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Research methodology is an integral part of the research activity used to develop an effective research design. It includes the most suitable methods of investigations, nature of the research instruments, sampling plan, types of data and statistical tests applied for data analysis. Present chapter provide detailed information on the research methodology and design strategy which is used in the study.

3.1 Title of the study

“A STUDY OF ECONOMIC VALUE ADDED BASED PERFORMANCE MEASUREMENT OF SELECTED PHARMACEUTICAL INDUSTRY IN INDIA”

3.2 Aim of the study

The aim of the present study is to study the performance of selected pharmaceutical industries using Return on Investment (ROI) and Economic Value Added (EVA).

3.3 Objectives

1. To study ability of selected pharmaceutical industries in generating value for their shareholders.
2. To evaluate performance of selected pharmaceutical industries using Return on Investment (ROI).
3. To evaluate performance of selected pharmaceutical industries using Economic Value Added (EVA).
4. To compare performance of selected pharmaceutical industries using ROI and EVA.
5. To study overall performance of selected pharmaceutical industries.
6. To check correlation between ROI and EVA.
7. To provide suggestions for improving financial performance on the basis of analysis through EVA.
3.4 Research Design

The research design is the plan to be followed in order to realize the research objectives or hypothesis. It represents the master plan that specifies the methods and procedures for collecting and analyzing the required information. This study uses a descriptive (analytical) study design on the basis of secondary data collected from Bombay Stock Exchange (BSE) website. The purpose of descriptive study design is to answer the questions who, what, where, when and why. Frequency, average and other statistical calculations are used to describe the observations. This study is used to obtain information concerning the current status of the phenomena to describe what exists with respect to variables or conditions in a situation. The purpose of descriptive study is to collect detailed and factual information that describes an existing phenomenon.

3.5 Sampling

Target Population:

The target population of the study is all large scale pharmaceutical industries in India.

Sampling Technique:

The study applied “Simple Random Sampling Method”. A Simple Random Sampling method utilizes random number as a selection criteria. The sampling population in the present study is all pharmaceutical industries which are listed in BSE with Grade-A (large scale). The random sample ensures that all pharmaceutical industries have given a fair and equal chance of being selected in the study.

Sample Size:

For the present study, researcher has taken 10 large scale (Group-A) pharmaceutical industries from BSE website. The list of selected pharmaceutical industries is given below:
List of selected Pharmaceutical Industries:

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of Pharmaceutical Industry</th>
<th>BSE Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CIPLA LTD</td>
<td>CIPLA</td>
</tr>
<tr>
<td>2</td>
<td>SUN PHARMACEUTIAL INDUSTRIES LTD</td>
<td>SUNPHARMA</td>
</tr>
<tr>
<td>3</td>
<td>BIOCON LTD</td>
<td>BIOCON</td>
</tr>
<tr>
<td>4</td>
<td>DR. REDDY’S LABORATORIES LTD</td>
<td>DRREDDY</td>
</tr>
<tr>
<td>5</td>
<td>CADILA HEALTHCARE LTD</td>
<td>CADILAHC</td>
</tr>
<tr>
<td>6</td>
<td>GLENMARK PHARMACEUTICALS LTD</td>
<td>GLENMARK</td>
</tr>
<tr>
<td>7</td>
<td>TORRENT PHARMACEUTICALS LTD</td>
<td>TORNTPHARM</td>
</tr>
<tr>
<td>8</td>
<td>GLAXO SMITHKLINE PHARMACEUTICALS LTD</td>
<td>GLAXO</td>
</tr>
<tr>
<td>9</td>
<td>AUROBINDO PHARMA LTD</td>
<td>AUROPHARMA</td>
</tr>
<tr>
<td>10</td>
<td>LUPIN LTD</td>
<td>LUPIN</td>
</tr>
</tbody>
</table>

Secondary record in form of balance sheet and profit & loss statement of each selected pharmaceutical industries will gathered from annual reports available on BSE web site. On BSE website annual reports are given for financial year 2009-10 to 2016-17. Hence in present study secondary data of last eight years for each selected industry will be taken. As on BSE India website, last eight years of annual reports were available, in present study was carried out on ten pharma companies with their last eight years annual reports.

3.6 Hypothesis

H₀₁: There is no significant difference in Total Equity between selected pharmaceutical companies

H₁₁: There is significant difference in Total Equity between selected pharmaceutical companies

H₀₂: There is no significant difference in Total Assets between selected pharmaceutical companies
$H_{12}$ : There is significant difference in Total Assets between selected pharmaceutical companies

$H_{03}$ : There is no significant difference in Total Liabilities between selected pharmaceutical companies

$H_{13}$ : There is significant difference in Total Liabilities between selected pharmaceutical companies

$H_{04}$ : There is no significant difference in Net Income After Tax between selected pharmaceutical companies

$H_{14}$ : There is significant difference in Net Income After Tax between selected pharmaceutical companies

$H_{05}$ : There is no significant difference in Net Income Before Tax between selected pharmaceutical companies

$H_{15}$ : There is significant difference in Net Income Before Tax between selected pharmaceutical companies

$H_{06}$ : There is no significant difference in Return on Investment (ROI) between selected pharmaceutical companies

$H_{16}$ : There is significant difference in Return on Investment (ROI) between selected pharmaceutical companies

$H_{07}$ : There is no significant difference in mean Economic Value Added (EVA) between selected pharmaceutical companies

$H_{17}$ : There is significant difference in mean Economic Value Added (EVA) between selected pharmaceutical companies

$H_{08}$ : There is no significant difference in mean Net Profit Margin between selected pharmaceutical companies
$H_{18}$ : There is significant difference in mean Net Profit Margin between selected pharmaceutical companies

$H_{09}$ : There is no significant difference in mean Return on Capital Employed (ROCE) between selected pharmaceutical companies

$H_{19}$ : There is significant difference in mean Return on Capital Employed (ROCE) between selected pharmaceutical companies

$H_{010}$ : There is no significant difference in mean Debt Equity Ratio between selected pharmaceutical companies

$H_{110}$ : There is significant difference in mean Debt Equity Ratio between selected pharmaceutical companies

$H_{011}$ : There is no significant difference in mean Asset Turnover Ratio between selected pharmaceutical companies

$H_{111}$ : There is significant difference in mean Asset Turnover Ratio between selected pharmaceutical companies

$H_{012}$ : There is no significant difference in mean Current Ratio between selected pharmaceutical companies

$H_{112}$ : There is significant difference in mean Current Ratio between selected pharmaceutical companies

$H_{013}$ : There is no significant difference in mean Quick Ratio between selected pharmaceutical companies

$H_{113}$ : There is significant difference in mean Quick Ratio between selected pharmaceutical companies

$H_{014}$ : There is no significant difference in mean Inventory Turnover Ratio between selected pharmaceutical companies
\( H_{14} \): There is significant difference in mean Inventory Turnover Ratio between selected pharmaceutical companies

\( H_{015} \): There is no significant difference in mean Dividend Payout Ratio between selected pharmaceutical companies

\( H_{115} \): There is significant difference in mean Dividend Payout Ratio between selected pharmaceutical companies

\( H_{016} \): There is no significant relation between EVA and ROI of selected pharmaceutical companies

\( H_{116} \): There is significant relation between EVA and ROI of selected pharmaceutical companies

3.7 Research Instrument

In this research secondary data derived from annual reports of selected pharmaceutical industries were used. Various rates and ratios will be obtained from information given in annual reports.

3.8 Type of Variables

Researchers manipulate variables in order to test hypothesis and learn more about the factors or conditions that are changing during the course of an investigation. There are two types of variables in this study:

a) Independent Variables: Total Debt Ratio and Debt-Equity Ratio are considered as independent variables.

b) Dependent Variables: Economic Value Added (EVA), EVA to Capital Employed Ratio are considered as dependent variables.
Computation of EVA:

Computation of EVA involves calculation of three figures…

1) Net Operating Profit Before Interest After Tax (NOPAT)
2) Capital Employed and
3) Weighted Average Cost of Capital (WACC) based on CAOM.

To compute market return long run averaged annualized daily return has been considered. The long run period should represent all cycles and abnormalities of the capital market.

Economic Value Added (EVA) = NOPAT – WACC X Capital Employed

where, Capital Employed = Net Block + Trading Investment + Net Current Assets

OR

Capital Employed = Total Assets – Current Liability

Return on Investment (ROI) = Net Profit / Total Investment X 100

3.9 Data Analysis

As it is a descriptive analytical study, descriptive statistics like Mean, Standard Deviation (SD) and Indices were obtained from given data. One Way ANOVA test and Trend Analysis were employed to analyze the data. Trend analysis was presented in form of line diagrams. Data analysis was carried out with the help of MS Excel and statistical software “STATA/MP”. For each statistical test, corresponding p – values were obtained and on the basis of that, the last conclusion for rejection / acceptance of the particular hypothesis will be made. Researcher has put the level of significance (l.o.s.) at 5%. i.e. if the p-value is less than 0.05, reject the hypothesis otherwise accept it.
3.10 Rational for taking the research topic

Majority of the companies obtain business units using Return on Investment (ROI) instead of Economic Value Added (EVA). Below given are advantages of ROI measure over EVA.

- ROI is a comprehensive measure in which any change directly affects financial statements.
- ROI is simple to calculate, easy to understand and meaningful in an absolute sense.
- ROI is a common denominator that may be applied to any organizational unit responsible for profitability, regardless of size or type of business. The performance of different units may be compared directly to one another.
- ROI data are available for competitors and can be used as a basis for comparison.

On other side value of Economic Value Added (EVA) does not provide basis for comparison like ROI. Till the EVA approach has some inherent advantages. Below given reasons to use EVA over ROI.

- With EVA all business units have the same profit objective for comparable investments whereas the ROI approach provides different incentive for investments across business units.
- The use of ROI as a measure deals with both these problems. They relate to asset investment whose ROI falls between the cost of capital and the center’s current ROI. If investment center’s performance is measured by EVA, investments that practice a profit in excess of the cost of capital will increase EVA and therefore economically attractive to the manager.
- Different interest rates may be used for different types of assets. A low rate may be used for inventories while a relatively higher rate may be used for investments in fixed assets. Furthermore, different rates may be used for different types of fixed assets to take into account different degrees of risk. Management control systems can be made considered with the framework used for decisions about capital investments and resources allocation. It
follows that the same type of asset may be required to earn the same return throughout the company, regardless of the particular business profitability. Thus, business unit managers should act consistently when deciding to invest in new assets.

- EVA in contrast to ROI, has a stronger positive correction with changes in a company’s market value. There are several reasons why shareholder value creation is critical for the firm: It (a) reduces the risk of takeover, (b) creates currency for aggressiveness in mergers and acquisitions, and (c) reduces cost of capital, which allows faster investment for future growth. Thus, optimizing shareholder value is an important goal of an enterprise. However, since shareholder value measures the worth of the consolidated enterprise as a whole it is nearly impossible to use it as a performance criterion for an organization's individual responsibility centers. The best proxy for shareholder value at the business unit level is to ask business unit managers to create and grow EVA. It indicates that companies with high EVA tend to show high market value added (MVA) or high gains for shareholders. When used as a performance metric, EVA motivates managers to increase EVA by taking actions consistent with increasing stockholder value.

Due to above reasons, researcher has decided to do an in-depth study and collect evidence to conclude which method of financial performance is better among ROI and EVA. Importance of present study is as follows:

- EVA acts as performance measure which is linked to shareholder value creation in all directions.
- It is useful in providing business knowledge to everyone.
- It is an efficient method for communicating to investors.
- It transforms the accounting information into economic quality which can be easily understood by non-financial managers.
- It is useful in evaluating Net Present Value (NPV) of projects in capital budgeting which is contradictory to IRR.
- Instead of writing value of firm in terms of discounted flow, it can be expressed in terms of EVA of project.
3.11 Limitations of the study

The limitations of the study are those characteristics of design or methodology that set parameters on the application or interpretation of the results of the study; that is, the constraints on generalizability and utility of findings that are the result of the devices of design or method that establish internal and external validity. This study has its own importance but the same has to be seen in the purview of the following limitations:

- The study considers only ten large scale pharmaceutical industries. Hence it might not be a representation of all pharmaceutical industries from whole India as such.
- The study has been limited to only those pharmaceutical industries which are listed on Bombay Stock Exchange (BSE) with Group – A category.

On the whole therefore, there is both hope and confidence that this effort will succeeded in eliminating or at least minimizing the potentially negative consequences of the problems enumerated above.