms' profitability.

Conclusion and Suggestions:

The findings of the study have drawn attention to the significance of measuring intellectual capital when assessing the performance of companies. As a developing country, India has a large potential for human capital. Programs for employee training and development should be carefully considered, and adequate funding must be allocated for them to maintain and enhance the profitability of the Indian Pharmaceutical Industry.

Overall, the increasing dependence on intellectual capital may benefit society. Promoting intellectual capital investments could impact how the government handles taxation, financing decisions, venture capital, and interest rates for projects involving intellectual capital.

Limitations of the Study:

The investigation is based on convenient sampling, focusing only on the top 50 Indian pharmaceutical companies according to their market capitalisation. For a better understanding, a larger data set could establish significant robustness to the results. For the non-availability of data on the employee cost to research and development (R&D) of the selected companies, we have considered the employee cost of the firm in general for calculating human capital efficiency.

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Annexure
List of Sample Companies (Market Capitalization more than INR 850 crore)

Sl No.	Name of the Company	MC (INR in Crore.)	Nature
1	Sun Pharmaceutical Inds. Ltd.	219491.16	Large Cap.
2	Divi'S Laboratories Ltd.	116908.38	Large Cap.
3	Cipla Ltd.	82174.01	Large Cap.
4	Dr.Reddy'S Laboratories Ltd.	71652.99	Mid. Cap.
5	Gland Pharma Ltd.	53713.02	Mid. Cap.
6	Torrent Pharmaceuticals Ltd.	47319.75	Mid. Cap.
7	Alkem Laboratories Ltd.	43247.86	Mid. Cap.
8	Biocon Ltd.	40166.07	Mid. Cap.
9	Aurobindo Pharma Ltd.	39196.36	Mid. Cap.
10	Abbott India Ltd.	37610.10	Mid. Cap.
11	Lupin Ltd.	33906.11	Mid. Cap.
12	Laurus Labs Ltd.	31706.89	Mid. Cap.
13	Glaxosmithkline Pharmaceuticals Ltd.	28171.38	Mid. Cap.
14	Ipca Laboratories Ltd.	26921.82	Mid. Cap.
15	Syngene International Ltd.	23923.54	Mid. Cap.
16	Pfizer Ltd.	19906.21	Mid. Cap.
17	Sanofi India Ltd.	17287.71	Mid. Cap.
18	Ajanta Pharma Ltd.	15452.99	Mid. Cap.
19	Alembic Pharmaceuticals Ltd.	14572.21	Small Cap.
20	Natco Pharma Ltd.	13822.25	Small Cap.
21	Glenmark Pharmaceuticals Ltd.	12477.48	Small Cap.
22	J B Chemicals & Pharmaceuticals Ltd.	12173.48	Small Cap.
23	Eris Lifesciences Ltd.	9366.95	Small Cap.
24	Granules India Ltd.	7596.42	Small Cap.
25	Procter & Gamble Health Ltd.	6649.63	Small Cap.
26	Caplin Point Laboratories Ltd.	5152.89	Small Cap.
27	Hikal Ltd.	4962.24	Small Cap.
28	F D C Ltd.	4336.73	Small Cap.
29	Aarti Drugs Ltd.	3972.54	Small Cap.
30	SupriyaLifescience Ltd.	3967.00	Small Cap.
31	A M I Organics Ltd.	3642.43	Small Cap.
32	Indoco Remedies Ltd.	3469.92	Small Cap.
33	Shilpa Medicare Ltd.	3447.34	Small Cap.
34	Sequent Scientific Ltd.	3323.20	Small Cap.
35	Strides Pharma Science Ltd.	3111.68	Small Cap.

Sl No.	Name of the Company	MC (INR in Crore.)	Nature
36	Gufic Biosciences Ltd.	2412.95	Small Cap.
37	Amrutanjan Health Care Ltd.	2320.33	Small Cap.
38	Hester Biosciences Ltd.	2309.87	Small Cap.
39	Marksans Pharma Ltd.	1864.42	Small Cap.
40	Morepen Laboratories Ltd.	1748.84	Small Cap.
41	Kopran Ltd.	1357.37	Small Cap.
42	Neuland Laboratories Ltd.	1317.12	Small Cap.
43	N G L Fine-Chem Ltd.	1209.53	Small Cap.
44	Orchid Pharma Ltd.	1160.41	Small Cap.
45	Chemcon Speciality Chemicals Ltd.	976.21	Small Cap.
46	Bajaj Healthcare Ltd.	939.45	Small Cap.
47	R P G Life Sciences Ltd.	925.61	Small Cap.
48	Syncom Formulations (India) Ltd.	916.79	Small Cap.
49	Panacea Biotec Ltd.	908.04	Small Cap.
50	Themis Medicare Ltd.	858.52	Small Cap.

Source: CMIE Prowess Database [as on 31-03-2022]

Large Cap: Marketcapitalisation of = 10 billion US Dollar (= INR 74642 Crore)
Mid. Cap: Market cap. = 2 billion but < 10 billion US Dollar (INR <74, 642 Crore to 14928 Crore)
Small Cap: Market cap. < 2 billion US Dollar (< INR 14928 Crore)