Chapter I

Introduction
A STUDY ON THE PROFITABILITY OF
PHARMACEUTICAL INDUSTRY IN INDIA

1.1 INTRODUCTION

The basic financial objective of companies is to maximise wealth within socially acceptable limits from the use of funds employed by them. No company can survive long without profit, for profit is the ultimate measure of its effectiveness. The crucial measure of the effective performance of a business is profit, which really is a measure of how well a business performs economically. Profitability refers to the ability of a firm to generate revenues in excess of expenses\(^1\). It is not a static phenomenon. Changes in its determinants result in changes in the profitability. Scientific study of the current trends of profitability provides a base to forecast the possible future trends of profitability.

Pharmaceuticals are medicinally effective chemicals, which are converted to dosage forms, suitable for patients to imbibe. In its basic chemical form, pharmaceuticals are called bulk drugs and the final dosage forms are known as formulations. Pharmaceutical Industry is driven by a global need to conquer disease. It is also a knowledge driven industry and is heavily dependent on Research and Development for new products and growth. The Indian Pharmaceutical Industry today is in the front rank of India's science-based industries with wide ranging capabilities in the complex field of drug manufacture and technology. It ranks very high in the third world, in terms of technology, quality and range of medicines manufactured. From simple headache pills to sophisticated antibiotics and complex cardiac compounds, almost every type of medicine is now made in India. The organised sector of the Pharmaceutical Industry has played a key role in promoting and sustaining development in this vital field. International companies associated with this sector have stimulated, assisted and spearheaded this dynamic development in the past fifty-three years (post independence period) and helped to put India on the pharmaceutical map of the world.\(^2\)
Though Pharmaceutical industry was previously dominated by multinational corporations (MNCs) recently Indian companies have entered the area and initial results have been encouraging. The market share of MNCs has fallen from 75 per cent in 1971 to around 35 per cent in 2002 in the Indian pharmaceutical market, while the share of Indian companies has increased from 20 per cent in 1971 to nearly 65 per cent in 2002. Public sector units have almost lost out completely.

1.2 STATEMENT OF THE PROBLEM

During 1990s, the industrial sector has been through the periods of robust growth and severe slowdown. These variations in performance took place in the backdrop of substantial policy changes, which affected different industries in many ways. Efficiency of an enterprise has assumed greater importance nowadays since it is the only tool to face the ongoing competition in the market. The challenge to pharmaceutical industry lies in providing adequate medicines at affordable costs to the Indian population. The industry has to compete globally, costwise and qualitywise for exports.

The profitability of pharmaceutical industry and its share in the national and international market depend on how effectively this challenge can be met. Hence, the performance of pharmaceutical industry provides a fertile ground to investigate into the factors that determine its operations and profitability since growth in the profitability of company will reflect on its all round accumulation of intrinsic wealth. In this context the following questions emerge:

i. Are the Pharmaceutical companies really efficient?
ii. What are the levels of efficiency of these companies?
iii. Do companies differ from each other in terms of efficiency?
1.3 OBJECTIVES OF THE STUDY

The study makes an attempt to find solutions to the questions raised above. Hence the specific objectives of the study are:

i. To examine the profitability of selected companies of Pharmaceutical Industry.
ii. To find out the factors influencing the level of profitability.
iii. To ascertain the quality of earnings and the impact of liquidity on profitability and on quality of earnings and
iv. To forecast the financial stability of the selected pharmaceutical companies.

1.4 HYPOTHESES OF THE STUDY

In tune with the objectives the following hypotheses are examined:

i. Earning capacity of a company does not depend on the age, size and ownership it belongs to.
ii. There is no significant relationship between the liquidity of a company and its profitability.
iii. There is no significant relationship between the liquidity of a company and its quality of earnings.

1.5 SCOPE OF THE STUDY

The study aims to make an analysis of the profitability of pharmaceutical industry in India. The efficiency of the management in accomplishing its goal of profit maximisation is measured by the profitability of the business. The need for incorporating industry standards in financial performance analysis has given rise to a new methodology for evaluating the financial health of the firms. The new measure called ‘Quality of Earnings’ makes use of standard management accounting concepts like average ratios and variance analysis. The study has analysed the accounting profitability and Quality of Earnings. Further the financial stability of the pharmaceutical industry is also studied by employing Altman’s model and Lambda model.
1.6 METHODOLOGY

The data used for the study are secondary in nature. The required data for the sample companies were collected from the compilation made by the Centre for Monitoring Indian Economy (CMIE) for the period 1991-1992 to 2000-2001. Prowess database of CMIE is the most reliable and empowered corporate database. It contains a highly normalized database built on a sound understanding of disclosures on well over 7000 companies in India. The annual published financial reports of the companies have been used for random checking of the data. The Stock Exchange Official Directory, Mumbai and Kothari’s Industrial Directory of India have also been used to supplement the data wherever necessary.

1.7 SAMPLING DESIGN

The pharmaceutical industry is purposely selected for the study considering its importance in health care sector of the economy. The companies for which the data were not available for more than one year of the study period have been dropped. In selecting the sample, The Stock Exchange Official Directory, Mumbai and Kothari’s Industrial Directory and database of the Centre for Monitoring Indian Economy (CMIE) namely, PROWESS has been mainly used. The database of CMIE has made compilation for 319 companies, of which only 65 companies have financial data available for a continuous period of 10 years, namely 1991-1992 to 2000-2001. Such companies, which account for 20 per cent of the population, constitute the sample. (Given in Appendix 1) The sample companies are Public Limited companies in the private sector. The sample companies have been classified into different groups on the basis of age, size and ownership for the purpose of groupwise analysis.
1.7.1 CLASSIFICATION BY AGE

The sample companies are distributed by their age, which is determined by considering their year of incorporation as the birth year and 31\textsuperscript{st} March 2001 as the concluding year. They are:

- Companies registered/incorporated prior to the plan period (1950) - old companies
- Companies registered/incorporated between 1950 and 1978 - moderately old companies.
- Companies registered/incorporated after the period of emergency proclaimed in 1977-78 - new companies.

The details of classification by age are presented in Table 1.1

<table>
<thead>
<tr>
<th>Age-group</th>
<th>Number of companies</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old</td>
<td>20</td>
<td>31</td>
</tr>
<tr>
<td>Moderately</td>
<td>25</td>
<td>38</td>
</tr>
<tr>
<td>New</td>
<td>20</td>
<td>31</td>
</tr>
<tr>
<td>Total</td>
<td>65</td>
<td>100</td>
</tr>
</tbody>
</table>

1.7.2 CLASSIFICATION BY SIZE

Based on their average paid up capital, which is the simple average of the paid up capital over the study period the sample companies are classified into three groups small, medium and large. The companies which have an average paid up capital up to Rs. 05 crores are classified as small companies, those with a paid up capital of more than Rs. 05 crores but up to Rs.10 crores are classified under the medium category. Those having more than Rs.10 crores are classified as big companies. The details of classification by size are presented in Table 1.2
Table 1.2
Classification of companies by size

<table>
<thead>
<tr>
<th>Size</th>
<th>Number of Companies</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>31</td>
<td>48</td>
</tr>
<tr>
<td>Medium</td>
<td>11</td>
<td>17</td>
</tr>
<tr>
<td>Large</td>
<td>23</td>
<td>35</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>65</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

1.7.3 CLASSIFICATION BY OWNERSHIP

Based on the ownership the sample companies have been classified mainly into two groups namely Indian and Foreign companies. The details are presented in Table 1.3.

Table 1.3
Classification of companies by ownership

<table>
<thead>
<tr>
<th>Ownership group</th>
<th>Number of Companies</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indian Companies</td>
<td>52</td>
<td>80</td>
</tr>
<tr>
<td>Foreign Companies</td>
<td>13</td>
<td>20</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>65</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

1.8 PERIOD OF STUDY

The period of study is confined to one decade, namely, 1st April 1991 to 31st March 2001. This period covers the post-liberalisation era of the Indian economy. Further, this period embraces the full length of business cycle. For the purpose of easy reference, the year 1991-1992 is mentioned as 1992, and so on, throughout the study.

1.9 FRAMEWORK OF ANALYSIS

To analyse the profitability of pharmaceutical industry, ratio analysis, statistical tools and models have been applied.
1.9.1 RATIO ANALYSIS

Ratio Analysis is an effective tool used for analysis of financial statements. It is mainly used for analysing the profitability throughout the study. Ratios classified on functional basis namely, liquidity, leverage, activity and profitability are employed. To examine the profitability of pharmaceutical industry, the ratios used are Margin on Sales, Return on Total Assets, Return on Capital Employed, Return on Shareholders’ Equity and Interest Coverage. Financial strength of the pharmaceutical industry is analysed with the help of liquidity and leverage ratios.

1.9.2 STATISTICAL TOOLS

Statistical tools used are Percentage, Mean, Median, Standard Deviation, Coefficient of variation, Annual Growth Rate, Analysis of Variance, Spearman’s Rank Correlation Co-efficient, Correlation Matrix and Correlation Analysis, Multiple Regression Analysis, and Discriminant Function. The tests of significance, namely ‘t’ and ‘F’ tests have been applied to test the hypotheses wherever necessary.

i) Annual Growth Rate (AGR)

This shows the rate of growth of a variable at a point of time in the study period.

Given the trend \( y = a + bt \),

\[ a \text{ and } b \text{ are calculated as follows.} \]

\[ b = \frac{\sum y_t t - \sum y_t \Sigma t}{\sum t^2 - (\Sigma t)^2} \]

\( b \) gives the rate of growth at a point of time \( t \) of the series or study period.

\[ a = \bar{y} - b \bar{t} \]

Where \( \bar{y} \) is mean of \( y \) and \( \bar{t} \) is mean of \( t \) series

AGR is used for analysis of profitability, liquidity and solvency wherever necessary.
ii) Analysis of Variance (ANOVA)

It is a technique of analyzing the variance explained by the dependent variable based on selected independent variables. The independent variables are termed as group variables or factors. ANOVA is used to find out whether the group means of the dependent variable differ significantly or not based on the classification of the independent variables. The ANOVA test is applied to find out whether the internal variables of profits differ significantly or not among the years. The ANOVA test is also extensively applied in this study to find out whether there is any significant difference in the profitability ratios in terms of age, size, profitability, ownership and the years.

iii) Spearman’s Rank Correlation Co-efficient

Correlation or Rank Correlation ($r_s$) is the technique of determining the degree of Correlation between two variables in case of ordinal data where ranks are given to the different values of the variables. The Spearman rank correlation co-efficient is calculated because this statistical tool does not assume any specific distribution for the two variables. Net Liquid Balance and Operating Cash Flow to Current Liabilities Ratios. The Spearman rank correlation technique is applied in this study to select the profitability ratios for ranking the companies. For calculating ‘r,’ between the profitability ratios, all the sixty-five sample companies are considered as the number of observations.

iv) Correlation Matrix and Correlation Analysis

Correlation Matrix is an array of Correlation Co-efficient values arranged in a tabular form where row and column variables show the correlation of each variable with the other variables in the array. It is used in this study to select the internal variables determining the profits. It is also employed to identify the liquidity. If there is a correlation of more than 0.80 between two liquidity ratios, the one that has high correlation with the dependent variable, is selected. This tool is applied to shortlist the liquidity ratios, for the purpose of further analysis. Correlation Analysis is used to determine the degree of relationship between (a) liquidity and profitability (b) liquidity and quality of earnings.
v) Multiple Regression Analysis

This technique has been used to study the extent to which the independent variables influence the dependent variable. To assess the relationship and impact of liquidity on profitability and liquidity on Quality of Earnings, stepwise Multiple Regression has been used. The stepwise Multiple Regression is a method of construction of a Multiple Regression equation wherein each variable is entered into the equation based on certain selection criteria. Initially, the equation starts with no predictor variable. As a first step, the variable with the maximum correlation with the dependent variable is selected based on the ‘F’ value, (The ‘F’ value is fixed as 3.84 with an associated probability of 0.05) which should be greater than or equal to the cut-off value fixed already and is considered for inclusion for entry into the equation based on their highest partial correlation values and their respective ‘F’ values. This study attempts to find out the extent to which the selected liquidity measures through correlation matrix have significant impact on the dependent variable viz., Return on Total Assets (Return on Investment).

vi) Discriminant Function

The discriminant function analysis is employed to construct a function with the selected profitability ratios so that the companies belonging to more profitable or less profitable groups are differentiated to the maximum. The linear combination of the variables is known as discriminant function and its parameters are called, discriminant function co-efficients.

The typical discriminant function will be of the form

\[ Z = a_0 + a_1 x_1 + a_2 x_2 + a_3 x_3 + \cdots + a_n x_n \]

Where, \( a_0 \) is the constant
\( a_1, a_2, \ldots, a_n \) are the discriminant function coefficients of the independent variables
\( x_1, x_2, \ldots, x_n \) are the independent variables
The Canonical Correlation is applied for discriminant function. This is interpreted as a percentage of the variation in the dependent variable explained by all the discriminating variables. Once the discriminant function is arrived at, then efficiency of the function as to how accurately it classifies the companies into the respective groups is assessed. For this, a classification matrix is developed using, ‘actual’ and ‘predicted’ group membership of the companies. From this, overall classification accuracy is calculated which in turn shows the efficiency of the discriminating ratios in the discriminant function. The discriminant function is applied in this study in order to identify the key ratios, which have classified the companies into more profitable and less profitable categories. For this purpose eighteen profitability ratios and interest coverage ratio are selected.

1.9.3 MODELS USED

In this study, three models namely Prof.Narasimhan and Prof.Balasubramanian’s model on Quality of Earnings, Edward I.Altman’s bankruptcy model and Lambda Index Model are employed.

• Quality of Earnings

Quality of earnings is computed by using an accounting model consisting of integrated ratios as suggested by Prof.Narasimhan and Prof.Balasubramanian.

\[
QE = RONW - (BR + FR),
\]

Where,

QE=Quality of Earnings
RONW=Return on Networth
BR=Business Risk which is represented by the average return on investment of the industry.
FR= The Risk undertaken by the firm by using of the external funds

• Edward I.Altman’s bankruptcy model

To predict financial distress, Edward I.Altman’s Bankruptcy model has been used. According to him, the multiple discriminant analysis score is called as ‘Z’ score.
\[ Z = 1.2x1 + 1.4x2 + 3.3x3 + 0.6x4 + 1.0x5 \]

Where,

- \( X_1 \) = Working Capital / Total Assets
- \( X_2 \) = Cumulative Retained Earnings / Total Assets
- \( X_3 \) = Earnings Before Interest and Taxes / Total Assets.
- \( X_4 \) = Market value of Equity / Book Value of Total Debt.
- \( X_5 \) = Sales / Total Assets.

**Lambda Index Model**

To assess whether the firms face the probability of cash insolvency, Embery's Lambda Model as modified by Prof. George Gallinger has been used. According to him,

\[
\text{Lambda or uncertainty factor (LI)} = \frac{\text{Liquid Resources + Expected Cash Flows}}{\text{Uncertainty of Cash Flows}}
\]

Where,

- Net Liquid Reserve = Cash + Marketable Securities + Unused lines of Credit.
- Free Cash Flow = Operating Cash Flow less Capital Expenditure.

**1.10 SIGNIFICANCE OF THE STUDY**

The study has academic and practical significance. It helps the academicians and researchers to develop new ideas for future study. The study focuses on the performance of profitability of pharmaceutical industry in India, which may be of interest not only to those who are manufacturing pharmaceuticals or related products but also others to see the process of change within the industry. This study will be useful to the management to take investment decisions and anticipate future conditions, identify areas of strength and intrinsic value. The study will help the policy makers in the evaluation of profitability of pharmaceutical industry. The study may also be useful to creditors and financial institutions in their effective credit policy formulation. The study will act as a guide to investors in their investment decisions.
1.11 LIMITATIONS OF THE STUDY

The study is subject to the following limitations:

A few of the sample companies have been following uniform accounting period. In such cases, the financial data have been so organized that they relate to the twelve months of the relevant accounting year. The financial statements from which the data have been extracted are historical and quantitative in nature. Hence, the study incorporates all the limitations that are inherent in the financial statements. The effect of inflation has not been considered in the present study.

1.12 CONCEPTS USED IN THE STUDY

1. **Net Sales (NS):** Sales excluding indirect taxes and duties such as excise, sales tax, octroi.
2. **Cost of Goods Sold (CGS):** Cost of production – change in stocks.
3. **Cost of Production (CP):** Total Raw Material expenses, Power and Fuel, 70 per cent of wages and Salaries, other operating expenses.
4. **Net of Non-Recurring Transactions (NNRT):** Income from non-recurring transactions net of non-recurring expenses. Non-recurring transactions include profit/loss on sales of fixed assets/sale of investments, provisions written back, prior period income/expenses, insurance claims.
5. **Earnings:** The term earnings refer to earnings net of non-recurring transactions. i.e. excluding non recurring income and expenses. Earnings and profits are used alternatively.
6. **Current Liabilities (CL):** Current Liabilities includes Sundry Creditors, Acceptances, Interest accrued and due... etc. Tax, Dividend and other provisions from part of current liabilities. Short-term borrowings are included in the current liabilities, but share application money amount is excluded from it.
7. **Current Assets (CA):** Inventory of raw materials, stores, finished and semi-finished goods, cash and bank balance, receivables such as sundry debtors, advances, investments in marketable securities excluding that of in group companies form part of current assets. Inter corporate loan and Housing loans to employees are excluded from current assets.
8. **Total Assets (TA):** The sum of all assets i.e. fixed assets net of depreciation, current assets and intangible assets.

9. **Total Tangible Assets (TTA):** Total assets less intangible assets.

10. **Capital Employed (CE):** Aggregate of the long-term loans, debentures, short-term loans and advances and shareholders’ equity.

11. **Shareholders' Equity (SHE):** Total paid up capital (Ordinary and preference) and accumulated reserves and surplus adjusted for losses.

12. **Tangible Portion of Shareholders Equity (TPSHE):** The excess of shareholders’ equity over intangible assets.

13. **Industrial Average (IA):** Average of the sample companies.

14. **Gross Contribution (GC):** Net Sales - Cost of goods sold. It is otherwise termed as Gross Profit.


16. **Retained Cash Flow (RCF):** Sum of retained earnings and depreciation provided during the period.

17. **Return on Networth (RONW):** Profit Before Tax (PBT)/Networth.


19. **Profit Margin (PM):** Earnings Before Interest and Tax (EBIT) / Net Sales

20. **Asset Turnover (ATO):** Net Sales / Total Assets

21. **Quality of Earnings (QE) = RONW − (BR + FR)**

22. **Expected compensation for Business Risk (BR) =** Average Return on Investment (AROI) of the industry.

23. **Expected compensation for Financial Risk (FR) =** Average Return on Investment (AROI) – Cost of debt (Kd)) x Debt /Equity
1.13 CHAPTER SCHEME

The report of the thesis is presented in nine chapters.

- The introductory chapter deals with the statement of the problem, objectives, hypotheses, scope, methodology, sampling design, period of study, framework of analysis, significance, limitations, concepts and chapter scheme.
- A profile of the pharmaceutical industry is given in the second chapter.
- A brief description of the review of literature is discussed in chapter three.
- Fourth chapter examines the profitability of the selected companies in the pharmaceutical industry. Determinants of earnings, composite profitability and key discriminators of profitability are analysed.
- Factors influencing the level of profitability are analysed in the fifth chapter. The analysis is made on the basis of age, size and ownership group. The temporal and inter-temporal growth of overall profitability is also examined.
- Sixth chapter ascertains the quality of earnings companywise in terms of asset management, cost management and leverage management.
- Seventh chapter assesses the impact of liquidity on profitability and on quality of earnings.
- Eighth chapter forecasts the financial stability of the selected companies by employing Altman’s model and Lambda model.
- A summary of the findings and suggestions are given in the ninth chapter.
REFERENCES


2. **www.indiainfoline.com**


