CHAPTER-4

RESEARCH METHODOLOGY

INDEX

[4.1] INTRODUCTION:

Research is a specific topic of study in which a firm or organization collects and analyzes data in order to improve the company's management or reach fresh conclusions. Research is often considered an academic activity because it is a component of education. It is an extremely careful research or inquiry, particularly the search for new facts in any field of expertise. Research is a unique contribution to the current body of knowledge that allows for growth. In a nutshell, research is the objective and systematic pursuit of knowledge in order to find a solution to a specific problem.

Figure 4.1: Things Includes in Research

Research Includes		
Financial Data	Consumer Feedback	Comparative Analysis

[Source: Self- Constructed]

➕ **Financial Data:**

Financial data is required when the research work is based on the financial institutions and companies.

➕ **Consumer Feedback:**

The feedback of the consumer is required when the company wants to understand the behavior of the consumer. When the product is new in the market at that time the feedback of consumer is needed. The feedback of consumer may be:

- **Positive Feedback**
- **Negative Feedback**

➕ **Comparative Analysis:**

Comparative Analysis is required in the financial data of two companies are compare with each other or the financial data for two years is compared.

115

So, the aim of this study is also to compare financial data to Pharmaceuticals Companies and to know an efficiency of the selected Pharmaceuticals Companies of India. For this research work DEA (Data Envelopment Analysis Model) is used and the parameters of DEA are as under:

- **Liquidity Ratios**
- **Activity Ratios**
- **Leverage Ratios**
- **Economic Indicator (EVA)**
- **Profitability Ratio**

The researcher can determine the final explanations and findings using research methodology. To quantify a company's financial health, trustworthy data must exist.

Without solid data, study job cannot be completed. So, research technique is a systematic approach to solving the research problem for the study. Research methodology is the study of how scientific research is conducted. Research technique covers the numerous processes taken by the researcher to examine the research problem, as well as the thinking behind that problem. Some of the elements of research methodology are as under:

- **Formulation of the Problem**
- **Title of the study**
- **Objectives of the study**
- **Hypothesis of the Study**
- **Research Design**
- **Data Collection**
- **Source of Data**
- **Sampling Method**
- **Universe of the Study**
- **Sample Size**
- **Period of the Study**
- **Tools and Techniques**
- **Findings**
- **Suggestions**

[4.2] MEANING OF RESEARCH:

The word **"Research"** is consequent from the Middle French "Recherche". That means **"to go about seeking"** the term itself consequent from the old French word "Recerchier". This word is the compilation of the 2 words i.e." Re + Cerchier". Research is the systematic way to find out the solution of the problem and to reach at the new findings or conclusion. It is the combination of two words i.e. Re + Search.

Figure-4.2: Meaning of Research

[Source: Self- Constructed**]**

Where,

RE- Again

SEARCH- To Find Out

Thus, research implies discovering new things that someone else has already searched for. Research is a careful research or inquiry, particularly the search for new information in any field of knowledge. Research is a thorough, systematic, structured, efficient, and logical exploration of a body of knowledge or a specific topic.

Every letter of Research gives special and defined meaning. It is described as under:
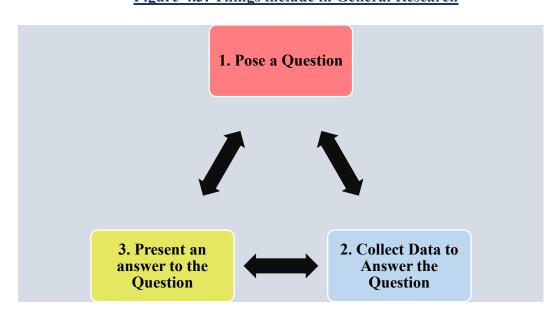
Table – 4.1: Table Showing Meaning of Research

Sr. No.	Word	Meaning	
1	R	Retain	Continue to hold
2	E	Enroot	On the way
3	S	Search	For solution
4	E	Engima	Quite difficult to understand
5	A	Articulate	Express clearly
6	R	Res Gestae	Introduce facts, explain nature
7	C	Contingency	Possible future incident
8	H	Herald	Announce the approach of something

[**Source:** Self- Constructed]

Research is creative as well as systematic work which is undertaken to increase the stock knowledge. It includes collection of data, arrangement of data and analysis of data. It is human activity which is based on intellectual application for particular investigation. The basic aim of research is discovering, interpreting and developing. It is serious study of a subject that is intended to find out new things or to test different ideas. General research includes the following three things

Figure-4.3: Things include in General Research

[**Source:** Self- Constructed]

118

[4.3] DEFINITION OF RESEARCH:

There are numbers of definition of research are given by the various authors. Some of them are as under:

[Source: www.google.co.in]

1. According to D. SLESINGER AND M. STEPHENSON:

"The manipulation of things, concepts or symbols for the purpose of generalizing to extend, correct or verify knowledge, whether that knowledge aids in construction of theory or in the practice of an art"

2. According to CLIFFORD WOODY:

"Research comprises defining and redefining problems, formulating hypothesis or suggested solutions; collecting, organizing and evaluating data; making deductions and reaching conclusion; and at last carefully testing the conclusion to determine whether they fit the formulating hypothesis"

3. According to WEBSTER INTERNATIONAL DICTIONARY :

"Research is careful inquiry or examination in seeking facts or principles, diligent investigation in order to ascertain something".

4. According to BRITISH MEDICAL DICTIONARY:

"Establishment of facts and their significance by experiment, scientific and analysis of data"

5. According to Kothari:

"Research is a pursuit of trust with the help of study, observation, comparison and experiment, the search for knowledge through objective and systematic method of finding solutions for the problem"

6. According to WALTZ AND BANSELL:

"Research is a systematic, formal, rigorous and precise process employed to gain solutions to problems or to discover and interpret new facts and relationships"

7. According to PAYTON:

"Research is the process of looking for a specific question in an organized, objective, reliable way"

8. According to THE MERRIAM:

"A studious inquiry or examination, especially; investigation or experimentation aimed at the discovery and interpretation of facts, revision of accepted theories or law in the light of new facts or practical application of such new theories or revised theories or law"

9. According to KERLINGER:

"Research is a systematic, controlled, empirical as well as critical investigation of hypothetical propositions about the presumed relations among natural phenomena"

10. According to LONGMAN DICTIONARY OF CONTEMPORARY ENGLISH:

"Research as a serious study of a particular subject that is intended to discover new facts or test an idea"

[4.4] NEED OF THE STUDY:

In today's competitive environment, it is critical to regularly assess the health of a company or sector in order to remain competitive. The financial situation of any industry can be examined using performance evaluation. DEA is a component of it. So, using Data Envelopment Analysis, we may identify efficient and inefficient units and use a variety of techniques to convert wasteful units into efficient ones. This research is critical for determining the financial health of specific pharmaceutical companies. As company or as an investor it is required to see that it is….
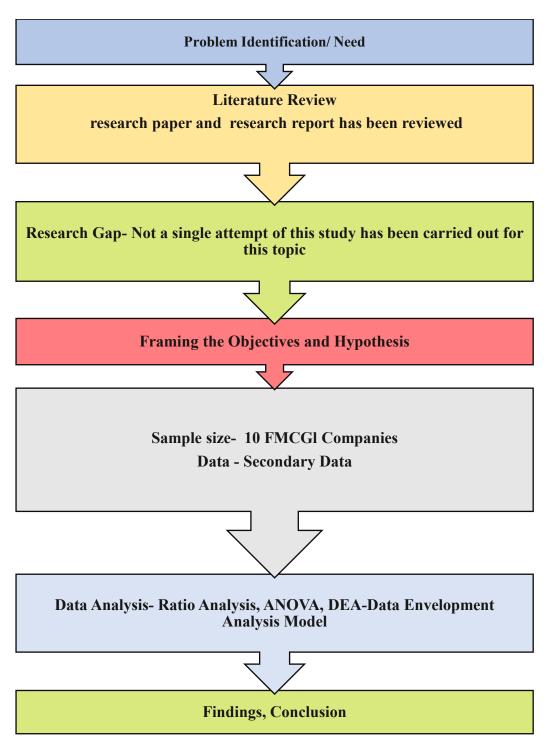
- **Efficient Unit or**
- **Inefficient Unit**

[4.5] RESEARCH PROCESS FOR THE STUDY:

The following research process has been carried out for the completion of the entire research work.

Figure 4.4: Research Process

```
┌─────────────────────────────────────────────────────────────┐
│                Problem Identification/ Need                  │
└─────────────────────────────────────────────────────────────┘
                              ↓
┌─────────────────────────────────────────────────────────────┐
│                     Literature Review                        │
│     research paper and  research report has been reviewed    │
└─────────────────────────────────────────────────────────────┘
                              ↓
┌─────────────────────────────────────────────────────────────┐
│ Research Gap- Not a single attempt of this study has been    │
│                   carried out for this topic                 │
└─────────────────────────────────────────────────────────────┘
                              ↓
┌─────────────────────────────────────────────────────────────┐
│            Framing the Objectives and Hypothesis             │
└─────────────────────────────────────────────────────────────┘
                              ↓
┌─────────────────────────────────────────────────────────────┐
│              Sample size-  10 FMCGl Companies                │
│                    Data - Secondary Data                     │
└─────────────────────────────────────────────────────────────┘
                              ↓
┌─────────────────────────────────────────────────────────────┐
│  Data Analysis- Ratio Analysis, ANOVA, DEA-Data Envelopment  │
│                      Analysis Model                          │
└─────────────────────────────────────────────────────────────┘
                              ↓
┌─────────────────────────────────────────────────────────────┐
│                    Findings, Conclusion                      │
└─────────────────────────────────────────────────────────────┘
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[4.6] STATEMENT OF THE PROBLEM:

Figure 4.5: Statement of the Problem

[**Source:** Self- Constructed]

In today's competitive world it is necessary to evaluate the health of the firm or industry on the regular basis to sustain in the market. With the help of Data Envelopment Analysis, we can find out the efficient and inefficient units and can take several measures to turn inefficient unit into efficient unit. To accurately evaluate the financial health and long-term sustainability of a company, a number of financial metrics must be considered. Till this date no research work has been conducted on DEA model for FMCG Companies of India.

From the review of literature following research gap has been carried out.

- ✓ Not a single attempt of this topic has been studied previously for the FMCG Companies in India

- ✓ The tools and statistical techniques applied in the previous study were limited.

[4.7] TITLE OF THE STUDY:

The study's title summarizes the main notion of the investigation. The optimal study title uses as few words as possible to adequately explain the substance and goal of the research activity or study. The following title has been chosen for the study:
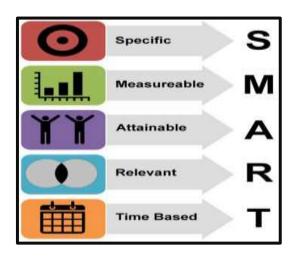
"A Study on Financial Health of Selected FMCG Companies of India by Using Data Envelopment Analysis model"

[4.8] OBJECTIVES OF THE STUDY:

The purpose of the research is to discover the answers of questions with the application of scientific procedure. The main purpose of research work is to find out the truth which is hidden and which has not been find out yet. Thus, each and every study has its own specific objectives. The objective of the study should be **"SMART".**

S – Specific

M – Measurable

A – Achievable

R – Realistic

T – Time Specific

Figure 4.6: Objectives of the Study

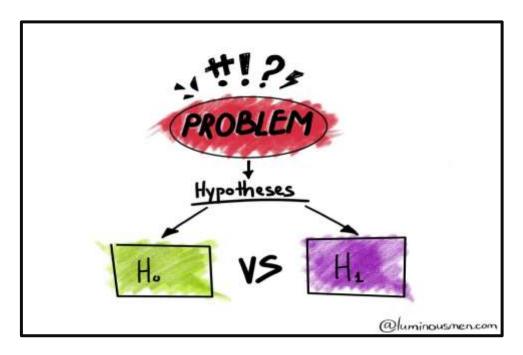[**Source:** www.study.com]

The objectives of this study are as under:

1. To Study the Financial Health of Selected FMCG Companies.

2. To Rank the selected FMCG Companies taking into consideration the input and output through efficiency measurement in DEA Model

3. To find out more efficient and less inefficient unit.

4. To compare Financial Health of Selected FMCG Companies.

[4.9] HYPOTHESES OF THE STUDY:

The hypotheses are the assumptions or the predictions of the study. There are main two types of the hypothesis i.e.

1. **Null Hypothesis (H_0)**

2. **Alternative Hypothesis (H_1)**

Null hypothesis is symbolized as **H_0** and Alternative hypothesis is symbolized as **H_1**. The hypothesis of the study clear and precise as well as it should be tasted

[**Source:** www.google.co.in]

Following are the hypothesis of the study.

1. H_0 = There is no significant difference between the **Liquidity Ratio** of the Selected FMCG Companies during the study period.

   H_1 = There is significant difference between the **Liquidity Ratio** of the Selected FMCG Companies during the study period.

   - H_0 = There is no significant difference between **Current Ratio** of Selected FMCG Companies during the study period
   - H_1 = There is significant difference between **Current Ratio** of Selected FMCG Companies during the study period
   - H_0 = There is no significant difference between **Quick Ratio** of Selected FMCG Companies during the study period
   - H_1 = There is significant difference between **Quick Ratio** of Selected FMCG Companies during the study period
   - H_0 = There is no significant difference between **Working Capital Ratio** of Selected FMCG Companies during the study period
   - H_1 = There is significant difference between **Working Capital Ratio** of Selected FMCG Companies during the study period

2. H_0 = There is no significant difference between the **Activity Ratio** of the Selected FMCG Companies during the study period.

   H_1 = There is significant difference between the **Activity Ratio** of the Selected FMCG Companies during the study period.

   - H_0 = There is no significant difference between Account Receivable Turnover Ratio of Selected FMCG Companies during the study period
   - H_1 = There is significant difference between Account Receivable Turnover Ratio of Selected FMCG Companies during the study period
   - H_0 = There is no significant difference between Inventory Turnover Ratio of Selected FMCG Companies during the study period
   - H_1 = There is significant difference between Inventory Turnover Ratio of Selected FMCG Companies during the study period

   - H_0 = There is no significant difference between Assets Turnover Ratio

of Selected FMCG Companies during the study period

- H_1 = There is significant difference between Assets Turnover Ratio of Selected FMCG Companies during the study period

- H_0 = There is no significant difference between Collection Period Ratio of Selected FMCG Companies during the study period

- H_1 = There is significant difference between Collection Period Ratio of Selected FMCG Companies during the study period

3. H_0 = There is no significant difference between the **Leverage Ratio** of the Selected FMCG Companies during the study period.

 H_1 = There is significant difference between the Leverage Ratio of the Selected FMCG Companies during the study period.

- H_0 = There is no significant difference between Debt Ratio of Selected FMCG Companies during the study period

- H_1 = There is significant difference between Debt Ratio of Selected FMCG Companies during the study period

- H_0 = There is no significant difference between Interest Coverage Ratio of Selected FMCG Companies during the study period

- H_1 = There is significant difference between Interest Coverage Ratio of Selected FMCG Companies during the study period

- H_0 = There is no significant difference between Equity Ratio of Selected FMCG Companies during the study period

- H_1 = There is significant difference between Equity Ratio of Selected FMCG Companies during the study period

4. H_0 = There is no significant difference between the **Economic Indicator** of the Selected FMCG Companies during the study period.

 H_1 = There is significant difference between the Economic Indicator of the Selected FMCG Companies during the study period.

- H_0 = There is no significant difference between EV to Net Operating Revenue of Selected FMCG Companies during the study period

- H_1 = There is significant difference between EV to Net Operating

Revenue of Selected FMCG Companies during the study period

5. **H_0** = There is no significant difference between the **Profitability Ratio** of the Selected FMCG Companies during the study period.

   H_1 = There is significant difference between the Profitability Ratio of the Selected FMCG Companies during the study period.

   - **H_0** = There is no significant difference between Return on Assets Ratio of Selected FMCG Companies during the study period

   - **H_1** = There is significant difference between Return on Assets Ratio of Selected FMCG Companies during the study period

   - **H_0** = There is no significant difference between Return on Capital Employed Ratio of Selected FMCG Companies during the study period

   - **H_1** = There is significant difference between Return on Capital Employed Ratio of Selected FMCG Companies during the study period

   - **H_0** = There is no significant difference between Return on Current Assets Ratio of Selected FMCG Companies during the study period

   - **H_1** = There is significant difference between Return on Current Assets Ratio of Selected FMCG Companies during the study period

   - **H_0** = There is no significant difference between Return on Equity Ratio of Selected FMCG Companies during the study period

   - **H_1** = There is significant difference between Return on Equity Ratio of Selected FMCG Companies during the study period

   - **H_0** = There is no significant difference between Operating Profit to Sales Ratio of Selected FMCG Companies during the study period

   - **H_1** = There is significant difference between Operating Profit to Sales Ratio of Selected FMCG Companies during the study period

[4.10] DESCRIPITION ABOUT THE AREA OF STUDY:

Figure 4.7: Area of the Study

[**Source:** www.google.co.in]

[4.11] SCOPE OF THE STUDY:

The scope of the study means the maximum extended limit of the Research work. The maximum is covered in this research work can be consider as the scope of the study. The scope of the study is divided into following two parts.

Figure-4.8: Scope of the Study

[**Source:** Self-Constructed]

1. **Functional Scope**

The study is restricted to some aspect of the performance evaluation. Other aspects of the Accounting are not covers in this research work.

2. **Geographical Scope:**

Geographically this study only covers the10 FMCG Companies which are listed in BSE. There are many FMCG Companies in India which can be covered in future.

[4.12] RESEARCH DESIGN:

The research design is the task of establishing specific circumstances for data collecting and analysis. In a nutshell, research design is the conceptual framework within which the research was conducted. There are several types of research designs, including exploratory, experimental, and descriptive designs. For this study, the following research design was adopted.

'Quantitative Research Design'

Quantitative research design method is required for the growth of business organization. Insights drawn from numerical data and analysis prove to be highly effective when taking decisions related to the future of the business.

[4.13] POPULATION OF THE STUDY:

The population of the study is each and every FMCG Companies of India which are listed in BSE (Bombay Stock Exchange). This research work can be extended up to the universe/ population of the study.

[4.14] SAMPLING METHOD:

It is very difficult to cover the whole population for the study. For that purpose, the researcher has to adopt one method from the various techniques. Keeping in view the problem, from whole population top 10 FMCG Companies of India (Which are listed in BSE) taken on the bases of Market Capitalization of December 2023.

[4.15] SAMPLE SIZE OF THE STUDY:

After deciding the sampling method, the sample size has been decided by the researcher. Due to the time restraint, it is not possible to make a study of all FMCG Companies of India. So, from whole population top 10 FMCG Companies of India (Which are listed in BSE) taken on the bases of Market Capitalization of December 2023.

Table – 4.2: Table Showing Top 10 FMCG Companies based on Market Capitalization on December 2023

Sr. No.	Name of Company	Market Cap (in INR, Lakh Crore)
1	Hindustan Unilever Limited (HUL)	6.11
2	ITC Limited	5.66
3	Nestle India Limited	2.35
4	Varun Beverages Limited (VBL)	1.39
5	Britannia Industries Limited	1.18
6	Godrej Consumer Products	1.06
7	Dabur India Limited	0.969
8	Tata Consumer Product	0.879
9	United Spirits	0.764
10	Marico Limited	0.69

[Source: www.moneycontrol.com]

[4.16] PERIOD OF THE STUDY:

This research work is carried out for the 10 Years. The duration starts from **2014-15 to 2023-24.**

[4.17] DATA COLLECTION:

The data collection is process of assembly of the data. The data can be gathered from the various sources. The data should be reliable and measurable. The

wrong data leads to the wrong path. And that will be affect the whole research work. For this study following two types of data are collected.

1. **Primary Data**
2. **Secondary Data**

1. Primary Data:

The primary data are those data which are collected for the first time. So, the primary data happen to be the original in nature.

2. Secondary Data:

The secondary data are those data which are already collected by the someone for the particular topic. The secondary data are used in this research work.

[4.18] SOURCE OF DATA:

The data can be primary or secondary. For this study only secondary data is used. So, the data has been collected from the Secondary Data sources.
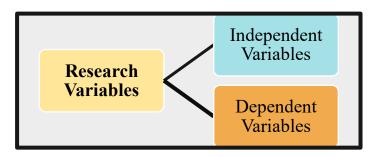
➕ **Secondary Data Source:**

The secondary data for the study is collected from the following sources.

- ✓ **Annual Reports of Selected Companies**
- ✓ **Books**
- ✓ **Journals**
- ✓ **Periodic**
- ✓ **Magazines**

[4.19] RESEARCH VARIABLES:

Figure-4.9: Research Variables of the Study

[**Source:** Self-Constructed]

- **Independent Variables:**

Input and output variables including financial ratios (Current Ratio, Quick Ratio, Working Capital Ratio, Account Receivable turnover ratio, Inventory turnover ratio, Assets turnover ratio, Collection Period Ratio, Debt Ratio, Interest coverage ratio, EVA, Return on Assets, Return on Equity, Return on Current Assets, Operating Profit to Sales)

- **Dependent Variable**: Companies Financial Health and Efficiency.

[4.20] TOOLS AND TECHNIQUES USED IN THE STUDY:

1. Simple Percentage

2. Ratio Analysis

3. One-Way ANOVA

4. DEA (Data Envelopment Analysis) Model

[4.20.1] Simple Percentage:

Percentage Analysis is the method to represent the raw stream of data as a percentage for the better understanding of correlated data.

In Mathematics, a 'Percentage' is the number or ratio as a fraction of 100. It is symbolized as the percentage sign i.e. "%" or abbreviation "pct."

For Example: 50% {read as Fifty Percent} is equal to 50/100 or 0.50. A related system which expresses a number as a fraction of 1000 uses the term "per mil" and "millage". Percentage is used to express how large/small one quantity is relative to another quantity. The first quantity usually represents a part of, or a change in the second quantity which should be greater than zero. The percentage analysis is the very simple so each and every can understand easily.

[4.20.2] Ratio Analysis

Ratio analysis is a quantitative method to measure company's liquidity Position, operational efficiency, as well as profitability by studying its financial statements such as

- **Balance Sheet and**
- **Income Statement**

In this research work following ratios are used

- **Liquidity Ratio**

- **Activity Ratio**

- **Leverage Ratio**

- **Profitability Ratio**

Ratio analysis can spot how a company is performing during the particular time, while comparing a company to another within the same industry or sector. Ratio analysis can forecast a company's future performance for superior or inferior.

[4.20.3] One-Way ANOVA:

Analysis of variance is a collection of statistical models and their associated procedures in which the observed variance in a particular variance is partitioned into components attributable to different source of variation. In one way ANOVA, only one factor is considered. The calculation of one way ANOVA can be done as under:

1. **Correction Factor**= T^2/N

Where,

   T= Total of Values

   N = No. of observations

2. **SST:** = $(\sum x_1{}^2 + \sum x_2{}^2 + \sum x_3{}^{2)}) - CF$

3. **SS Between:** = $(\sum x_j)^2 /n_j$

133

4. **SS Within:** = SST- SS between

[4.21] CHAPTER PLAN

This research report includes six chapters. This chapter was included to fulfill the study's objectives. Every chapter is important in its own right, and it includes thorough understanding about the topic covered. The chapter plan for this subject is as follows:

Table – 4.3: Table Showing Chapter Plan of the Study

Chapter	Chapter Name
Chapter-1	Overview of FMCG Industry
Chapter-2	Conceptual Framework of DEA Model
Chapter-3	Review of Literature
Chapter-4	Research Methodology
Chapter-5	Data Analysis and Interpretation
Chapter-6	Summary, Findings and Suggestions

[Source: Self-Constructed**]**

Chapter-1: Overview of FMCG Industry

This chapter is divided into two parts. First part gives an overview of FMCG Industry. It covers all the information regarding the FMCG Industry like, Meaning, Definition, History,

The second part includes Profile of Selected Companies, SWOT Analysis of selected companies.

Chapter-2: Conceptual Framework of DEA Model

This chapter is divided into two parts. The first part provides conceptual framework of different ratios like,

- Liquidity Ratio
- Activity Ratio
- Solvency Ratio
- Profitability Ratio etc.

The second part provides the Conceptual Framework of DEA (Data Envelopment Analysis) Model

Chapter-3: Review of Literature

This chapter covers Meaning of literature review, need as well as review of literature regarding this study.

- Articles and Research Paper
- Thesis/ Research Report

Chapter-4: Research Methodology

This chapter covers Meaning of research, Definitions, Need, Statement of the problem, objectives, hypothesis, scope of the study, Period, Population, Sampling method, Sample size, Data collection method, Source, Chapter plan, Significance, Limitations and Future scope of the study.

Chapter-5: Data Analysis and Interpretation

This chapter covers all the calculation aspects and interpretation of the tables. It covers application of ANOVA and DEA Model.

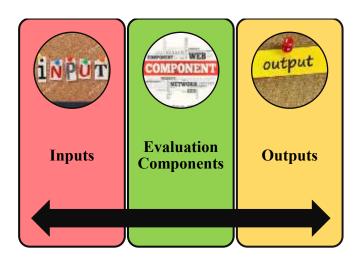**Chapter-6: Summary, Findings and Suggestions**

This chapter is related to the findings which are carried out from the interpretation as well as suggestions that changes to be done to make inefficient unit into efficient unit.

[4.22] SIGNIFICANCE OF THE STUDY

Companies' efficiency is vital in determining the financial health of any sector. The DEA Model allows one to readily identify efficient and inefficient units. As a result, the study's findings will benefit both companies and investors.

The current study examines the overall performance of selected ten FMCG companies in India using Data Envelopment Analysis. The evaluation components are classified as follows in order to establish the overall efficiency of the chosen units.

Figure-4.10: Evaluation Components of the Study

[**Source:** Self-Constructed]

With the help of DEA model, one comes to know the efficient and efficient units which would be helpful to the top management to reach to the desired standards. Performance Evaluation of FMCG industry is a major concern for

- **Company,**
- **Shareholders,**
- **Creditors,**
- **Customers**
- **Employees**
- **Investors etc.**

An efficient FMCG sector would enhance the economy as a whole. Therefore, the outcome of this study would play an important role.

[4.23] LIMITATIONS OF THE STUDY

Each and every study having their own significance and limitations. Some limitations of this study are as under:

1. This study is only limited to FMCG Industry.
2. The convenient sampling method is used for the study.
3. Due to time constrain the sample size for the study is 10 FMCG Companies only. So, the sample size is too small and the result cannot be generalized.

4. This study is based on secondary data which are derived from websites, annual reports, articles, journals, magazines. It may be misleading.

5. For the calculation, ratio analysis has been used which has its own limitations and it also applies to the present study.

6. The Limited statistical tools and techniques are used in the study as well as drawbacks of statistical tools like average, single factor Anova etc. apply to the study.

7. The performance of selected FMCG companies were evaluated with the help of DEA model which has its own limitations may also apply to this research work.

[4.24] FUTURE SCOPE OF THE STUDY

The scope of future research can be established after examining both the study's breadth and its limits. To overcome the limitations of this study, the prospective researcher can perform research on this issue. In that work, the constraints of this research effort can be avoided to some degree.

The following are the future scope which will helpful to the future researcher.

1. This study only focus on FMCG Industry. The study can be extended to the other Industry like,
    - Fertilizers
    - Auto-Mobiles
    - Hotels and Tourism
    - Cement Industry
    - Service Sector
    - Telecommunication
    - Agriculture and so on.

2. This study only concentrations on FMCG Industry of India. The study can be extended to the other country.

3. In this study, only 10 Companies have been selected. More than 10 Companies can be selected for the future study.

4. Other statistical tools can be use

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