

Trend Analysis of Cost Components in Select Pharmaceutical Companies

C Samuel Joseph, F J Peter Kumar, S. Paul Jefferson Clarence

Abstract: *The purpose in this paper is to identify the cost components which are vital in consideration towards manufacturing especially in pharmaceutical companies. The manufacturing costs are significant in total expenses in pharmaceutical industry. In this study, a thorough investigation on the cost components and the trend in expenses and operating profit of pharma companies are studied, giving due regard to cost components to have understanding and to find out how they may differ among various types of pharma companies. The data published in the annual reports from 2009 to 2018 of top five pharmaceutical companies based on their annual revenues has been selected for further diagnosis. The analysis reveals that manufacturing costs are different for all the five companies. The study also reveals that there is a considerable indication that the companies are conscious on the much-needed health benefits to the society in the future at an affordable cost.*

Keywords: COGS, Pharmaceutical Manufacturing Companies.

I. INTRODUCTION

India is one of the largest providers of generic drugs globally. Indian Pharma sector, discovers, develops, produces, and supplies meets 50 per cent of the demand for various vaccines in the world. Presently over 80 per cent of the anti-retroviral drugs used worldwide to cure AIDS are supplied by Indian Pharmaceutical Sector. Every business eventually boils down to a rupee sign, and Pharma Companies are no exception to it. To ensure that the company survives and grow with an assurance of competitive advantage in the domestic and global market all their products must be sold at a reasonable cost to make the unit profitable.

II. COST MANAGEMENT

Cost is universal and most highly visible performance metric, which are always prioritized by top management and control professionals. Effective cost management demands, implementation of such steps that are repeatable and can be integrated with organization goals. Globalization has made cost management in product/service delivery essential for staying competitive in the global market. Pharmaceutical sector are considered to be, more flexible, innovative, quick to react to changing markets, less bureaucratic,

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entrepreneurial, and 'in-touch' with reality. Spending for Medicine in India is expected to raise between 9-12 percent for 2018-22 which is driven by increasing consumer spending, and raising healthcare insurance among others.

1.2 Statement of Problem

In Pharmaceutical sector, the cost of a new drug to reach the market place has been steadily goes in an upward swing. But at the same time the market showed 5.5 per cent in 2017 to 7.1 per cent. Medicine sales in India raised to 8.1 per cent year-on-year in November 2017. Much expenses are incurred in the pre-clinical trials. Further it takes about 7 to 10 years of gestation period to bring in adequate revenue to cover up the developmental costs. This place, pharma companies on a mission mode in discovering a successful drug that clears the approval mechanism, and brings in sufficient revenue on commercialization, and helps firms achieve the desired profits. All this could be possible only if the sector is conscious of its inherent cost. Hence this study assumes importance.

III. OBJECTIVES OF THE STUDY

The study pertains to Pharmaceutical companies. The companies were identified as top performers in the sector, based on the revenue for 2018. The data for top companies were generated as disclosed in the annual reports published and were subjected to analysis. The following are the main objectives of the study,

1. To delineate, analyze and interpret the cost components and its general pattern in Pharma companies.
2. To assess and analyze the trends of the identified cost components of the selected Pharma companies to gain a better understanding of the trends.

IV. RESEARCH METHODOLOGY

There have been substantial research efforts by different authors and scholars on Cost Management and Behavior and its effect on Operating Profit, and these studies had formed the basis of this present study.

1.4.1 Algorithm

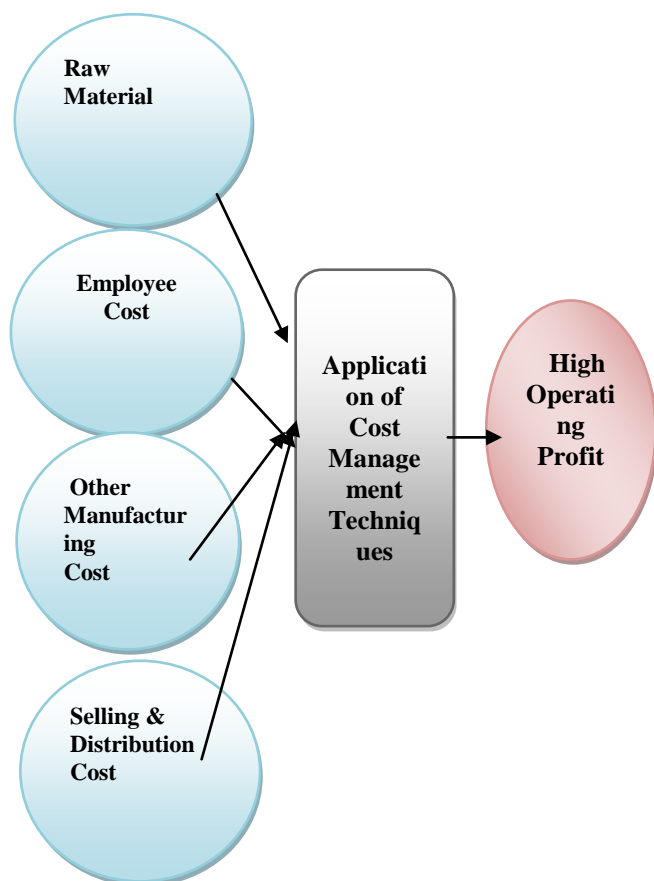
This study is descriptive in nature which quantifies the behavior of cost components and traces it to the firm performance measured in terms of profitability. The authors rallied on data from secondary sources like, the annual reports



of the respective pharma companies, web resources from Bombay Stock Exchange, National Stock Exchange, besides, databases like PROWESS, ACE and HOOVERS were also rallied upon. Top Five Pharmaceutical companies, which are extremely performing well were selected based on the annual revenues for 2018. These companies engage themselves in manufacturing of branded generic and prescription drugs, development of wide range of formulation's and therapies. The data, pertains for a period of 2008-09 to 2017-18. Inferential statistics were used to investigate the different dimensions on the selected Pharma companies which include Trend Analysis, Mean Performances and Variances and Inter-correlation matrix.

The Sample size was selected was, Five Pharmaceutical companies, which were performing well formed the basis of selection based on the annual revenues for 2018. These companies engage themselves in manufacturing of branded generic and prescription drugs, development of wide range of formulation's and therapies.

1.4.2 Conceptual Flow Diagram



V. REVIEW OF LITERATURE

Basu, Et. al. (2008), "In the pharmaceutical industry, costs attributed to manufacturing played a significant role in company's total expenses. Srivastava (2017) "Indian pharmaceutical industry ranks 3rd in the world in terms of volume, quality and range of medicines it manufactures. There are hundreds of pharmaceutical companies in India so a comparative study of their profitability is always needed. Present study is an effort to give an insight into profitability measures of selected pharmaceutical companies in India.

Lassi. R et. al (2017) Fundamental analysis is required to help the investor for taking investment decisions. This research paper mostly focuses on Fundamental analysis of Pharmaceutical Sector. Okunbor (2013) "The authors argues that, the issue of cost behaviour and cost estimation is vital and fundamental in tactical decision-making, planning and control. Novák, et. al (2016) "Cost management is one of the issues in corporate performance and financial management. From the results of transformed model, the authors believe that asymmetric cost behavior is affected by asymmetric behavior of the production in kg in proportion to the production time." Oberholzer M (2004) "The purpose of this paper is to determine the cost structures of companies that formed part of an empirical investigation. Dvorský et. al. (2017) "Cost management is one of the most significant issues in company performance and company financial management which any enterprise has to solve as in the periods of declines of sales revenues, as well as during their growth. Hrušecká et. al. (2018) "Results are presented from quantitative research as part of a project on cost variability and cost management systems. The main objective was to analyze principal findings stemming from determining perception of cost behaviour in practice of industrial firms.

VI. RESULT ANALYSIS & DISCUSSIONS

1.6.1 Market Share

In this chapter the trends of various cost components prevailing among pharma industries for the period of ten years from 2008-2009 to 2017-2018 has been analyzed, using trend percentages. The analysis is based on the figures of collecting from the selected Pharma Companies.

Table 1
MARKET SHARE OF SELECTED PHARMA COMPANIES FOR THE YEAR 2018

S.No.	Name of the Company	Per cent of Total Market Capitalization (Rs in Crores)
1	Aurobindo Pharmaceutical Ltd	32,649.70
2	Cipla Ltd	43,738.10
3	Dr. Reddy's Laboratories Ltd	34,550.12
4	Lupin Ltd	33,291.38
5	Sun Pharmaceutical Ltd	1,18,862.47

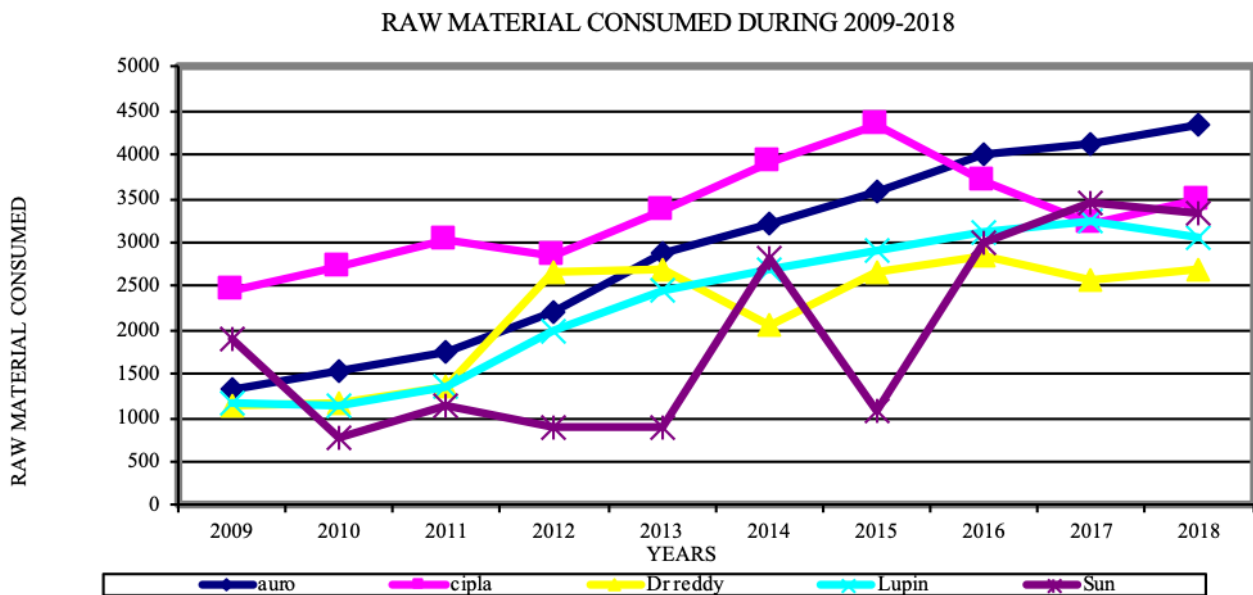
Source: Secondary Data – Moneycontrol.com

From the above table, its observed that Sun Pharma is leading in terms of Market Capitalization with Rs. 1.18 lakhs, as on March 2018. Cipla Ltd takes the second position, Aurobindo and Dr. Reddy's Lab and Lupin's are marginally closer to each other.

1.6.2 Raw Materials Consumed

The raw material happens to be the basic components in the Pharma Sector. The total amount of raw materials consumed for the period 2008-09 to 2017-18 (for a period of 10 years has been studied to understand the trend.

Fig No: 1 Trends in Raw Materials in Select Pharma Sector for 2008-09 to 2017-18

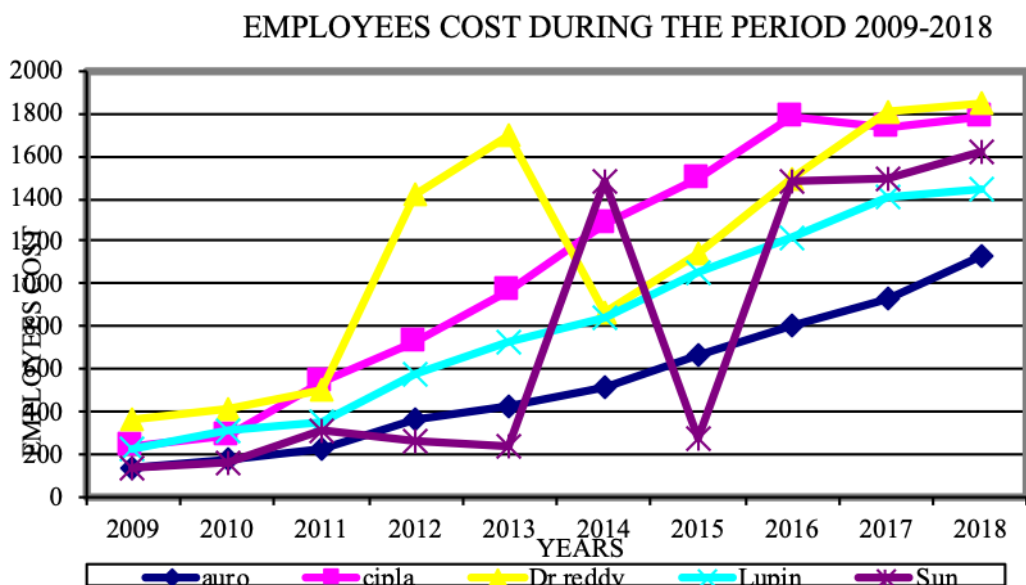


It is absorbed from the above graph, that the raw materials consumed across the selected pharma companies from the period 2008-09 to 2017-18 was found fluctuating over the period of 10 years. And it is at the peak for Cipla for the year 2014-15. The management has to closely monitor the consumption patent of raw materials in the manufacturing process to avoid any wastages or spill outs.

1.6.3 Employees Cost

The employee cost is the most prominent in the Pharma Sector. The total amount of employee cost consumed for the period 2008-09 to 2017-18 (for a period of 10 years has been studied to understand the trend.

Fig No: 2 TRENDS IN EMPLOYEE COST IN SELECT PHARMA SECTOR FOR 2008-09 TO 2017-18



It is absorbed from the above graph, that the Employee cost consumed across the selected pharma companies from the period 2008-09 to 2017-18 was found more fluctuating over

the period of 10 years. Sun pharma was volatile for the year 2013-14. But one thing



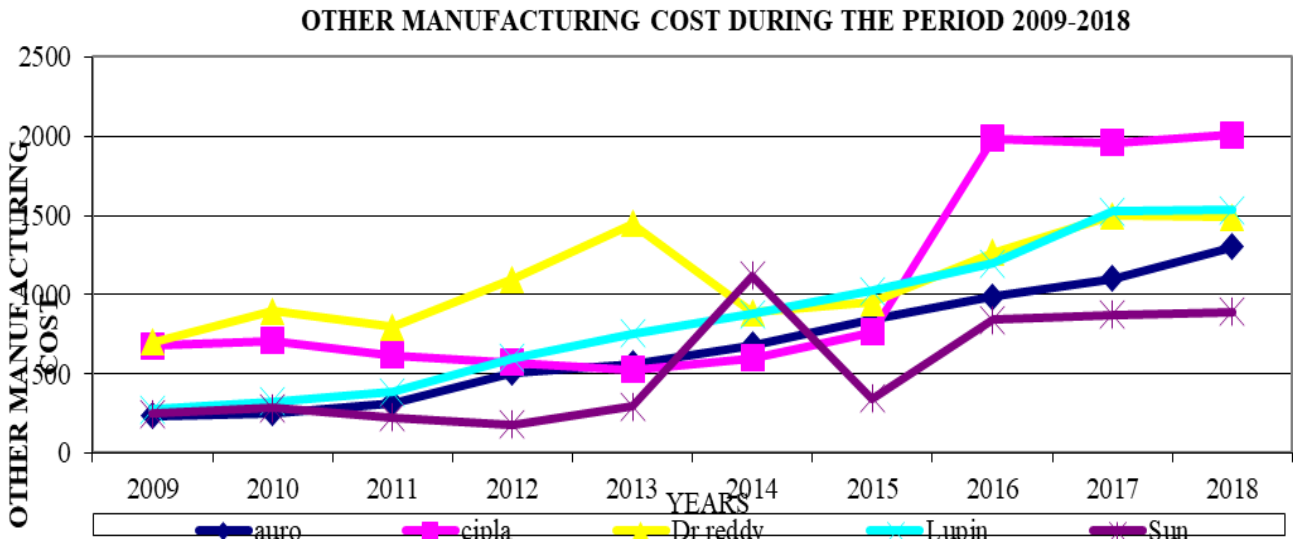
is noticed its increasing every year for every company.

1.6.4 Other Manufacturing Cost

The other manufacturing cost makes significance in the entire Pharma Sector. The total amount of other

manufacturing cost consumed for the period 2008-09 to 2017-18 (for a period of 10 years has been studied to understand the trend. Which is presented in the following table.

Fig No: 3 TRENDS IN OTHER MANUFACTURING COST IN SELECT PHARMA SECTOR FOR 2008-09 TO 2017-18

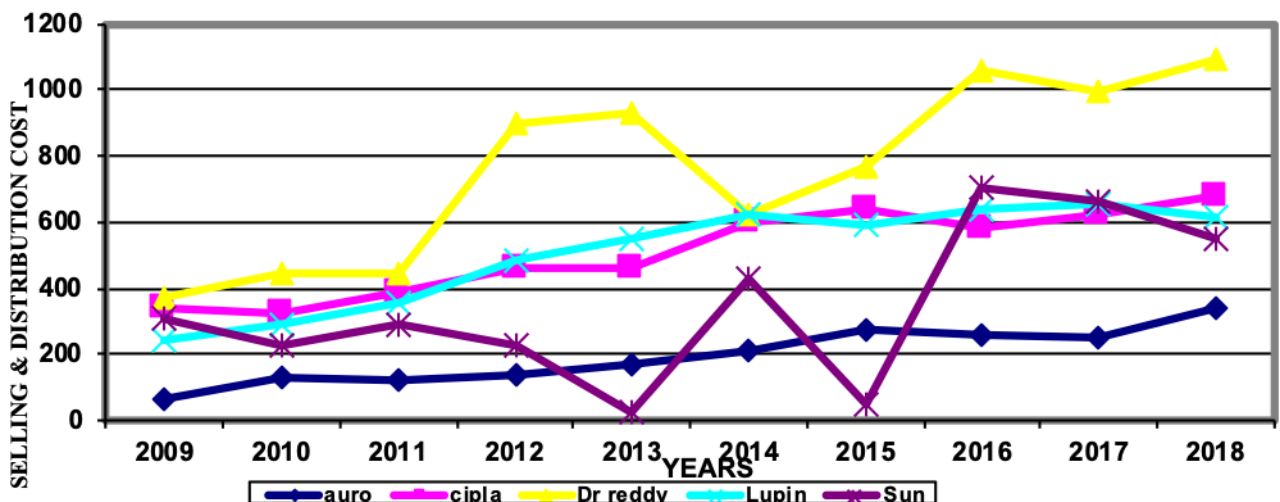


It is observed from the above graph, the other manufacturing cost of Cipla pharma it seen on the higher side. Cipla pharma should revisit its other manufacturing cost (since it shows higher values compared to other companies) and take necessary efforts immediately to bring down other manufacturing cost. Invariably, the graph shows an increasing trend hence all companies should have cost reduction or minimization strategies in place.

.6.5 SELLING AND DISTRIBUTION COST

The selling and Distribution cost are vital for any company in the Pharma Sector. The total amount of the selling and distributions cost consumed for the period 2008-09 to 2017-18 (for a period of 10 years has been studied to understand the trend.

Fig No: 4 TRENDS IN SELLING AND DISTRIBUTION COST IN SELECT PHARMA SECTOR SELLING AND DISTRIBUTION COST DURING THE PERIOD 2009-2018



It is observed from the above graph, the selling and distribution cost is higher with Dr. Reddy’s Lab, while compared to other companies. It indicates that the company gives more important for selling and distribution function. Once the market is established they can take efforts to bring down the selling and distribution cost.

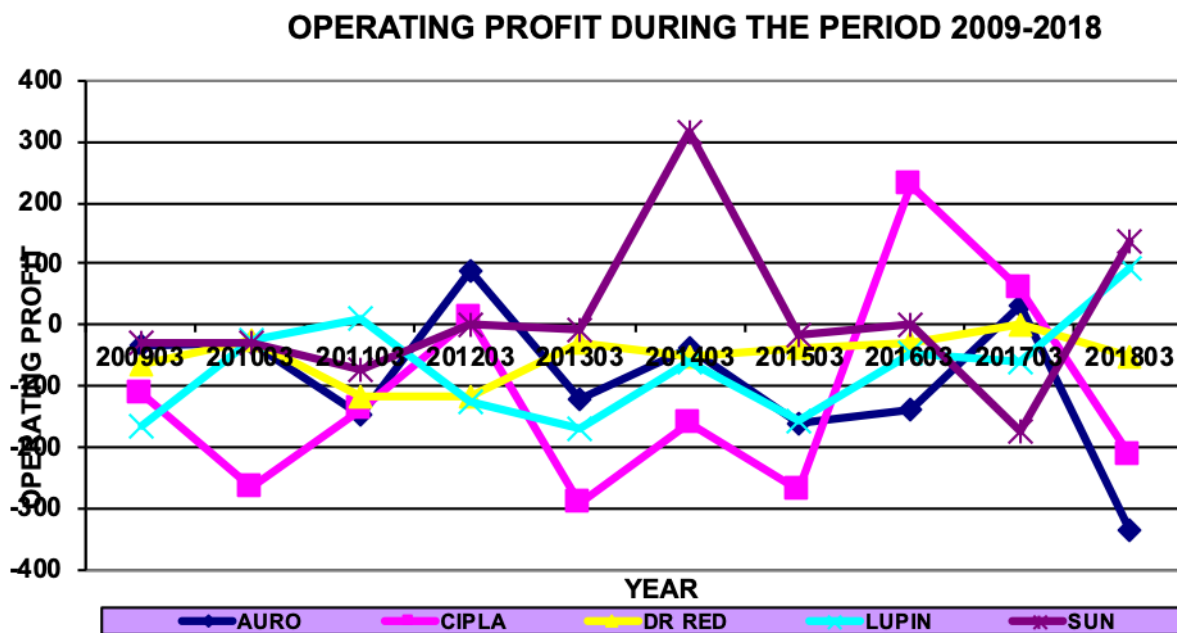
1.6.6 OPERATING PROFIT

The operating profits happen to be the basic components in the Pharma Sector. The total amount of the operating profits consumed for the period 2008-09 to 2017-18 (for a



period of 10 years has been studied to understand the trend.

Fig No: 5 TRENDS IN OPERATING PROFITS IN SELECT PHARMA SECTOR FOR 2008-09 TO 2017-18

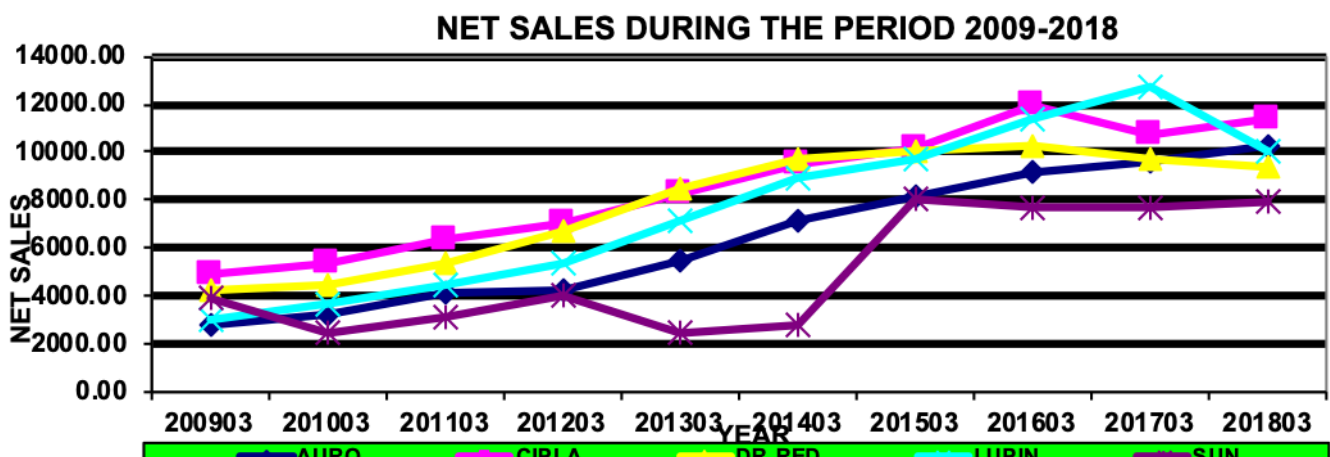


It is observed from the above graph, the operating profit is very much volatile it is at the peak for sun pharma followed by Cipla. The other companies should fall in line with increase its operating profit in a sustainable way, either by adopting sales improvement strategy or cost minimization strategy

1.6.7 Net Sales

The net sales happen to be the basic components in the Pharma Sector. The total amount of the net sales earned for the period 2008-09 to 2017-18 (for a period of 10 years has been studied to understand the trend.

Fig No: 6 TRENDS IN NET SALES IN SELECT PHARMA SECTOR FOR 2008-09 TO 2017-18



It is observed from the above graph, the net sales of sun pharma seem to be very low and volatile while compared to other companies. And Cipla seems to be performing very good in the market.

VII. MEAN PERFORMANCES AND ANALYSIS OF VARIANCE ACROSS THE SELECT PHARMA COMPANIES

The Following analysis gives the summary statistics such as min. value, max. value, mean, standard deviation and CV (%)

of financial parameters among the Pharma Companies during the period of study 2008-2018. To compare their mean performance analysis of variance 'F' test is performed and the results are furnished below:

1.7.1 Net Sales

The net sales across pharma companies has been studied with the help of mean, standard deviation and co-efficient of variance.



TABLE 2
NET SALES OF PHARMA COMPANIES

Pharma Company	Min	Max	Mean	SD	CV (%)
Aurobind	1316.06	4337.74	2829.87	1093.75	38.7
Cipla	2084.08	4330.15	3195.97	658.42	20.6
Dr.Reddy's	1146.10	2848.80	2136.71	679.14	31.8
Lupin	1149.06	3232.49	2251.45	818.28	36.3
Sun	782.27	3464.95	1894.15	1059.15	55.9
F Value (4,50) =4.06*					

It is seen from the above table that the mean Net Sales ranged from 1894.15 in Sun Pharma to 3195.97 in Cipla. The least CV 20.6 per cent is observed in Cipla which shows the consistent performance during the period 2008-2018. The significance (ANOVA) of F statistics showed that there is significant difference in the mean net sales among the Pharma

companies and is higher in Cipla.

1.7.2 Raw Material

The raw material across pharma companies has been studied with the help of mean, standard deviation and co-efficient of variance.

TABLE 3
RAW MATERIAL

Pharma Company	Min	Max	Mean	SD	CV (%)
Aurobind	96.32	433.02	271.33	123.20	45.4
Cipla	74.69	239.01	173.42	57.88	33.4
Dr.Reddys	77.10	297.30	210.68	92.26	43.8
Lupin	109.26	381.32	258.19	98.73	38.2
Sun	37.36	382.52	176.19	155.17	88.1
F Value (4,50) =1.86 ns					

It is seen from the above table that the mean Raw Material ranged from 173.42 in Sun Pharma to 271.33 in Aurobindo Pharma. The least CV 33.4 per cent is observed in Cipla which shows the consistent performance during the period under study namely 2008-2018. The significance (ANOVA) of F statistics showed that there is significant difference in the mean raw material among the Pharma companies and is

higher in Cipla.

1.7.3 Power and Fuel Expenses

The power and fuel expenses across pharma companies has been studied with the help of mean, standard deviation and co-efficient of variance.

TABLE 4
POWER & FUEL EXPENSES

Pharma Company	Min	Max	Mean	SD	CV (%)
Aurobind	145.80	1131.64	517.98	326.71	63.1
Cipla	186.47	1785.94	1003.12	641.25	63.9
Dr.Reddys	368.60	1843.00	1115.82	565.75	50.7
Lupin	231.48	1441.64	788.05	437.19	55.5
Sun	117.12	1617.69	691.53	660.73	95.5
F Value (4,50) = 2.16 ns					

It is seen from the above table that the mean Power & Fuel Expenses ranged from 517.98 in Aurobindo Pharma to 1115.82 in Dr. Reddy's. The least CV 50.7 per cent is

observed in Dr. Reddy's Lab shows the consistent performance during the period

under study namely 2008-2018. The significance (ANOVA) of F statistics showed that there is significant difference in the mean power & fuel expenses among the Pharma companies and is higher in Dr. Reddy's Lab.

1.7.4 Employee Cost

The employee cost across pharma companies has been studied with the help of mean, standard deviation and co-efficient of variance.

**TABLE 5
EMPLOYEE COST**

Pharma Company	Min	Max	Mean	SD	CV (%)
Aurobind	234.65	1299.92	659.04	357.44	54.2
Cipla	509.42	2007.33	993.30	640.66	64.5
Dr.Reddys	698.20	1498.40	1073.17	302.52	28.2
Lupin	274.58	1533.71	816.70	456.53	55.9
Sun	179.79	1118.84	502.06	349.45	69.6
F Value (4,50) = 3.16*					

It is seen from the above table that the mean Employee Cost ranged from 502.06 in Sun Pharma to 1073.17 in Dr. Reddy's Lab. The least CV 28.2 is observed in Dr. Reddy's Lab which shows the consistent performance during the period under study namely 2008-2018. The significance (ANOVA) of F statistics showed that there is significant difference in the mean Employee cost among the Pharma

companies and is higher in Dr. Reddy's Lab.

1.7.5 Other Manufacturing Expenses

The other manufacturing expenses across pharma companies has been studied with the help of mean, standard deviation and co-efficient of variance.

**TABLE 6
OTHER MANUFACTURING EXPENSES**

Pharma Company	Min	Max	Mean	SD	CV (%)
Aurobind	60.46	279.56	140.44	89.98	64.1
Cipla	193.84	1022.67	537.21	294.70	54.9
Dr.Reddys	193.90	797.90	461.95	225.26	48.8
Lupin	143.50	975.01	478.85	288.97	60.3
Sun	31.39	1525.97	494.62	492.09	99.5
F Value (4,50) = 2.99*					

It is seen from the above table that the mean Other Manufacturing Expenses ranged from 140.44 in Aurobindo to 537.21 in Cipla. The least CV 48.8 per cent is noticed in Dr. Reddy's Lab which shows the consistent performance during the period under study namely 2008-2018. The significance (ANOVA) of F statistics showed that there is significant difference in the mean other manufacturing expenses among

the Pharma companies and is higher in Dr. Reddy's Lab.

1.7.6 Selling and Distribution Expenses

The selling and distribution expenses across pharma companies has been studied with the help of mean, standard deviation and co-efficient of variance. The details are presented in the following table No 3.7.

**TABLE 7
SELLING & DISTRIBUTION EXPENSES**

Pharma Company	Min	Max	Mean	SD	CV (%)
Aurobind	65.98	337.47	188.72	83.59	44.3
Cipla	282.21	678.09	489.78	142.08	29.0



Dr.Reddys	375.40	1093.50	738.06	273.02	37.0
Lupin	243.21	658.80	498.12	147.81	29.7
Sun	27.23	700.86	337.96	225.79	66.8
F Value (4,50) = 13.21*					

It is seen from the above table that the mean Selling & Distribution Expenses ranged from 188.72 in Aurobindo to 738.06 in Dr. Reddy’s Lab. The least CV 29.0 is noticed in Cipla which shows the consistent performance during the period under study namely 2008-2018. The significance (ANOVA) of F statistics showed that there is significant

difference in the mean Selling and Distribution Expenses among the Pharma companies and is higher in Cipla.

1.7.7 Miscellaneous Expenses

Miscellaneous expenses across pharma companies has been studied with the help of mean, standard deviation and co-efficient of variance. The details are presented in the following table No 3.8.

**TABLE 8
MISCELLANIOUS EXPENSES**

Pharma Company	Min	Max	Mean	SD	CV (%)
Aurobind	23.75	250.49	108.59	66.37	61.1
Cipla	49.58	617.25	284.41	152.92	53.8
Dr.Reddys	30.00	428.40	160.06	115.07	71.9
Lupin	51.65	196.98	100.61	36.89	36.7
Sun	14.73	712.56	246.20	263.30	106.9
F Value (4,50) = 3.33*					

It is seen from the above table that the mean Miscellaneous ranged from 100.61 in Lupin to 284.41 in Cipla. The least CV 36.7 per cent is noticed in Lupin Pharma which shows the consistent performance during the period under study namely 2008-2018. The significance (ANOVA) of F statistics showed that there is significant difference in the mean net sales among the Pharma companies and is higher in Lupin Pharma.

1.7.8 Operating Profit

The operating profit across pharma companies has been studied with the help of mean, standard deviation and co-efficient of variance. The details are presented in the following table No 3.9

**TABLE 9
OPERATING PROFIT**

Pharma Company	Min	Max	Mean	SD	CV (%)
Aurobind	288.89	2670.01	1410.03	925.40	65.6
Cipla	631.82	2195.55	1569.96	558.68	35.6
Dr.Reddys	569.80	2723.50	1574.90	666.44	42.3
Lupin	575.42	4486.12	2079.29	1410.27	67.8
Sun	-664.82	1737.36	488.58	779.87	159.6
F Value (4,50) = 4.41*					

It is seen from the above table that the mean Operating Profit ranged from 488.58 in Sun Pharma to 2079.29 Lupin. The least CV 35.6 per cent is observed in Cipla which shows the consistent performance during the period under study namely 2008-2018. The significance (ANOVA) of F statistics showed that there is significant difference in the mean Operating Profit among the Pharma companies and is higher in Cipla

VIII. RELATIONSHIP BETWEEN COST COMPONENTS AND FIRMS PERFORMANCE

In order to study the relation between set of Cost Components (independent variables) namely Raw Material consumed – X₁ , Power & Fuel Expenses – X₂ , Employee Cost – X₃ , Other Manufacturing Expenses – X₄, General & Administrative Expenses – X₅, Selling & Distribution – X₆,



Miscellaneous Expense – X₇ , with dependent variable out and presented below:
Operating Profit – Y, Inter – Correlation matrix was worked

TABLE 10
INTER-CORRELATION MATRIX

	RM	PF	EC	OME	GA	SD	MISC	OPPROF
RM-X1	1.00							
PF-X2	0.76	1.00						
EC-X3	0.69	0.68	1.00					
OME-X4	0.62	0.59	0.86	1.00				
GA-X5	0.53	0.57	0.87	0.70	1.00			
SD-X6	0.41	0.45	0.83	0.69	0.67	1.00		
MISC-X7	0.32	0.24	0.49	0.39	0.66	0.25	1.00	
OPPROF-Y	0.49**	0.41**	0.37**	0.49**	0.19	0.41**	-0.17	1.00

IX. RECOMMENDATIONS FOR MANAGEMENT

A conclusion section is not required. Although a conclusion may review the main points of the paper, do not replicate the abstract as the conclusion. A conclusion might elaborate on the importance of the work or suggest applications and extensions.

- i) To adopt to rigorously management philosophies like TQM, TCM and TPM
- ii) To streamline the R&D through relevant market study, clinical trials.
- iii) To encourage knowledge management in their regular operations

To Explore Online business to save logistics and supply chain costs.

X. CONCLUSION

The author has assumed that the data represented by companies in their financial statements are based on the same interpretation. For instance, all costs like raw material, power and fuel etc., pertain to drug manufacturing only. Secondly, its assumed that every pharma company under study follow generally accepted accounting practices (Ind AS).

Given the nature of Industry each company is engaged in manufacturing of tablets, vaccines, syrups etc., hence the data represents aggregated information and not product wise. The study reveals that the various costs of the Pharma companies shows a fluctuating trend year on year. The Coefficient of variation reveals the consistency of operations among the Pharma companies' F- statistics prescribe the significant differences between mean and the cost factor. The Mean Operating Profit is higher in Cipla, Employee cost is higher in Dr.Reddy's Lab, Raw material is higher in Cipla.

The Inter-Correlation from the Independent variables are significantly and positively correlated with dependent variable Y- operating profit. Hence the three cost variables viz, Raw Material, Other Manufacturing Expenses and

Selling & Distribution expenses are substantially important contributing variables on the Operating Profit.

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