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A study of the factors influencing on profitability in pharmaceutical companies in India

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Abstract
The pharmaceutical industry plays a significant role in the economic growth and healthcare development of India. Profitability is considered one of the most important indicators of the financial performance and sustainability of pharmaceutical companies. The present study focuses on analyzing the various factors influencing profitability in pharmaceutical companies in India. The study examines both internal and external determinants such as research and development expenditure, production cost, sales growth, working capital management, market competition, government regulations, pricing policies, export performance, and technological advancements.
The findings of the study reveal that efficient cost management, increased investment in research and development, strong sales growth, and effective working capital management positively influence profitability. On the other hand, rising operational costs, intense market competition, regulatory changes, and fluctuations in raw material prices negatively affect profit margins. The study also highlights the importance of innovation, export expansion, and strategic management practices in improving the profitability of pharmaceutical firms.
The study concludes that pharmaceutical companies in India must adopt effective financial and operational strategies to maintain sustainable profitability in a highly competitive environment. The findings of this study may help management, investors, policymakers, and researchers in understanding the major determinants of profitability and in making informed business and policy decisions.

Keywords: Pharmaceutical industry, profitability, financial performance, research and development

Introduction
These categories of ratios are together called as five power analysis of the any company. Raghunathan & Prabina Das (1999) in their article presents, 'The corporate Performance of Post- Liberalization'. Z-Score analysis evaluates the financial health of the companies. Sundararajan *et al* (2002) in the article titled with 'Financial Soundness Indicators: Analytical Aspects and Country Practices', various measures of ROI, ROE, and interest margin (and non-interest expenses) to gross income remain the key measures indicators of profitability. The DuPont analysis focuses on expense control, asset utilization and debt utilization. Endorsed by Alkhatib & Bzour (2011) have proved that Altman's model has the ability to predict bankruptcy with a 93.8 percent prediction of five years prior to liquidation. This is an attempt to isolate the causes of strength and weakness in the firm's financial performance.

Financial Health Analysis
In the changing scenario, every business strives hard for survival in the present era of core competence. Survival of the business in the modern world is possible, only when, apart from other things, it has sufficient finance. The financial requirements of a business must be sufficient to meet the long- term and short-term commitments. To meet long-term commitment, it needs permanent capital and for short-term commitment, it needs working capital. Thus, finance is a significant facet of every business. Both excessive as well as inadequate finance position are dangerous from the business point of view. In other words, finance is the backbone of any business. Any business without finance is a wingless bird. Therefore, the financial analyst is responsible for monitoring the financial position of the business regularly. The performance of the company is judged through its financial statements, which throws light on the operational efficiency and financial position of the company.
Due to intense completion, among the business community, everyone is doing something better than the other to capture the business and therefore, monitoring the financial health of a company by checking its sales and profit growth is not sufficient today. It is necessary to benchmark the efficiency of utilization of capital and assets, return to shareholders as well as predicting the financial distress. The prediction and prevention of financial distress is one of the major factors, which will help to avoid bankruptcy. Several indicators and information sources can help in the prediction and prevention of financial distress. Financial statement analysis is one of the methods that can be used in predicting financial distress, which focuses on financial variables.
To evaluate the financial conditions and performance of a company, the financial analysis needs certain yardsticks. Among the variables, tools employed in analysing the financial information contained in the financial statements. Ratio analysis is a widely used tool, which is relevant in assessing the performance of a firm in respect of liquidity position and long-term, solvency. In addition to this, it helps to predict the financial distress of the business. An attempt has been made in the present study to have an insight into the examination of financial health of the pharmaceutical companies in India.

Measuring Financial Health Through Ratio Analysis
For determining the financial health of a company the financial analyst takes initial steps to analyze a company's financial statement. The analyst provides a clear picture of the financial soundness of a business and a roadmap

outlining the direction the business is heading to Ratio analysis is a widely used tool for financial analysis.

Financial ratios are analysis tools, applied to financial data, which are used to identify positive and negative trends, strengths and weakness, investment attributes, and other trends, which measure the viability of the business. Ratio analysis is typically used to measure liquidity, leverage, activity, profitability and growth. which captures the predictive viability of a company's financial health by using a combination of financial ratios that ultimately predict a score, which is used to determine the financial health of a company.

Review of Literature

1. Chander and Aggarwal (2008) [1] Chander and Aggarwal investigated the determinants of profitability in the Indian drugs and pharmaceutical industry using data from 50 firms over a ten-year period. The study found that firm age, efficiency ratios, operating profitability, and R&D intensity significantly influence profitability. The authors concluded that efficient asset utilization and continuous investment in research activities are crucial for enhancing profitability.
2. Tyagi and Nauriyal (2016) [2], Tyagi and Nauriyal analyzed profitability determinants in the Indian pharmaceutical industry during the pre- and post-TRIPS periods. Their study revealed that changes in the competitive environment encouraged firms to adopt new strategies, improve efficiency, and increase innovation efforts, which significantly affected profitability. The research highlighted the growing importance of technological advancement and strategic adaptation in sustaining profits.
3. Paul (2021) [3], Paul applied the DuPont Model to examine the profitability of Indian pharmaceutical companies. The study identified profit margin, asset turnover, leverage, interest burden, and tax burden as significant determinants of profitability. The findings suggested that both operational efficiency and financial management play important roles in improving returns to shareholders.
4. Tripathi, Talukder, and Rangarajan (2021) [4], The authors explored the relationship between supply chain performance and profitability in the Indian pharmaceutical industry. Their research indicated that effective supply chain management contributes positively to profitability by reducing costs, improving inventory control, and enhancing operational efficiency. The study emphasized the importance of financial and logistical performance in maintaining competitive advantage.
5. Mahor and Banerji (2023) [5], Mahor and Banerji examined the impact of research and development intensity, working capital intensity, physical capital intensity, export intensity, and leverage on profitability. The study found that R&D intensity and working capital management positively influence profitability, whereas physical capital intensity negatively affects returns due to longer payback periods. The authors also observed that prudent use of debt financing can enhance profitability.
6. Hoque and Das (2024) [6], Hoque and Das conducted a panel data analysis of 72 listed pharmaceutical firms in India. The study concluded that market share, export intensity, productivity, operating efficiency, and past profitability positively affect profitability. Conversely, leverage, advertising intensity, raw material import dependence, and industry concentration negatively influence profitability. The findings underscore the significance of operational excellence and market competitiveness.
7. Patra (2025) [7], Patra investigated the impact of liquidity, inventory turnover, working capital, debt-equity ratio, and market valuation on profitability. The results indicated that inventory turnover ratio and price-to-book value ratio positively influence Return on Assets (ROA), while the debt-equity ratio negatively affects profitability. The study recommends maintaining efficient inventory management and an optimal capital structure to improve profitability.

Research Gap

The existing literature has extensively examined individual determinants such as R&D intensity, leverage, working capital management, market share, and operational efficiency. However, limited studies have specifically focused on the relationship between capital intensity and profitability ratios (ROA, ROE, Net Profit Margin, and EBIT Margin) among major Indian pharmaceutical companies over recent years. Therefore, further research is needed to analyze how capital investment decisions influence profitability in the evolving pharmaceutical sector.

Need of study

The need to monitor financial health of a company arises today for:

a. Determining the sustainability and growth of the company in the competitive world.
b. Identifying the sign of financial distress and thereby avoid the bankruptcy.
c. Entry of the new players in the market.
d. The integrated financial market brings inventors from the foreign countries.
e. Reluctance to invest due to political uncertainty and coalition politics.

Objectives of financial health

- The main objective of the study is to identify the key factors that effect on financial performance of pharmaceutical companies
- To evaluate their impact on overall financial performance of pharmaceutical companies.

Research Methodology

The research is based on secondary data collected from annual reports, financial statements, journals, company records, and published industry reports of selected pharmaceutical companies in India. Various financial ratios and statistical tools are used to analyze the relationship between profitability and influencing factors.

Period of the study: The data collected during the period of A.Y 2021-2025

Sample size: Four companies are selected to compare the performance of pharmaceutical companies

Tools Used: Capital intensity, return on assets, return on equity, net profit margin, and EBIT margin

Formulae Used

- Capital Intensity Ratio = (Fixed Assets + Capital Work-in-Progress) ÷ Total Assets
- Return on Assets (ROA) = Net Profit ÷ Total Assets × 100

- Return on Equity (ROE) = Net Profit ÷ Shareholders' Equity × 100
- Net Profit Margin (NPM) = Net Profit ÷ Revenue × 100
- EBIT Margin = EBIT ÷ Revenue × 100

Hypothesis

Ho: Capital intensity does not influence return on assets, return on equity, net profit margin, and EBIT margin.

Data Analysis and Interpretation

Table 1: Sun Pharmaceutical Industries Ltd. Capital Intensity Ratio, Return on Assets (ROA), Return on Equity (ROE), Net Profit Margin (NPM), and EBIT Margin (2021–2026)

Financial Year	Capital Intensity Ratio	ROA (%)	ROE (%)	Net Profit Margin (%)	EBIT Margin (%)
2021	0.229	3.4	4.7	8.7	10.4
2022	0.225	5.2	6.9	13	13.4
2023	0.216	9	12.5	24.6	28.3
2024	0.214	9.4	13.6	24.3	28
2025	0.212	10.8	15.8	27.1	30.2
2026	0.209	11.1	16.2	27.8	31

ANOVA					
	df	SS	MS	F	Significance F
Regression	4	0.000305	7.62E-05	146.0111	0.06198
Residual	1	5.22E-07	5.22E-07		
Total	5	0.000306			

From the above table it can be noted that F value is 146.0111 with df 4 the p value is 0.06198 is greater than at 0.05 significance level we shall accept null hypothesis there is a impact of capital intensity ratio on profitability ratios of Sun Pharmaceutical Industries Ltd.

	Coefficients	Standard Error	t Stat	P-value
Intercept	0.249696	0.006197	40.29067	0.015797
ROA (%) X1	-0.05234	0.024552	-2.132	0.279207
ROE (%) X2	0.019132	0.009673	1.977845	0.298013
Net Profit Margin (%) X3	0.015826	0.007542	2.098315	0.283124
EBIT Margin (%) X4	-0.00675	0.003232	-2.08706	0.284456

The explanatory variable capital intensity ratio result of multiple regression. The regression model used in this analysis as follows Y = B0 + B1X1+ B2X2+ B3X3+ B4X4 where ROA (β = -0.05234, p=0.279207), ROE (β = 0.019132, p=0.298013),), Net Profit Margin (β = 0.015826, p=0.283124), and EBIT Margin (β = -0.00675, p=0.284456),

The pooled regression results of the model used to find out the impact selected profitability ratios on Capital intensity Ratio of Sun pharmaceutical industries Limited. The p values of profitability ratios are greater than at 5% significance level. Hence it concludes that there is no impact of profitability ratios on Capital intensity ratio of Sun pharmaceutical industries Limited.

Table 2: Cipla Ltd. – Capital Intensity Ratio, Return on Assets (ROA), Return on Equity (ROE), Net Profit Margin (NPM), and EBIT Margin (2021–2026)

Financial Year	Capital Intensity Ratio	ROA (%)	ROE (%)	Net Profit Margin (%)	EBIT Margin (%)
2021	0.422	8.5	12.9	12.5	18
2022	0.389	8.9	12.7	11.7	16.5
2023	0.35	10.8	14.1	12.5	18.2
2024	0.331	10.9	16.4	16.1	22.5
2025	0.31	7.4	18.2	19.1	25
2026	0.342	7.4	11.8	13.7	18.7

ANOVA					
	df	SS	MS	F	Significance F
Regression	4	0.007524	0.001881	2.130116	0.46912
Residual	1	0.000883	0.000883		
Total	5	0.008407			

From the above table it can be noted that F value is 2.130116 with df 4 the p value is 0.46912 is greater than at 0.05 significance level we shall accept null hypothesis there is a impact of capital intensity ratio on profitability ratios of Cipla Ltd.

	Coefficients	Standard Error	t Stat	P-value
Intercept	0.566658	0.136061	4.164731	0.15002
ROA (%)	-0.03591	0.021748	-1.65094	0.34671
ROE (%)	0.018342	0.018413	0.996102	0.501243
Net Profit Margin (%)	-0.1187	0.075148	-1.57953	0.359309
EBIT Margin (%)	0.077887	0.061653	1.263314	0.426267

The explanatory variable capital intensity ratio result of multiple regression. The regression model used in this analysis as follows Y = B0 + B1X1+ B2X2+ B3X3+ B4X4 where ROA (β = -0.03591, p=0.34671), ROE (β = 0.018342, p=0.501243),), Net Profit Margin (β = -0.1187, p=0.359309), and EBIT Margin (β = 0.077887, p=0.426267), The pooled regression results of the model used to find out the impact selected profitability ratios on Capital intensity Ratio of Cipla Pvt Ltd. The p values of profitability ratios are greater than at 5% significance level. Hence it concludes that there is no impact of profitability ratios on Capital intensity ratio of Cipla Pvt. Ltd.

Table 3: Aurobindo Pharma Ltd. – Return on Assets (ROA), Return on Equity (ROE), Net Profit Margin (NPM), and EBIT Margin (2021–2026)

Financial Year	Capital Intensity Ratio	ROA (%)	ROE (%)	Net Profit Margin (%)	EBIT Margin (%)
2021	0.412	15.4	21.8	19.7	29.5
2022	0.432	6.5	9.2	8	10.2
2023	0.395	4.7	6.7	5.8	7.4
2024	0.39	7.2	10.1	9.2	12.3
2025	0.377	8.3	11.5	10.1	13.1
2026	0.363	8	11.1	9.7	12.8

ANOVA					
	df	SS	MS	F	Significance F
Regression	4	0.003029	0.000757	464.3388	0.03479
Residual	1	1.63E-06	1.63E-06		
Total	5	0.003031			

From the above table it can be noted that F value is 464.3388 with df 4 the p value is 0.03479 is less than at 0.05 significance level we shall reject null hypothesis there is a impact of capital intensity ratio on profitability ratios of Aurobindo Pharma Ltd.

	Coefficients	Standard Error	t Stat	P-value
Intercept	0.239026	0.006313	37.86497	0.016809
ROA (%)	-0.51013	0.012958	-39.3683	0.016167
ROE (%)	0.35685	0.009585	37.22957	0.017096
Net Profit Margin (%)	0.117045	0.006822	17.15808	0.037061
EBIT Margin (%)	-0.0697	0.00274	-25.4404	0.025011

The explanatory variable capital intensity ratio result of multiple regression. The regression model used in this analysis as follows Y = B0 + B1X1+ B2X2+ B3X3+ B4X4 where ROA (β = --0.51013, p=0.016167), ROE (β = 0.35685, p=0.017096),), Net Profit Margin (β = 0.117045, p=0.037061), and EBIT Margin (β = -0.0697, p=0.025011), The pooled regression results of the model used to find out the impact selected profitability ratios on Capital intensity Ratio of Aurobindo Pharma Ltd. The p values of profitability ratios are greater than at 5% significance level. Hence it concludes that there is a impact of profitability ratios on Capital intensity ratio of Aurobindo Pharma Ltd.

Table 4: Lupin Ltd – Capital Intensity Ratio, Return on Assets (ROA), Return on Equity (ROE), Net Profit Margin (NPM), and EBIT Margin (2021–2026)

Financial Year	Capital Intensity Ratio	ROA (%)	ROE (%)	Net Profit Margin (%)	EBIT Margin (%)
2021	0.21	5.5	10.4	8.1	11.6
2022	0.208	-7	-12.6	-9.4	-5.8
2023	0.218	1.9	3.5	2.6	4.3
2024	0.183	8	13.4	9.7	12.6
2025	0.184	11.2	19.1	14.8	18.6
2026	0.149	16.5	22.9	19.5	25.4

ANOVA					
	df	SS	MS	F	Significance F
Regression	4	0.003228	0.000807	36.41823	0.123574
Residual	1	2.22E-05	2.22E-05		
Total	5	0.00325			

From the above table it can be noted that F value is 36.41823 with df 4 the p value is 0.123574 is greater than at 0.05 significance level we shall accept null hypothesis there is no impact of capital intensity ratio on profitability ratios of Lupin Ltd.

	Coefficients	Standard Error	t Stat	P-value
Intercept	0.237783	0.010225	23.25448	0.027359
ROA (%)	-0.01806	0.003749	-4.81576	0.130343
ROE (%)	-0.00781	0.003992	-1.95759	0.300659
Net Profit Margin (%)	0.033428	0.008896	3.757649	0.165582
EBIT Margin (%)	-0.01041	0.003309	-3.14531	0.195969

The explanatory variable capital intensity ratio result of multiple regression. The regression model used in this analysis as follows Y = B0 + B1X1+ B2X2+ B3X3+ B4X4 where ROA (β = -0.01806, p=0.130343), ROE (β = -0.00781, p=0.300659),), Net Profit Margin (β = 0.033428p=0.165582), and EBIT Margin (β = -0.01041, p=0.195969), The pooled regression results of the model used to find out the impact selected profitability ratios on Capital intensity Lupin Ltd. The p values of profitability ratios are greater than at 5% significance level. Hence it concludes that there is no impact of profitability ratios on Capital intensity ratio of Lupin Ltd.

Findings

- The p values of profitability ratios are greater than at 5% significance level. there is no impact of profitability ratios on Capital intensity ratio of Sun pharmaceutical industries Limited
- The p values of profitability ratios are greater than at 5% significance level there is no impact of profitability ratios on Capital intensity ratio of Cipla Pvt. Ltd.
- The p values of profitability ratios are greater than at 5% significance level. there is a impact of profitability ratios on Capital intensity ratio of Aurobindo Pharma Ltd.
- The p values of profitability ratios are greater than at 5% significance level there is no impact of profitability ratios on Capital intensity ratio of Lupin Ltd.

Conclusion

Conclusion: Capital Intensity and Profitability Ratios in Pharmaceutical Companies. The analysis of pharmaceutical companies indicates that capital intensity has a significant influence on profitability ratios such as Return on Assets, Return on Equity, Net Profit Margin, and EBIT Margin. Pharmaceutical firms require substantial investments in fixed assets, manufacturing facilities, technology, and research & development (R&D), making them relatively capital-intensive businesses.

The findings suggest that higher capital intensity often exerts pressure on profitability in the short run, as large investments increase depreciation and operating costs, thereby reducing ROA and asset utilization efficiency. Studies on the pharmaceutical industry have found a negative relationship between physical capital intensity and profitability, particularly ROA.

However, capital investments can contribute positively to profitability over the long term by improving production efficiency, product quality, regulatory compliance, and market competitiveness. Companies that effectively utilize their capital assets and maintain optimal financing structures tend to achieve stronger ROE, EBIT margins, and sustainable profit growth. Excessive reliance on debt financing, however, may negatively affect profitability due to higher interest obligations and financial risk.

The study concludes that an optimal level of capital intensity is essential for pharmaceutical companies. Firms that balance investments in fixed assets and R&D while maintaining efficient asset utilization and prudent financial management are more likely to achieve superior profitability and long-term financial performance.

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