# Diversification Strategy and Firms Performance: An Empirical Analysis of Select FMCG Firms in India

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A B S T R A C T

An attempt has been made in this study to investigate the relationship between Product diversification and its impact on profitability in the FMCG firms listed on NSE (Nifty FMCG Index). For understanding into the performance of the diversified firms Gini-Simpson Entropy measure was used to derive the Diversification index whose results revealed that a wide variations existed between the companies under study, but an interesting factor that was noted was the absence of wide fluctuations within the companies over the years. The average index for the ten year period revealed that the fifteen companies fell into three broad categories namely high, medium and low. Those securing an index value of 0.60 and above were classified as high, and those varying between 0.30 and 0.59 as medium and below 0.30 as low. Further, trend analysis for all the fifteen companies with regard to sales, gross profit, Net Profit and Dividend is a mixture of bright, dull and intermediate performance. Some are bright on all parameters while others have a mixed future. Thus can be said the performance of Diversified companies to a large extent depends on the current pursuing diversification strategy along with the all the external factors and management of the organizations and it ability to tap and enhance to the new and already existing opportunities.

## 1.1 Introduction

For a company, Diversification is a form of Corporate Strategy. It is a form of strategy through which the firm increased profitability through greater sales volume achieved from increased line of production, new products and new markets (Fatemeh, Mohammad, Mona, & Leila, 2013). The theme of diversification-performance relation has inspired a large literature in many fields, including Industrial organization,

Corporate Finance and Strategic Management (Guo, 2012). However, in spite of the ample of research in the field, the literature has not yet decisive conclusion whether diversification causes a positive impact or negative impact on the profitability.

Corporate Diversification is a strategy to build the business by expanding into different areas, such as industries and product lines. It can be done either to expand, or to revitalize or to save the company. The arguments of diversification in the management process have taken up the central and a universal position. Diversification has become an increasingly important aspect of doing business in the world today (Elango & Ma, 2003). The level of attention received over last few decades for the topic Diversification in academic institutions speaks of the interest of the researchers to study the relationship between diversification and firm performance in several fields. As per

the literature review, researchers coincide in the fact that there is no agreement on the precise nature of its relationship. Some studies show that performance increases over time (Chang & Thomas, 1989) whereas others have demonstrated that diversification decreases performance (Iqbal, Hameed, & Qadeer, 2012). There are still others who have shown that the relationship depends only in crisis period (Ooi, Hooy, & Som, 2014). These show that diversifications yet have mixed results that are inconclusive and contradictory.

Thus, the inquest of whether diversification increases or decreases firm's performance is still deserving for further research. In addition, despite of ample of studies in existence, very little attention has been paid in India in recent times where diversification plays a major role in the growth of the business. This means that there is a major gap in terms of the time period of the study in the relevant literature. This research attempts to fill this gap by studying the situation of Indian FMCG Companies in the present scenario and provide more empirical evidence on the effects of diversification on firm's performance based on individual company-level data.

One of the notable study conducted on firm's diversification and its effect on firm performance was carried out by Rumelt in 1974 in his paper titled "Strategy, Structure and Economic Performance" and in 1982 paper titled "Diversification Strategy and Profitability". He categorized firms based on the level of diversification i.e., into highly diversified, moderately diversified and low diversification firms. This classification was based on Specialization Ratio (SR), calculated based on the annual sales from the largest business segment with the total sales of the firm (Iqbal, Hameed, & Qadeer, 2012). And paper carried out by Pai in 2015 with the title "Diversification as a Corporate Strategy: Indian Scenario", used Diversification Index and classified the companies into 3 classes that is high diversification, Medium diversification and low diversification based on Gini-Simpson quadratic entropy measure. This paper is based on the inquest whether diversifying the business has any impact on the firm's performance and profitability. With the 15 companies listed on the National Stock Exchange under the FMCG Sector this study has attempted to identify whether there was any relationship between firm's diversification and profitability. However since the number of firms under study were few, the approach adopted is different from the studies already conducted.

## 1.2 Review of Literature

**Pai (1993),** studied "Diversification as a Corporate Strategy: Indian Scenario" with an objective to study the financial health and the extent of success in diversification with the help of the sales performance over the period under study. The study was conducted for a period of six years from 1984–1990 with companies dealing in consumer goods, pharmaceutical, tobacco, cement, paper and engineering goods with sample size of 10 companies. The results depicted that no conclusive ultimate analysis could be arrived at. That is the profits and indices were significant or not, depending on individual firms and not as a general rule , however the results

of trend analysis revealed that the companies under study reflected enhanced future potential and performance of the diversified companies.

**Attaran & Zwick (1987)**, conducted a study on "Entropy and Other Measures of Industrial Diversification". The study demonstrates that entropy is a useful measure for comparing industrial diversity either among regions or for a particular region over time. For the purpose of illustration, employment diversity indices were computed using the entropy method for the state of Oregon from 1972 to 1984. The entropy measure was disaggregated into its between-set and with-set elements and within different groups of Industries.

**Hoskisson, Hitt, Johnson, & Moesel (1993),** studied "Construct Validity of an Objective (Entropy) Categorical Measure of Diversification Strategy". Results indicate strong convergent, discriminate and criterion-related validity of entropy measure of diversification. The study suggests that it may be appropriate to use diversification factor with both the entropy and Rumelt subjective measures for maximum accuracy. Also, the results suggest that the SIC measure may be appropriate in more limited circumstances.

**Palepu (1985),** in his study titled "Diversification Strategy, Profit Performance and the Entropy Measure" combines the strengths of the index approach, namely, simplicity, objectivity and replicability, with the essential richness of Rumelts methodology. Using Jacquemin-Berry entropy measure of diversification and the line-of-business data, this study finds that firms with predominantly related diversification show significantly better profit growth than firms with predominantly unrelated diversification.

**Patrick (2012),** in his paper titled "Product Diversification and Performance of Manufacturing Firms in Nigeria", examined the effects of product diversification on the performance of the manufacturing firms in Nigeria. Data collected were analyzed using Panel Regression analysis employing fixed, random and Haussmann test of fixed effect estimates. The results indicate that an increase in the size of manufacturing firms causes to diversify their products. The Dummy variable result implies that diversifying firms have higher level of ROA. The implication of the study is that as the number of shareholders increases, the lesser the decision of the firms to diversify. Also, total debt level of the firm may also influence diversification decision which will improve performance level.

## 2.1. Objectives of the Study

The general objective is to study the relationship that exists between corporate diversification and Firm Performance of Indian FMCG Sector while the Specific objectives are to:

1 To analyze the impact of Diversification on Profitability using Gini-Simpson entropy measure.
2 To assess and extrapolate the performance of the diversified companies to gauge their future potential through trend analysis.

## 2.2. Hypothesis

H1$_0$: There is no correlation between the diversification index and gross profit.

## 2.3. Research Methodology

The study focused on the Fast Moving Consumer Goods (FMCG) sector with operations listed in NSE (Nifty FMCG Index) for the purpose of measuring the extent of diversification and its impact on profitability. The period was limited to the period spanning 2005-2015, a ten year span that should be adequate in terms of studying the diversification strategies and identifying the trends. A shorter time period is desirable because strategic plans change over time. The financial data for the study were obtained from the prowess database published by the Centre for Monitoring the Indian Economy (CMIE). This database has formed the basis of several empirical studies on the Indian Corporate sector.

The Sample consists of a total of 15 companies in the FMCG sector namely Britannia Industries Ltd., Colgate-Palmolive (India) Ltd., Dabur India Ltd., Emami Ltd., GlaxoSmithKline Consumer Healthcare Ltd., Godrej Consumer Product Ltd., Godrej Industries Ltd., Hindustan Uniliver Ltd. ITC Ltd., Jubilant Food works Ltd., Marico Ltd., Procter & Gamble Hygiene & Health Care Ltd., Tata Global Beverages Ltd., United Breweries Ltd., and United Spirits Ltd. A brief profile of these companies is given in this chapter later on.

2.3.1. Framework of Analysis: The data collected were analyzed chapter wise. Various Financial and statistical tools were used for the purpose of analysis. The tools are delineated below in their sequence of deployment:

The "Diversification Index" (DI) using Gini-Simpson's Quadratic Entropy Measure formula was used for arriving at the extent of diversification achieved by each company. The index was calculated as below:

$$D = 1 - \sum_{i=1}^{N} Pi^2$$

Where,

D = extent of diversification.

Pi = proportion of product I to total sales.

N = total products in the firms' portfolio

While studying the relationship between the DI and profit, Karl Pearson's correlation formula was used this is as follows:

$$r = \frac{n(\Sigma xy) - (\Sigma x)(\Sigma y)}{\sqrt{[\, n\Sigma x2 - (\Sigma x)2][n\Sigma y2 - (\Sigma y)2]}}$$

In the Trend Analysis Chapter, basically the "Regression Analysis" was used to forecast the performance of the companies on different parameters.

In order to check the goodness of fit of the regression coefficient, the Analysis of Variance (ANOVA was undertaken. The one-way ANOVA model was used. Further both 'F Statistic' and 'T Statistic' were used to determine the linear relationship between the independent and the dependent variables. Ultimately the 'Durbin-Watson Test' was employed to test whether any auto-correlation existed in the data. Its existence would quash the other findings.

The use of Gretel software and Microsoft Excel and Word were used for analysis, typing and drawing graphs. Different graphs have been illustrated where found appropriate and necessary.

## 3.1. Measurement of Diversity using Entropy Measure

Measurement of diversity, using quantitative measures, would serve as a descriptive measure in terms of which several populations could be compared and difference interpreted. Various functions of Entropy have been developed by different authors. The aim of this paper was to measure diversification of various companies with respect to its various products in terms of their respective sales value. Hence, quadratic entropy measure called the Gini-Simpson index was used. Providing a unified approach for measurement of diversity and its analysis. The formula used was:

$$D = 1 - \sum_{I=1}^{N} Pi^2$$

Properties:

1. When total sales is accounted for by one product there is no diversity.
2. When all the product categories contribute uniformly to sales, the diversification index takes on its maximum value.
3. When the number of product categories is large, the value of index is high.
4. The diversification index gives importance to the number of categories as well as their contribution to total sales of the company.

### 3.1.1. Results of the Index

**Table-3.1. Diversification Index – Results**

| Companies | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Tata Global | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.01 | **0.00** |
| United Spirits | 0.05 | 0.04 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | **0.01** |
| United Breweries | 0.03 | 0.02 | 0.02 | 0.03 | 0.03 | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 | **0.02** |
| Glaxosmithkline | 0.02 | 0.02 | 0.02 | 0.02 | 0.03 | 0.12 | 0.12 | 0.13 | 0.11 | 0.10 | **0.07** |
| Colgate-P | 0.00 | 0.00 | 0.01 | 0.00 | 0.20 | 0.20 | 0.21 | 0.21 | 0.23 | 0.25 | **0.13** |
| Britannia | 0.15 | 0.18 | 0.20 | 0.23 | 0.26 | 0.27 | 0.29 | 0.30 | 0.29 | 0.29 | **0.25** |
| Jubilant | 0.11 | 0.09 | 0.08 | 0.26 | 0.33 | 0.35 | 0.38 | 0.40 | 0.41 | 0.42 | **0.28** |
| Emami Ltd. | 0.28 | 0.31 | 0.29 | 0.35 | 0.37 | 0.40 | 0.40 | 0.37 | 0.40 | 0.43 | **0.36** |
| Marico Ltd. | 0.00 | 0.28 | 0.31 | 0.31 | 0.33 | 0.39 | 0.48 | 0.55 | 0.56 | 0.53 | **0.37** |
| Dabur India | 0.78 | 0.78 | 0.81 | 0.81 | 0.80 | 0.80 | 0.00 | 0.00 | 0.00 | 0.00 | **0.48** |
| ITC Ltd. | 0.30 | 0.35 | 0.48 | 0.56 | 0.55 | 0.48 | 0.57 | 0.59 | 0.58 | 0.60 | **0.51** |
| Godrej Consumer | 0.53 | 0.51 | 0.50 | 0.49 | 0.50 | 0.76 | 0.55 | 0.55 | 0.54 | 0.53 | **0.55** |
| Procter & Gamble | 0.67 | 0.65 | 0.64 | 0.61 | 0.59 | 0.57 | 0.56 | 0.52 | 0.48 | 0.49 | **0.58** |
| Godrej Industries | 0.56 | 0.64 | 0.63 | 0.66 | 0.69 | 0.68 | 0.67 | 0.67 | 0.68 | 0.69 | **0.66** |
| Hindustan Uniliver | 0.81 | 0.80 | 0.81 | 0.80 | 0.81 | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | **0.80** |

The diversification index was calculated year wise for all the fifteen companies and the average index value was also computed for the period of 2006 to 2015. The results of which can be seen in Table 3.1. It was observed that a wide variation existed between companies under study. However, it was interesting to note that for each company, over the years, there was only marginal fluctuations. The average index for the ten year period categorized the fifteen companies into three broad categories, namely high, medium and low.

Those securing an index value of 0.60 and above were classified as high, those varying between 0.30 and 0.59 as medium and those varying between 0 and 0.30 as low. Thus, two companies namely, Hindustan Unilever and Godrej Industries fell into the first category with an average of 0.80 and 0.66 respectively.

Six companies fell into the second category namely, Dabur with an average of 0.48, Emami having an average of 0.36, Godrej Consumer with an average of 0.55, ITC with an average of 0.51, Marico with 0.31 and Procter and Gamble with an average index of 0.58. And in the last class it had seven companies namely, Britannia, Colgate. GlaxoSmithKline, Jubilant, Tata global, United Breweries, United Spirits having an average of 0.25, 0.13, 0.07, 0.28, 0.00, 0.02, 0.01 respectively.

Interpretation of the index was felt necessary because it is not necessary that a high index doesn't indicate superiority and vice versa. High, medium or low value of index is purely based on the number of products an organization has diversified into as well as how the sales value is spread over its products. Whether each product from all the diversified products contribute evenly, thinly or in an imbalance manner.

A firm generating its sales from all the products evenly is a good sign for the firm, but at the same time speaks of vulnerability of the organization i.e. the risk factor in the organization. Risk Factor reflects the failure of the company to succeed every time a company diversifies i.e. all the product groups a company diversifies contributes significantly to its total sales. Hence the categories achieved through the computation is not enough to state the companies with a high index value perform better than a medium or a low diversification index.

The same can be observed from the below diversification Index table where the first category group firm HUL, if observed the index shows a constant diversification for the past four years yet falls into the first category. It is mainly due to the sales contribution of HUL is evenly distributed over its products whereas as for Godrej industries it falls into the respective category due to the fact that the major chunk of its sales is contributed from two out of its seven products.

Similar cases are noticed into the other categories, like ITC being a highly diversified company diversified itself into more than 15 products falls into the Medium category of DI. Basically due to its failure to succeed in all diversified products. Hence this table provides an insight into each company over the ten years about the extent of diversification of the companies under study.

## 3.2. Correlation between "DI" and Gross Profit

For further understanding of the significance of Diversification Index, and to know the performance of this diversified firms establishing a relationship between DI and profits of the respective company was felt necessary. At the first instance net profit was considered to be the indicator of profitability of the firm. But since the various components of the net profit which vary from company to company such as the interest component, the tax policies, depreciation and the dividend policy. Gross profit was considered as the measure of

profitability. Karl Pearson's correlation was employed to correlate the two variables i.e. Diversification Index and Gross Profit.

### 3.2.1 Karl Pearson's Correlation

Two or more variables are said to be correlated if they vary together so that movement in one is accompanied by corresponding movement in the other. Correlation helps to

evaluate the degree of relationship between two variables. It summarizes both the degree as well as the direction of movement in one figure. Denoted by the symbol "r" and always varies between +1 and -1. When r = +1, it shows a perfect positive correlation between the two variables. When r = -1, it is perfect negative correlation and if r = 0, it shows no correlation between variables.

### 3.2.2 Results of the Correlation

**Table-3.2: Results of Correlation between Diversification Index and Gross profit**

| Sl. No. | Companies | Average DI | Average Gross Profit | r Value | Significance (one tail) | Remarks |
|---|---|---|---|---|---|---|
| 1 | Britannia | 0.25 | 3171.30 | 0.51 | 0.06 | significant at 90% CL |
| 2 | Colgate | 0.13 | 4811.97 | 0.94 | 0.00 | significant at 99% CL |
| 3 | Dabur | 0.48 | 6295.55 | -0.85 | 0.00 | significant at 99% CL |
| 4 | Emami | 0.36 | 2547.04 | 0.87 | 0.00 | significant at 99% CL |
| 5 | Glaxosmithkline | 0.07 | 5215.70 | 0.77 | 0.00 | significant at 99% CL |
| 6 | Godrej Consumer | 0.55 | 5687.93 | 0.22 | 0.27 | significant at 80% CL |
| 7 | Godrej Industries | 0.66 | 2730.39 | 0.66 | 0.02 | significant at 95% CL |
| 8 | Hindustan | 0.80 | 33088.53 | -0.59 | 0.04 | significant at 95% CL |
| 9 | ITC Ltd. | 0.51 | 78454.16 | 0.74 | 0.01 | significant at 99% CL |
| 10 | Jubilant | 0.28 | 839.43 | 0.86 | 0.00 | significant at 99% CL |
| 11 | Marico Ltd. | 0.37 | 3749.35 | 0.84 | 0.00 | significant at 99% CL |
| 12 | Procter & Gamble | 0.58 | 2631.78 | -0.85 | 0.00 | significant at 99% CL |
| 13 | Tata Global | 0.00 | 7835.96 | -0.33 | 0.17 | significant at 85% CL |
| 14 | United Breweries | 0.02 | 1789.11 | -0.73 | 0.01 | significant at 99% CL |
| 15 | United Spirits | 0.01 | -3840.70 | 0.38 | 0.14 | significant at 85% CL |

The results of correlations done can be seen on table 3.2. The table reveals that ten companies namely, Britannia, Colgate, Emami, Glaxo, Godrej consumer, Godrej Industries, ITC, Jubilant, Marico and United Spirits have a positive correlation coefficients, While the remaining five had a negative correlation coefficients, Dabur (-0.85), HUL (- 0.59), Procter (-0.85), Tata Global (-0.33) and United Breweries(-0.73). The One-tail test of significance illustrated that in case of all the companies (except four namely, Britannia, Godrej Consumer, Tata Global and United Spirits) the correlation was significant at 95 percent or 99 percent confidence levels, implying that the sample was not biased and indicating that there is a correlation between diversification Index and gross profits of these firms. However it must be noted that within these ten companies there include five companies which are negatively correlated. For Dabur it was observed that the diversification of products was zero thereby the sales were contributed only by its core product thereby securing a negative correlation. Similar was the case in case of Hindustan, Tata Global and United Breweries whose level of diversification was held constant over the period of the study, thereby achieving a negative value. Whereas in case of Procter as diversification level increased the profit decreased and as diversification level

decreased led to a marginal increase in the profits this led to a negative correlation coefficient (r). Hence it can be said that DI need not be the true reflection of profitability of the diversified company.

Another point to be noted, which the table exhibited to confirm the above statement was, the fact that the company with low DI had a high correlation coefficient (Colgate: DI = 0.13 and r = + 0.94). Further, a company with a high DI had not just a low value of r but also a negative r (HUL: DI = 0.80 and r = (-) 0.59). Thus, no conclusion can be drawn stating that a high diversification index means high profits. But a moderate level of diversification provides a high correlation coefficient, also significant at 99 percent confidence level. (ITC: DI = 0.51 and r = + 0.74).

In line with our basic objective in order to assess the performance of the diversified companies, further interpretation is done for only those companies having a positive value of r, as the firms with a negative r has already been depicted. For Britannia, though r was positive it was not very high (0.25) and the significant value indicating that r was significant at 90 percent critical level. In the case of Colgate the r value was very high being significant at 99 percent critical level. Meaning the

sample error was just 1 percent. Emami and Glaxo, the r value was high (0.87 and 0.77 respectively). And the t-statistic for both the companies revealed that r was significant at 99 percent significant level.

For Godrej Consumer the r was not very high (0.22) significant at critical level of 80 percent. Godrej industries however had a higher r value (0.66) with a sampling error of less than 5 percent. In the case of ITC, Jubilant, Marico, depicted a high value of r (0.74, 0.86 and 0.84 respectively). And the t stat revealed the r value of these companies significant at 99 percent. As for United Spirits the r value was low (0.38). Further, the t- test showed that the sampling error was significant at 85 percent critical level. Hence, from the above analysis a conclusion can be drawn that the significance of diversified companies and profits is entirely dependent on individual firms and not as a general rule. Stating a high, medium or low level of diversification will result in better and improved performance of the organization.

## 4.1. Trend Analysis

The future of any company is dependent on the past performance of the respective organization. Though other factors such as the technological change, the preferences of the consumers, the government policies. Competition etc. also play their respective roles. However the past track record is considered to be an important barometer to measure the firm's future potential and help to forecast the trends to come. Trend Analysis is a facet of technical analysis that tries to anticipate the future development of a stock in view of past information. Reflecting the various rewards of diversification in the future years, if not, at least the overall performance trend would reflect the role of diversification played.

## 4.2. Regression Analysis

Regression Analysis establishes the nature of the relationship between variables. Regression refers to the study of dependence of Y a random variable on X which isn't a random variable. For our purpose of study the known variable is the Time and sales, Gross Profit, net profit and dividend are unknown variables.

### 4.2.1. F- Statistic

F &T tests are used to test the null hypothesis that there is no linear relationship between the dependent variable and independent variables. If the calculated F-Statistic exceeds the F-table value at 5 percent level, $H_0$ is rejected and $H_1$ is accepted.

### 4.2.2. Coefficient of Determination

To test the strength of association i.e. how well does X forecast Y, coefficient of determination is used. Represented by $r^2$.
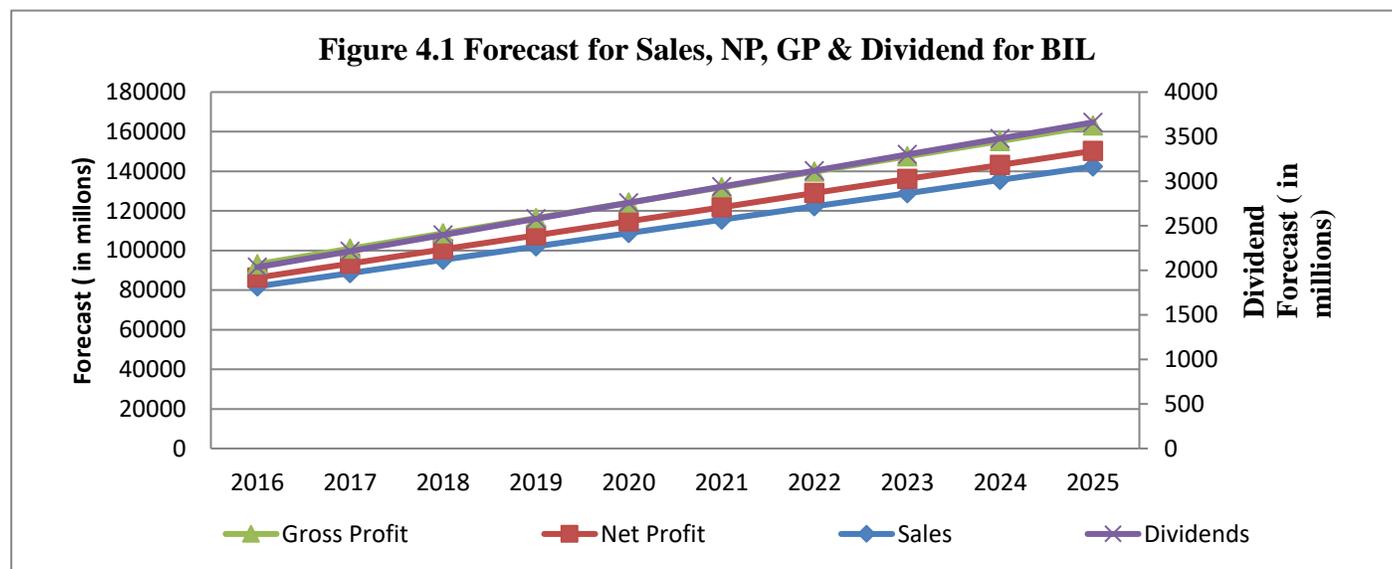
### 4.2.3. T – Statistic

It is a ratio of the departure of an estimated parameter from its notional value and its standard error. It is the square root of F and the associated degrees of freedom is n-2.

### 4.2.4. Durbin-Watson Test

Durbin Watson statistic is a test statistic used to find the existence of autocorrelation in the residuals (prediction errors) from a regression analysis.

### 4.3 Results of Analysis

All the techniques mentioned above were used for all the companies with regard to four parameters namely, sales, gross profit, net profit and dividend. The amount of information being bulky and voluminous hence only the results have been shown in tabular form company wise.

### 4.3.1 Britannia Industries Limited (BIL)

**Table-4.1: Regression Results for BIL**

| Variable | b' value | a' value | $R^2$ | T' test | F' test | D-W test |
|---|---|---|---|---|---|---|
| Sales | 6725.89 | -13477526.13 | 0.99 | 29.499** | 870.189* | 0.86 |
| Net Profit | 386.73 | -775217.52 | 0.56 | 3.173* | 10.07* | 0.78 |
| Gross Profit | 660.66 | -1325084.41 | 0.54 | 3.420* | 11.693* | 0.71 |
| Dividend | 180.58 | -362012.44 | 0.82 | 6.013* | 36.155* | 1.55 |

*Significant at 5% level

**Significant at 95% level

**Figure 4.1 Forecast for Sales, NP, GP & Dividend for BIL**

In the presentation of analysis findings, all the four variables are shown sequentially in table 4.1 starting with sales. For BIL the R square for sales was very good (0.99) revealing the extreme goodness of fit of regression line at 99 percent. Both 'T' and 'F' statistics were found to be statistically significant at 5 percent level of significance. This depicted that there exist a linear relationship with the dependent and the independent variables, proving the alternate hypothesis true (i.e.) 'b' is greater than 0, which means the linear relationship is accepted. Since the value of 'T' was 29.499 and that of 'F' was 870.189 which are high, it clearly revealed that high degree of linear relationship between the two variables.

The 'D-W' test value (0.86) being less than one but more than 0.80 signifying the possibility of using the data for prediction. In case of net profit the R square was low (0.56) though not high yet is indicative of a fairly good fit of the regression line and this is proved by the forecast made. Both 'T' and 'F' test showed figures (3.173 and 10.07 respectively) which at 5 percent level were found statistically significant. The 'D-W' Value was at a level of 0.78 which is above the

**4.3.2. Colgate – Palmolive (India) Ltd.**

prescribed limit 0f 70 percent, indicative of the accuracy of the forecast.

Thee regression analysis for gross profit too revealed a R square of 0.54 which is not high but indicates a fairly good fit of the regression line and the same proved by the forecast made. Regarding the dividends paid by Britannia the r square (0.82) indicating the goodness of fit. The 'T' value was 6.013 and 'F' value was 36.155 both significant at 5 percent level. The 'D-W' value was 1.55, also positive for forecast.

A combined line graph for all the four variables can be seen on Graph 4.1. It must be stated that in case of Britannia Industries it was observed that the overall past performance was good and therefore, revealed health trend for the future. It may be concluded that diversification on the part of this company had in no way hampered its performance. On the contrary it is very much possible it contributed to its good performance. But since a comparison isn't made about the before and after diversification study wasn't conducted hence nothing can be conclusively said.
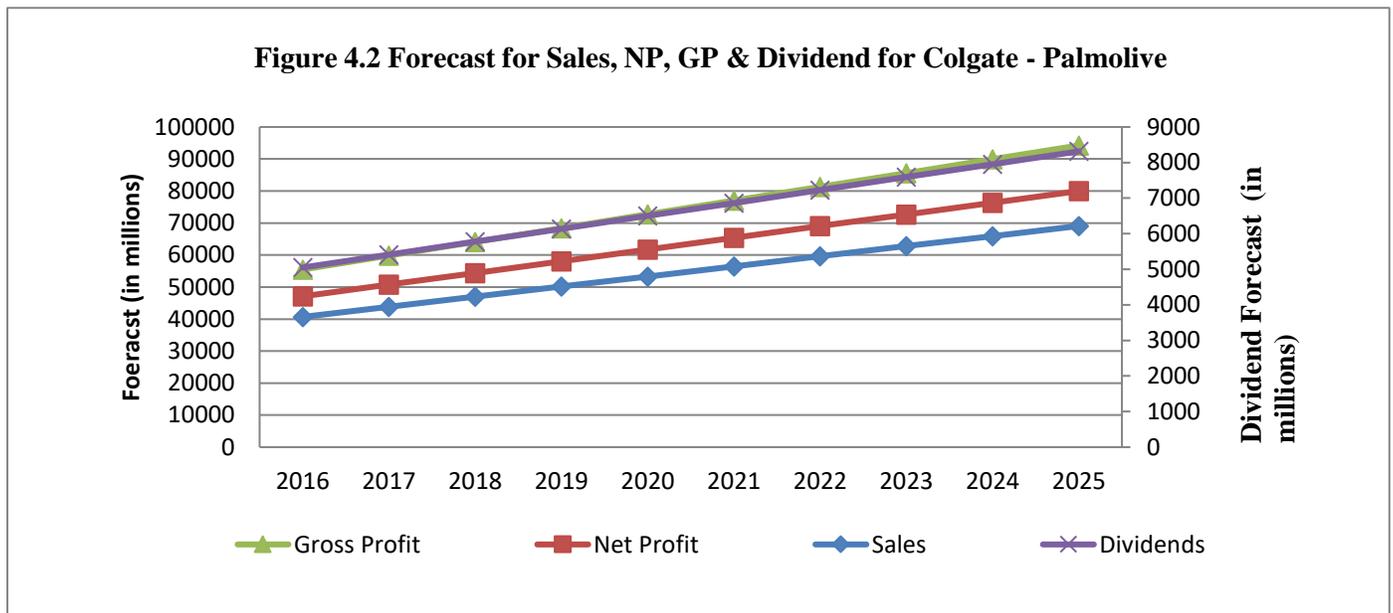
**Table-4.2: Regression Results for Colgate - Palmolive**

| Variable | b' value | a' value | $R^2$ | T' test | F' test | D-W test |
|---|---|---|---|---|---|---|
| Sales | 3156.68 | -6323185.40 | 0.97 | 17.013** | 289.433* | 0.42 |
| Net Profit | 498.40 | -998344.37 | 0.96 | 13.526* | 182.955* | 1.59 |
| Gross Profit | 649.79 | -1301580.47 | 0.98 | 20.470* | 419.004* | 2.59 |
| Dividend | 362.99 | -726727.86 | 0.89 | 8.067* | 65.079* | 0.98 |

*Significant at 5% level
**Significant at 95% level

**Figure 4.2 Forecast for Sales, NP, GP & Dividend for Colgate - Palmolive**

In case of Colgate-Palmolive the regression analysis revealed a very healthy track record based on all the parameters. The results for the same was shown in table 4.2. Regarding Sales, the regression coefficient R2 was as high as 0.97 indicating the goodness of fit of the regression line. The 'T' value of 17.013 and 'F test figure of 289.433 were both statistically significant at 5 percent level respectively. Disapproving the null hypothesis that there exist no linear relationship between the 2 variables. The 'D-W' value of 0.42 however certified the exist an auto-correlation in the observed data.

Regression Analysis of the net profits of the company showed a R square of 0.96 and the calculate 'T' value was 13.526 significant at 5 percent level and these was held true for 'F' test with an value of 182.955. The 'D-W' value was high at 1.59 indicating non-existence of auto-correlation. Gross profit

too had an $R^2$ of 0.98 with 'T' and F test values high (20.470 and 419.004) at five percent level of significance. The 'D-W' statistic was highest at 2.59 out of all the other parameters, clearing the data for predication.

For dividend the regression coefficient was at 0.89 indicating the goodness of fit. With 'T' and F test values high (8.067 and 65.079) at five percent level of significance. The 'D-W' statistic was high (0.98) Thus, For HUL which is a highly diversified organization the above analysis reveal a steady future. It must be noted that the all four parameters depicted excellent performance, more importantly its consistency in paying of dividends, revealing the success of the company in its diversification. The results of the firm can be taken as an example of success, in spite of it high level of diversification evidencing the efficiency of its managers.
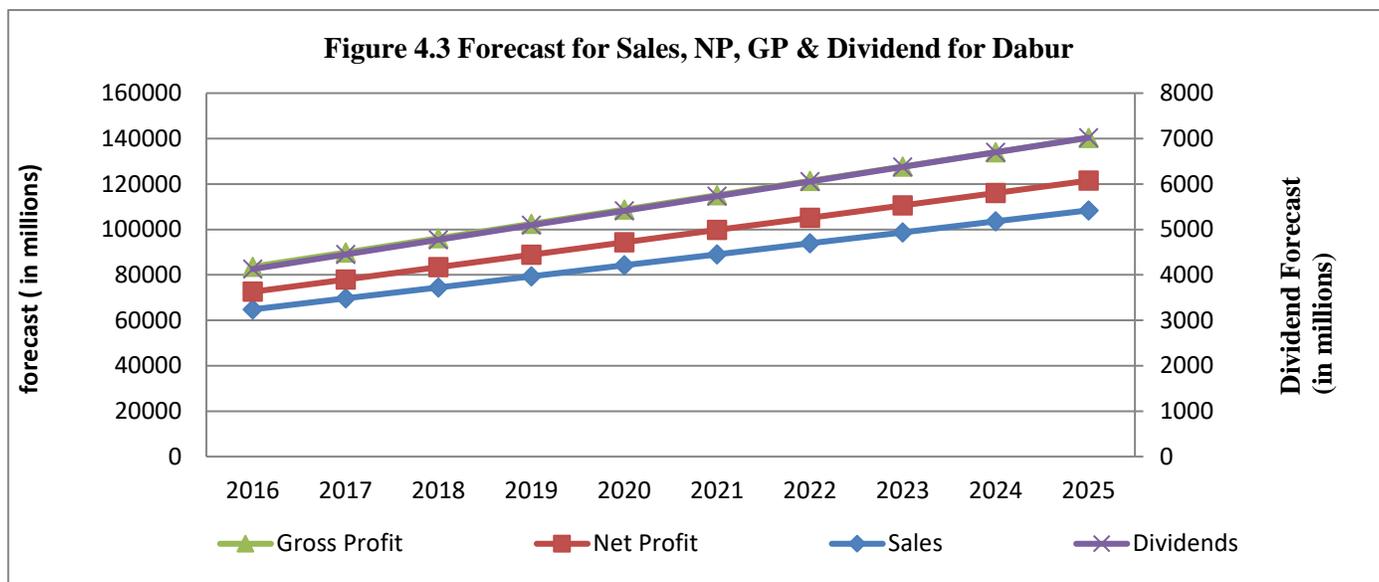
### 4.3.3. Dabur Industries Limited

**Table-4.3: Regression Results for Dabur Industries Ltd.**

| Variable | b' value | a' value | $R^2$ | T' test | F' test | D-W test |
|---|---|---|---|---|---|---|
| Sales | 4846.03 | -9704799.63 | 0.88 | 7.562** | 57.185* | 1.42 |
| Net Profit | 590.95 | -1183588.08 | 0.97 | 16.568* | 274.502* | 1.31 |
| Gross Profit | 864.17 | -1731109.10 | 0.96 | 14.068* | 197.913* | 1.82 |
| Dividend | 321.25 | -643505.69 | 0.96 | 13.966* | 195.042* | 0.51 |

*Significant at 5% level
**Significant at 95% level

**Figure 4.3 Forecast for Sales, NP, GP & Dividend for Dabur**



In the presentation of analysis findings, all the four variables are shown sequentially in table 4.3 starting with sales. For DIL the R square for sales was very good (0.88) revealing the goodness of fit of regression line. Both 'T' and 'F' statistic were found to be statistically significant with a value of (7.562 and 57.185 respectively) at 5 percent level of significance. And the value of 'T' and that of 'F' were high, it clearly revealed the high degree of linear relationship between the two variables. The 'D-W' test value (1.42) being more than one signify the possibility of using the data for prediction.

In case of net profit the R square was too high (0.97) indicative of very good fit of the regression line and this is proved by the forecast made. The 'D-W' Value was at a level of 1.31, indicative of the accuracy of the forecast as there existed no auto-correlation.

Thee regression analysis for gross profit too revealed a R square of 0.96 which is very high revealing extremely good fit of the regression line and the same proved by the forecast made. Both 'T' and 'F' stat depicted (14.068 and 197.913 respectively) which were statistically significant at 5 percent level. The 'D-W' Value was at a level of 1.82 which is above that indicates the accuracy of the forecast.

Regarding the dividends paid by Dabur the R square (0.96) indicating the goodness of fit. The 'T' value was 13.966 and 'F' value was 195.042 both significant at 5 percent level. The 'D-W' value was 0.55, indicating data less reliable for forecast.

A combined line graph for all the four variables can be seen on Graph 4.3. It must be stated that in case of Dabur Industries it was observed that the overall past performance was good and therefore, revealed health trend for the future.

### 4.3.4. Emami Ltd.

**Table-4.4: Regression Results for Emami Ltd.**

| Variable | b' value | a' value | $R^2$ | T' test | F' test | D-W test |
|---|---|---|---|---|---|---|
| Sales | 1948.01 | -3905531.54 | 0.99 | 25.918** | 671.736* | 1.73 |
| Net Profit | 402.24 | -807032.64 | 0.76 | 5.077* | 25.776* | 0.55 |
| Gross Profit | 580.24 | -1164015.73 | 0.94 | 11.563* | 133.714* | 0.91 |
| Dividend | 213.61 | -428568.93 | 0.91 | 8.789* | 77.244* | 1.37 |

*Significant at 5% level
**Significant at 95% level

Figure 4.4 Forecast for Sales, NP, GP & Dividend for Emami

In case of Emami the regression analysis revealed a very healthy track record based on all the parameters. The results for the same was shown in table 4.4. Regarding Sales, the regression coefficient R2 was as high as 0.99 indicating the extreme goodness of fit of the regression line with just 1percernt variation. The 'T' value of 25.918 and 'F test figure of 671.736 were both statistically significant at 5 percent level respectively. Disapproving the null hypothesis that there exist no linear relationship between the 2 variables. The 'D-W' value of 0.42 however certified the existence of an auto-correlation in the observed data.

Regression Analysis of the net profits of the company showed an R square of 0.76 and the calculated 'T' value was 5.077 significant at 5 percent level and these was held true for 'F' test with a value of 25.776. The 'D-W' value was low (0.55) indicating the existence of auto-correlation. Hence data

**4.3.5: Glaxosmithinkline Consumer Healthcare Ltd.**

predicted for net profit may not completely relied upon. Gross profit and had a $R^2$ of 0.94 with 'T' and F test values high 11.563 and 133.714) at five percent level of significance. The 'D-W' statistic was highest at 0.91 out of all the other parameters, clearing the data for predication.

For dividend the regression coefficient was at 0.91 indicating the goodness of fit. With 'T' and F test values high (8.789 and 77.244) at five percent level of significance. The 'D-W' statistic was high (0.98) clearing the data for predication stating nonexistence of auto-correlation. Thus, For Emami which is a moderate diversified organization the above analysis reveal a steady ng yet gradually increasing future. It must be noted that the all four parameters depicted excellent performance. Revealing the success of the company in its diversification.

**Table-4.5: Regression Results for Glaxosmithkline Consumer Healthcare Ltd.**

| Variable | b' value | a' value | $R^2$ | T' test | F' test | D-W test |
|---|---|---|---|---|---|---|
| Sales | 3826.43 | -7666893.00 | 0.90 | 8.890** | 79.041* | 2.91 |
| Net Profit | 609.77 | -1222772.43 | 0.88 | 8.254* | 68.121* | 1.63 |
| Gross Profit | 860.64 | -1725100.42 | 0.89 | 8.673* | 75.217* | 2.80 |
| Dividend | 251.48 | -503993.31 | 0.77 | 5.599* | 31.351* | 2.37 |

*Significant at 5% level                    **Significant at 95% level

**Figure 4.5 Forecast for Sales, NP, GP & Dividend for Glaxosmith**



The results of Glaxo with respect to all it's parameter proved to be positive. For all the variables namely sales, net profit, gross profit and dividend, the $R^2$ was high (0.90, 0.88, 0.89 and 0.77 respectively). Which signifies the extreme goodness of fit of the regression line.

The calculate value of 'T' and 'F' test in terms of all the variables were almost similar except for dividends which was quite lower than that of the others, all being significant at 5 percent level. Which again established that there existed a linear

relationship between the respective dependent and the independent variable (time).

The 'D-W' values calculated for all the variable were more than two except for net profit which was more than one and half i.e. (2.91, 1.63, 2.80 and 2.37 respectively). Bearing testimony to the fact that there was no auto-correlation therefore fit very well for prediction. The forecasted figures of the same can be seen in Table 6.10 and combined line graph 4.5.

**4.3.6 Godrej Consumer Products Ltd.,**

**Table-4.6: Regression Results for Godrej Consumer Products Ltd.**

| Variable | b' value | a' value | $R^2$ | T' test | F' test | D-W test |
|---|---|---|---|---|---|---|
| Sales | 9244.70 | -18549616.85 | 0.93 | 10.758** | 115.743* | 0.53 |
| Net Profit | 676.21 | -1355940.08 | 0.88 | 8.167* | 66.708* | 1.33 |
| Gross Profit | 1317.78 | -2643708.76 | 0.95 | 12.422* | 154.304* | 0.75 |
| Dividend | 161.66 | -323434.61 | 0.94 | 11.490* | 132.030* | 1.72 |

*Significant at 5% level          **Significant at 95% level

**Figure 4.6 Forecast for Sales, NP, GP & Dividend for Godrej Consumers**

The results of Godrej Consumer with respect to all the parameters proved to be positive. For all the variables namely sales, net profit, gross profit and dividend, the $R^2$ was high (0.93, 0.88, 0.95 and 0.94 respectively). Which signifies that the goodness of fit of the regression line id good. The calculated value of 'T' and 'F' test in terms of all the variables being significant at 5 percent level. Which established that there existed a linear relationship between the respective dependent and the independent variable (time) disapproving the null hypothesis.

The 'D-W' values calculated for sales and gross profit was low i.e. 0.53 and 0.75 respectively and for Net Profit and Dividend were more than one i.e. (1.33 and 1.72 respectively). Proving to the fact that there was no auto-correlation therefore fit very well for prediction but in case of sales and GP the predicted data may not be too reliable.
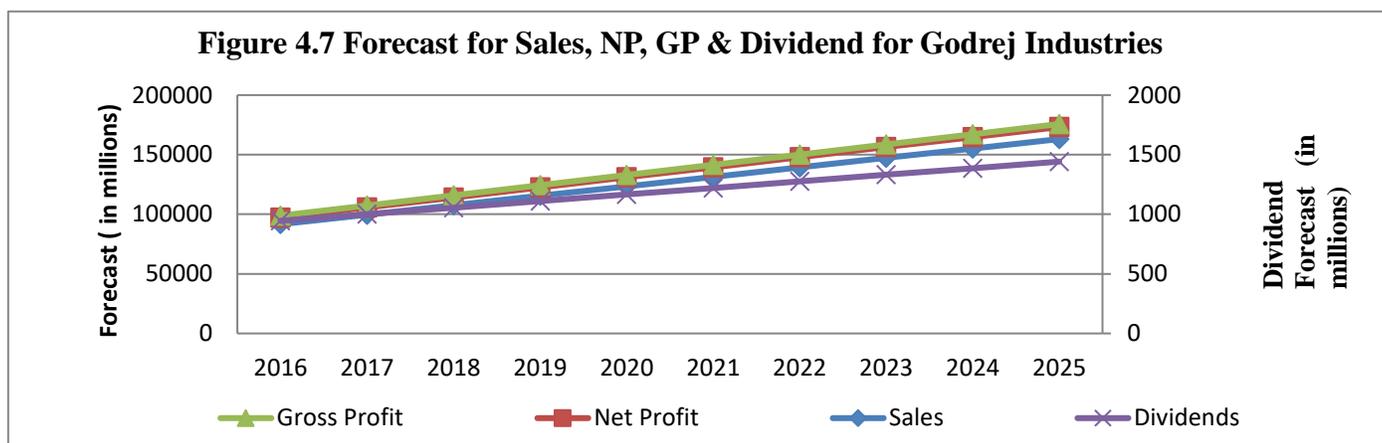
### 4.3.7. Godrej Industries ltd.

**Table-4.7: Regression Results for Godrej Industries Ltd.**

| Variable | b' value | a' value | $R^2$ | T' test | F' test | D-W test |
|---|---|---|---|---|---|---|
| Sales | 7933.28 | -15901804.17 | 0.93 | 10.776** | 116.121* | 0.51 |
| Net Profit | 100.28 | -200537.64 | 0.36 | 2.107* | 4.441* | 2.15 |
| Gross Profit | 508.17 | -1018953.32 | 0.93 | 10.232* | 104.684* | 2.77 |
| Dividend | 55.22 | -110384.74 | 0.95 | 11.945* | 142.693* | 1.82 |

*Significant at 5% level          **Significant at 95% level



Figure 4.7 Forecast for Sales, NP, GP & Dividend for Godrej Industries

The analysis done for Godrej Industries ltd, for purpose forecast revealed different situations. In case of Net profit the reverse situation was found than that of the other three variables.

The regression coefficient for Sales, Gross Profit and Dividend were high (0.93, 0.93 and 0.95 respectively), indicating that the trend for the future would be good. The calculated value of 'T' and 'F' statistics also suggested the same. For sales the values were 10.77 and 116.121, for GP the values were 10.232 and 104.684, while for Dividends it was 11.94 and 142.693. All the values for the above three variables were statistically significant at five percent level. The D-W test for sales was low (0.51) while for GP and dividend was (2.77 and 1.82 respectively), being reliable for predication whereas for Sales the predication may not hold right.
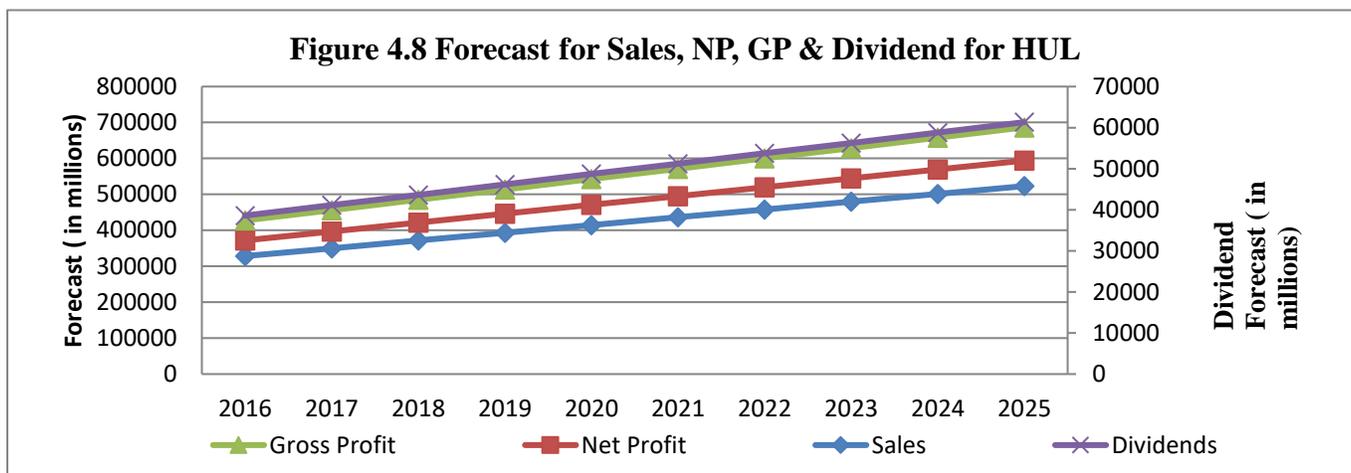
In case of net profits the situation was different with a regression coefficient of 0.36 which shows it is not a good fit for regression line. Hence no further explanation is provided. As the very basic condition of R square id hold wrong as well as the 'T' and 'F' stat aren't significant at 5 percent level of significance.

### 4.3.8. Hindustan Unilever Ltd.:

**Table-4.8: Regression Results for Hindustan Unilever Ltd.**

| Variable | b' value | a' value | $R^2$ | T' test | F' test | D-W test |
|---|---|---|---|---|---|---|
| Sales | 21628.92 | -43275552.55 | 0.93 | 10.739* | 115.326* | 2.42 |
| Net Profit | 3048.13 | -6101394.43 | 0.88 | 8.099* | 65.596* | 1.36 |
| Gross Profit | 4096.24 | -8202403.82 | 0.88 | 8.173* | 66.796* | 1.14 |
| Dividend | 2526.11 | -5054042.33 | 0.43 | 2.774* | 7.694* | 1.89 |

*Significant at 5% level

**Figure 4.8 Forecast for Sales, NP, GP & Dividend for HUL**



In the presentation of analysis findings, all the four variables are shown sequentially in table 4.8 starting with sales. For HUL the R square for sales was very good (0.93) revealing the extreme goodness of fit of regression line. Both 'T' and 'F' statistic were found to be statistically significant at 5 percent level of significance. This depicted that there exist a linear relationship since the value of 'T' and that of 'F' were high, it clearly revealed the high degree of linear relationship between the two variables. The 'D-W' test value (2.42) being more than two signify there exist no-autocorrelation between the variables and also signifies the possibility of using the data for prediction.

In case of net profit the R square was too high (0.88) indicative of very good fit of the regression line and this is proved by the forecast made. Both 'T' and 'F' test showed figures (8.099 and 65.596 respectively) which at 5 percent level were found statistically significant. The 'D-W' Value was at a level of 1.36, indicative of the accuracy of the forecast as there exist no auto-correlation.

Thee regression analysis for gross profit revealed a R square of 0.88 which is very high revealing good fit of the regression line and the same proved by the forecast made. Both 'T' and 'F' stat were statistically significant at 5 percent level. The 'D-W' Value was at a level of 1.14 not very high but the value being more than one indicates its use for prediction.

Regarding the dividends paid by Dabur the R Square (0.43) indicating low the goodness of fit. The 'T' value was 2.774 and 'F' value was 7.694 both significant at 5 percent level. The 'D-W' value was 1.89, indicating data less reliable for forecast.

Thus, for HUL which is a highly diversified conglomerate the above analysis reveal a very consistent and growing future. Excellent performance in all the four areas also its consistency in payment of dividends to its owners, revealed that the company diversified to succeed. HUL is a good example of a large consumer products company yet displaying good results. Hence a conclusion can be drawn that the management approach towards diversification has yielded profits. The graphical representation is shown on graph 4.8.
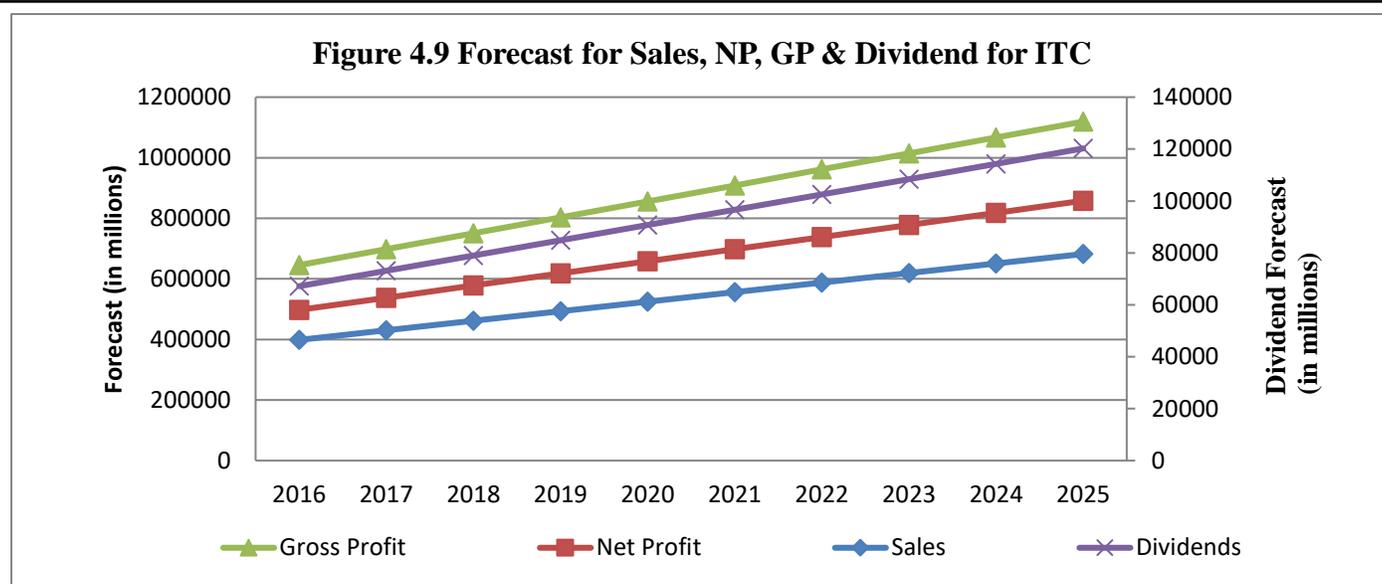
**4.3.9 Indian Tobacco Company Ltd. (ITC):**

**Table-4.9: Regression Results for I T C Ltd.**

| Variable | b' value | a' value | $R^2$ | T' test | F' test | D-W test |
|---|---|---|---|---|---|---|
| Sales | 31519.47 | -63144759.47 | 0.97 | 17.373** | 301.808* | 0.53 |
| Net Profit | 8517.05 | -17071130.00 | 0.95 | 12.254* | 150.166* | 0.44 |
| Gross Profit | 12592.30 | -25238363.77 | 0.95 | 12.717* | 161.728* | 0.43 |
| Dividend | 5895.00 | -11817125.01 | 0.91 | 8.807* | 77.555* | 2.32 |

*Significant at 5% level          **Significant at 95% level

**Figure 4.9 Forecast for Sales, NP, GP & Dividend for ITC**

The results which emerged on all the parameters with respect to all test used except for 'D-W" test proved to be positive. ITC was primarily a tobacco company before diversifying, an area of acute competition and taxation target every year. Despite this the future looks bright for the company. For all the variables namely sales, net profit, gross profit and dividend, the $R^2$ was high (0.97, 0.95, 0.95 and 0.91 respectively). Which signifies that the goodness of fit of the regression line is good. All the parameters being significant at 5 percent level. Which established that there existed a linear relationship between the respective dependent and the independent variable (time) disapproving the null hypothesis.

The 'D-W' values calculated was low for sales, Net profit and Gross profit was low i.e. 0.53, 0.44 and 0.43 respectively And for Dividend were more than two (2.32). Proving to the fact that there was auto-correlation therefore doesn't fit very well for prediction except for Dividend. The forecasted figures of the same can be seen in the combined line graph 4.9.
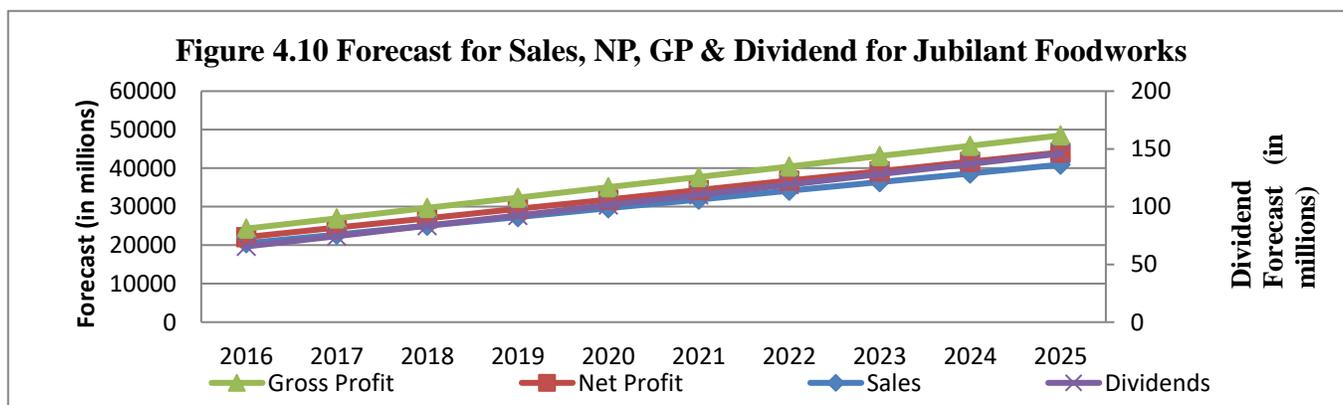
### 4.3.10 Jubilant Foodworks Ltd:

**Table-4.10: Regression Results for Jubilant Foodworks Ltd.**

| Variable | b' value | a' value | $R^2$ | T' test | F' test | D-W test |
|----------|----------|----------|-------|---------|---------|----------|
| Sales | 2267.08 | -4549928.88 | 0.92 | 9.432** | 88.967* | 0.41 |
| Net Profit | 176.63 | -354487.83 | 0.89 | 8.120* | 65.927* | 0.90 |
| Gross Profit | 246.27 | -494281.54 | 0.89 | 6.802* | 46.271* | 0.89 |
| Dividend | 8.94 | -17957.48 | 0.27 | 1.732# | 3.000# | 1.40 |

*Significant at 5% level        **Significant at 95% level        #Not Significant at 5% level



**Figure 4.10 Forecast for Sales, NP, GP & Dividend for Jubilant Foodworks**

In case of Jubilant the regression analysis revealed a very healthy track record based on most of the parameters except for dividends. The results for the same was shown in table 4.19. Regarding Sales, the regression coefficient $R^2$ was as high as 0.92 indicating the extreme goodness of fit of the regression line with just 8 percent variation. The 'T' value of 9.432 and 'F test figure of 88.967 were both statistically significant at 5 percent level respectively. Disapproving the null hypothesis that there

exist no linear relationship between the 2 variables. The 'D-W' value of 0.412 however certified the existence of auto-correlation in the observed data.

Regression Analysis of the net profits of the company showed a R square of 0.89 and the calculate 'T' value was 8.120 significant at 5 percent level and these was held true for 'F' test with an value of 65.927. The 'D-W' value was (0.90) indicating then nonexistence of auto-correlation. Hence data can be used for prediction

Gross profit had an $R^2$ of 0.89 with 'T' and F test values high 6.802 and 46.271) at 5 percent level of significance. The 'D-W' statistic was high at 0.89, clearing the data from the fear of auto correlation for predication.

For dividend the regression coefficient was at 0.27 indicating the goodness of fit was at its lowest with 'T' and F test values (1.732 and 3.000 weren't statistically significant at five percent level of significance. Accepting the null hypothesis. The 'D-W' statistic was high (1.40) clearing the data, stating nonexistence of auto-correlation.
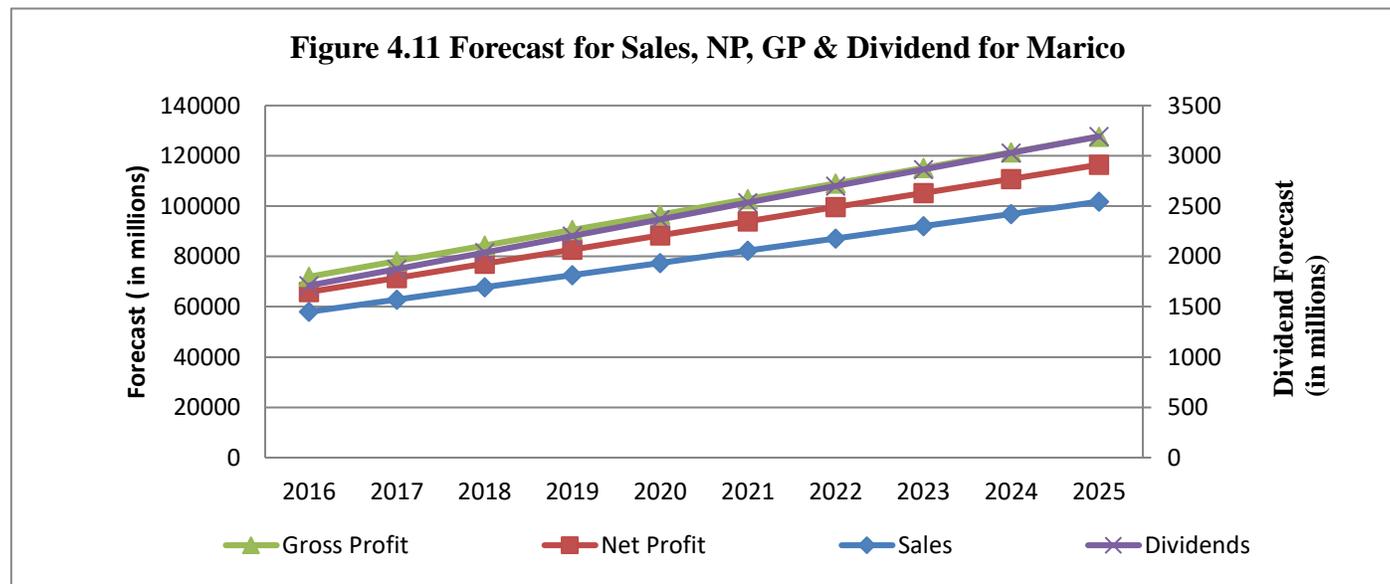
### 4.3.11 Marico Ltd.

**Table-4.11: Regression Results for Marico Ltd.**

| Variable | b' value | a' value | $R^2$ | T' test | F' test | D-W test |
|---|---|---|---|---|---|---|
| Sales | 4866.04 | -9751950.80 | 0.98 | 19.386** | 375.802* | 1.65 |
| Net Profit | 565.84 | -1134684.82 | 0.93 | 10.656* | 65.927* | 1.42 |
| Gross Profit | 755.14 | -1514459.62 | 0.91 | 9.789* | 95.817* | 0.50 |
| Dividend | 164.68 | -330283.80 | 0.42 | 2.393* | 5.720* | 1.89 |

*Significant at 5% level          **Significant at 95% level



**Figure 4.11 Forecast for Sales, NP, GP & Dividend for Marico**

In the presentation of analysis findings, all the four variables are shown sequentially in table 6.521 starting with sales. For Marico the R square for sales was very good (0.98) revealing the goodness of fit of regression line and a variation of only 2 percent. Both 'T' and 'F' statistic were found to be statistically significant with a value of (19.386 and 375.802 respectively) at 5 percent level of significance. Proving the alternate hypothesis true (i.e.) 'b' is greater than 0, which means the linear relationship is accepted. Since the value of 'T' and that of 'F' were high, it clearly revealed the high degree of linear relationship between the two variables. The 'D-W' test value (1.65) being more than one signify the possibility of using the data for prediction.

In case of net profit the R square was too high (0.93) indicative of very good fit of the regression line and this is

proved by the forecast made. Both 'T' and 'F' test showed figures (10.656 and 65.927 respectively) which at 5 percent level were found statistically significant. The 'D-W' Value was at a level of 1.42, indicative of the accuracy of the forecast as there existed no auto-correlation.

Thee regression analysis for gross profit too revealed a R square of 0.91 which is very high revealing good fit of the regression line and the same proved by the forecast made. Both 'T' and 'F' stat depicted were statistically significant. The 'D-W' Value was at a level of 0.50 which is very low questioning the accuracy of the forecast.

Regarding the dividends paid by Marico the R square (0.42) indicating a low the goodness of fit of the regression line. The 'T' value was 2.393 and 'F' value was 5.720 both significant at 5 percent level. The 'D-W' value was 1.89, indicating data very

reliable for forecast. A combined line graph for all the four variables can be seen on Graph 4.11. It must be stated that in case of Marico it was observed that the overall past performance was good and therefore, revealed health trend for the future.
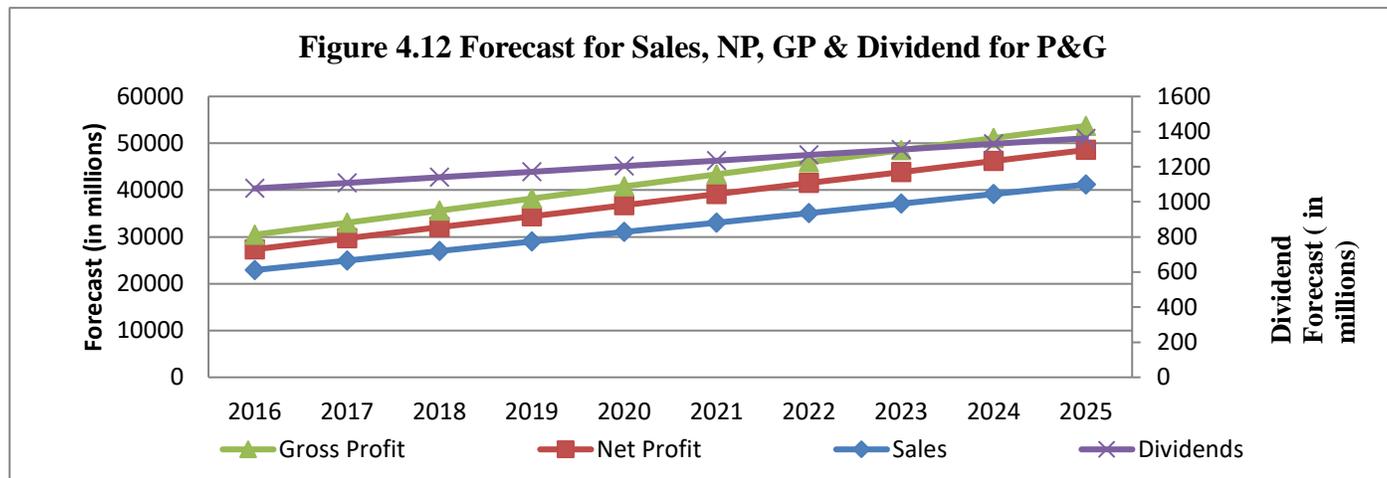
### 4.3.12 Procter & Gamble Hygiene & Health Care Ltd:

**Table-4.12: Regression Results for Procter & Gamble Hygiene & Health Care Ltd.**

| Variable | b' value | a' value | $R^2$ | T' test | F' test | D-W test |
|---|---|---|---|---|---|---|
| Sales | 2030.34 | -4070270.76 | 0.91 | 8.985** | 80.732* | 0.48 |
| Net Profit | 223.18 | -446804.13 | 0.72 | 4.870* | 23.718* | 1.13 |
| Gross Profit | 328.26 | -657338.61 | 0.67 | 4.045* | 16.362* | 0.85 |
| Dividend | 31.71 | -62857.27 | 0.54 | 3.092* | 9.562* | 0.97 |

*Significant at 5% level          **Significant at 95% level



Figure 4.12 Forecast for Sales, NP, GP & Dividend for P&G

The results of P&G with respect to all its parameter proved to be positive. For all the variables namely sales, net profit, gross profit and dividend, the $R^2$ was high (0.91, 0.72, 0.67and 0.54 respectively). Which signifies the fairly good level goodness of fit of the regression line.

The calculate value of 'T' and 'F' test in terms of all the variables were almost similar except for sales which was quite high than that of the others, all being significant at 5 percent level. Which again established that there exists a linear

relationship between the respective dependent and the independent variable (time).

The 'D-W' values calculated for all the variable were 0.48, 1.1, 0.85 and 0.97 respectively. Bearing testimony to the fact that there was no auto-correlation therefore fit very well for prediction. Except for Sales foe which the stat was low. The forecasted figures of the same can be seen in Table 4.12 and combined line graph 4.12.
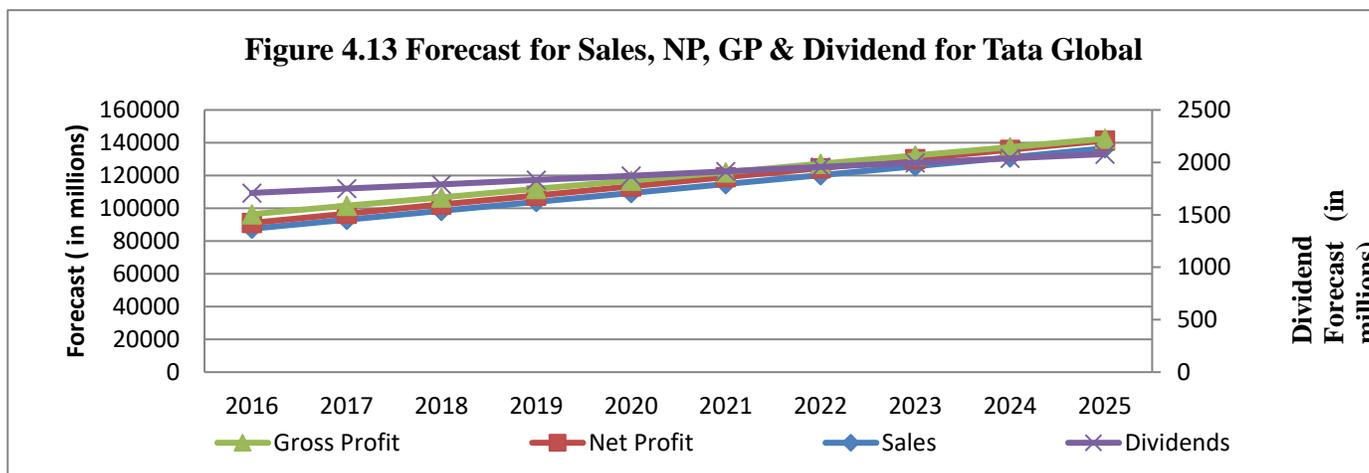
### 4.3.13 Tata Global Beverages Ltd.

**Table-4.13: Regression Results for Tata Global Beverages Ltd.**

| Variable | b' value | a' value | $R^2$ | T' test | F' test | D-W test |
|---|---|---|---|---|---|---|
| Sales | 5452.54 | -10904778.45 | 0.99 | 25.726** | 661.833* | 2.13 |
| Net Profit | 124.80 | -248043.83 | 0.40 | 1.227# | 1.507# | 3.20 |
| Gross Profit | -458.72 | 930099.83 | 0.08 | (-0.810)# | 0.655* | 1.60 |
| Dividend | 41.16 | -81271.81 | 0.08 | 0.806# | 0.649# | 2.24 |

*Significant at 5% level      **Significant at 95% level      #Not Significant at 5% level

**Figure 4.13 Forecast for Sales, NP, GP & Dividend for Tata Global**



The analysis done for Tata Global Beverages ltd, for purpose forecast revealed different situations in Table 6.25 .The regression coefficient for Sales was 0.99 indicative of its goodness of fit regression line For sales the 'T' and 'F' statistic were 25.726 and 661.833, both significant at 5 percent level with a 'D-W' value of more than 2 i.e.( 2.13) revealing no auto correlation and the that can be used for future prediction.

Whereas in case of for Net profit, Gross Profit and Dividend the regression coefficient were very low (0.40, 0.08 and 0.08 respectively), indicating that the trend for the future would be declining. The calculated value of 'T' and 'F' statistics also suggested the same. For NP the values were 1.22 and 1.50, for GP it was (-0.810) and 0.655 while for Dividends it was 0.806 and 0.649. All the values for the above three variables were not statistically significant at five percent level, accepting the null hypothesis The D-W test for sales for all the 3 variables were (3.20, 1.60 and 2.24 respectively), being reliable for predication .The table 6.26 and graphical representation of the prediction is shown in Figure 6.13.
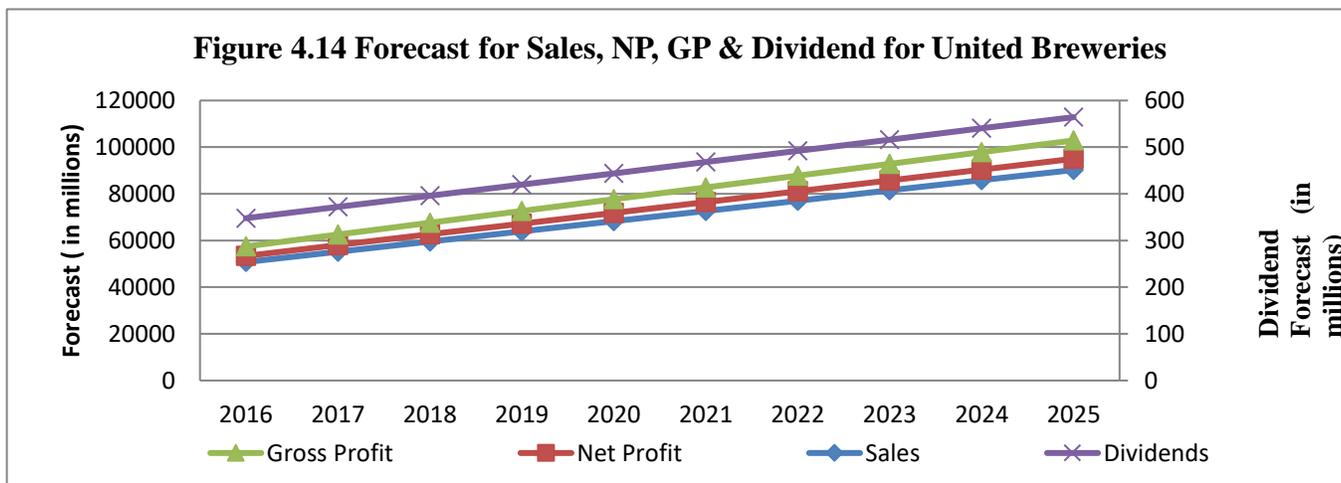
### 4.3.14 United Breweries Ltd:

**Table-4.14: Regression Results for United Breweries Ltd.**

| Variable | b' value | a' value | $R^2$ | T' test | F' test | D-W test |
|---|---|---|---|---|---|---|
| Sales | 4381.17 | -8781648.49 | 0.99 | 31.012** | 961.756* | 1.45 |
| Net Profit | 247.01 | -495366.96 | 0.93 | 10.110* | 102.208* | 1.52 |
| Gross Profit | 417.49 | -837572.71 | 0.98 | 13.220* | 174.758* | 2.31 |
| Dividend | 24.04 | -48118.81 | 0.08 | 6.049** | 36.591* | 1.90 |

*Significant at 5% level          **Significant at 95% level

**Figure 4.14 Forecast for Sales, NP, GP & Dividend for United Breweries**



The results in table 4.27 which emerged on all the parameters except dividends with respect to all test used test proved to be positive. The future looks bright for the company. For all the variables namely sales, net profit and gross profit the $R^2$ was high (0.98, 0.93 and 0.98 respectively). Whereas for dividends the R square was just 0.08 which was very low. Which signifies that the goodness of fit of the regression line is good for the first three parameters, in case of dividends the results were poor.

The calculated value of 'T' and 'F' test in terms of Sales, NP and GP were 31.01 and 961.75 for sales, 10.110 and 102.208 for NP 13.22 and 174.758 for gross profit and for dividend 6.049 and 36.59. All the parameters being significant at 5 percent level. Which established that there existed a linear relationship between the respective dependent and the independent variable (time) disapproving the null hypothesis.

The 'D-W' values calculated high for all i.e. 1.45, 1.52, 2.31 and 1. 90 for sales, net profit, gross profit and dividend respectively. Proving to the fact that there was no auto-correlation therefore fit very well for prediction. The forecasted figures of the same can be seen in Table 4.14 and combined line graph 4.14.

### 4.3.15 United Spirits

**Table-4.15: Regression Results for United Spirits Ltd.**

| Variable | b' value | a' value | $R^2$ | T' test | F' test | D-W test |
|---|---|---|---|---|---|---|
| Sales | 9504.79 | -19041747.60 | 0.92 | 9.583** | 91.825* | 1.11 |
| Net Profit | -3452.56 | 6937077.83 | 0.34 | (-2.037)# | 4.150# | 2.07 |
| Gross Profit | -2862.28 | 5750763.49 | 0.33 | (-2.000)# | 3.999# | 1.97 |
| Dividend | 0.09 | 90.22 | 0.00 | 0.006# | 0.000# | 1.47 |

*Significant at 5% level          **Significant at 95% level          #Not Significant at 5% level



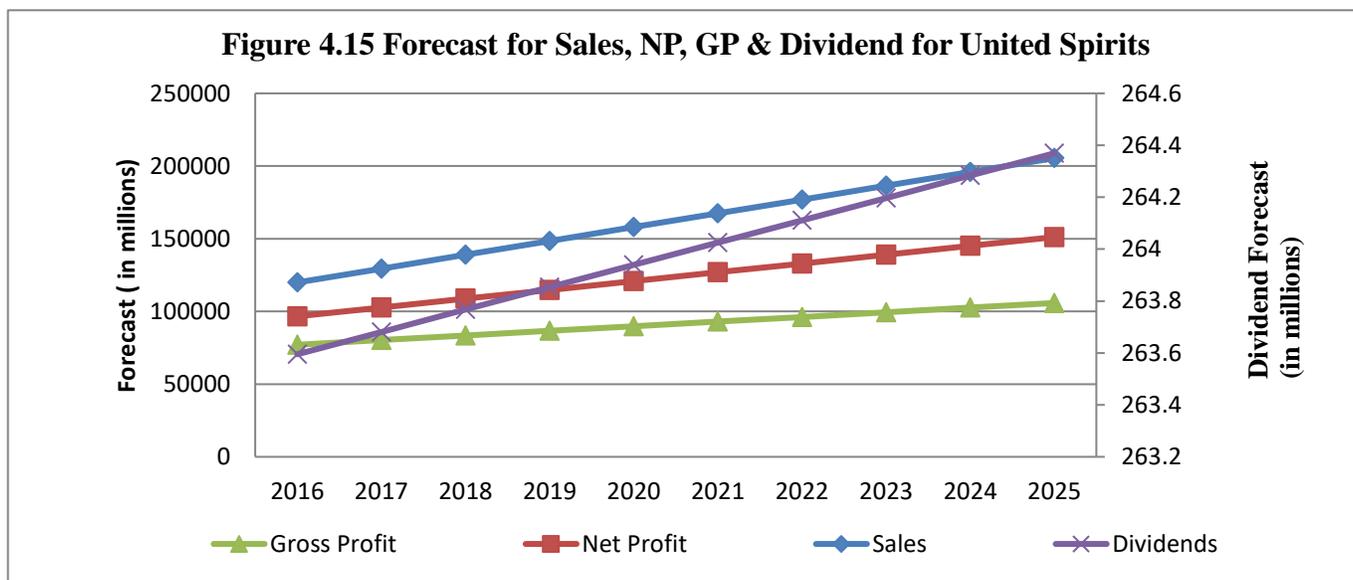Figure 4.15 Forecast for Sales, NP, GP & Dividend for United Spirits

Table 6.15 reflects the regression results for United Spirits. Starting with sales the R square for sales was very good (0.92) revealing the extreme goodness of fit of regression line. Both 'T' and 'F' statistic were found to be statistically significant with a value of (9.583 and 91.825 respectively) at 5 percent level of significance. This depicted that there exist a linear relationship with the dependent and the independent variables, proving the alternate hypothesis true (i.e.) 'b' is greater than 0, which means the linear relationship is accepted. Since the value of 'T' and that of 'F' were high, it clearly revealed the high degree of linear relationship between the two variables. The 'D-W' test value (1.11) being more than two signify there exist no-autocorrelation between the variables and also signifies the possibility of using the data for prediction.

In case of net profit, Gross profit and Dividend the R square was too low (0.34, 0.33 and 0.00 respectively) indicative poor good fit of the regression line and this is proved by the forecast made. Both 'T' and 'F' test showed figures (-2.037 and 4.150 for net profit, for GP it was -2.00 and 3.99 and for dividend it

was 0.00 and 0.00 all the three were not statistically significant. The 'D-W' Value was at a level of 2.07, 1.97 and 1.47 for respective parameters. Reflecting that there exist no auto-correlation but the data being very low in terms of r square forecasting done wouldn't be reliable

Thus, United Spirits showed a very deteriorating performance. This can be attributed to the past performance which was declining the same reflected for the future.

The forecast for the company can be seen on table 6.15 and its graphical representation is shown on graph 4.15.

### Conclusion

The study investigated the relationship between Product diversification and firm performance in the FMCG sector listed on NSE from the data generated, analysed and interpreted. For understanding into the performance of the diversified firms Gini-Simpson Entropy measure was used to derive the Diversification index whose results revealed that a wide variations existed between the companies under study, but an

interesting factor that was noted was the absence of wide fluctuations within the companies over the years. The average index for the ten year period revealed that the fifteen companies fell into three broad categories namely high, medium and low. Those securing an index value of 0.60 and above were classified as high, and those varying between 0.30 and 0.59 as medium and below 0.30 as low.

Six companies fell into the second category namely, Dabur with an average of 0.48, Emami having an average of 0.36, Godrej Consumer with an average of 0.55, ITC with an average of 0.51, Marico with 0.31 and Procter with an average index of 0.58. And in the last class it had seven companies namely, Britannia, Colgate. GlaxoSmithKline, Jubilant, Tata global, United Breweries, United Spirits having an average of 0.25, 0.13, 0.07, 0.28, 0.00, 0.02, 0.01 respectively.

The values of the average index was then used to correlate with the Gross Profit whose results depicted that most of the companies had a positive correlation coefficients, while Dabur, HUL, P&G, Tata Global and United Breweries had negative correlation coefficients, 'r' being (-0.85, -0.59, -0.85, -0.33 and -0.73 respectively). The t significance test conducted revealed most of the correlation coefficients significant at a level of 80 percent and 99 percent confidence level.

Though the DI employed revealed the fifteen companies falling into three different classes of high, medium and low, it failed to indicate the superiority of the organization with a high diversification index value and vice versa. The correlation between the DI and the gross profits too failed to establish the fact of superiority. Hence a conclusion was arrived that the significance of the diversified firms depends upon each of the individual firms and not as a general rule.

Trend Analysis for Britannia, Colgate, Dabur and Emami revealed largely similar scenarios. The R square was high for all the three companies with only exception of Dabur it was 0.88 for sales and less than 60 percent for BIL for N.P. and G.P. In all cases the 'T' and 'F' tests conducted displayed results which were significant at 5 percent confidence level. The 'D-W' test conducted was also satisfying.

In case of Godrej industries and Tata Global reflected a low R-square less than 0.40 percent for Net profit and the T&F statistic were not significant at 5 percent level. Hence the forecast reflected a declining trend. The trend for dividend was poor was HUL, Jubilant, Marico, and P& G with a low R square value. Further, T & F tests were not satisfactory for all other variables except for sales.

United Spirits had the lowest performance with respect to all variables, with the lowest R-square for all its variables considered for trend analysis except for sales. The T & F statistic also for revealing a non-significant relationship depicting a declining trend.

Trend analysis for all the fifteen companies with regard to sales, gross profit, Net Profit and Dividend is a mixture of bright, dull and intermediate performance. Some are bright on all parameters while others have a mixed future. Thus can be said the performance of Diversified companies to a large extent depends on the current pursuing diversification strategy along with the all the external factors and management of the organizations and it ability to tap and enhance to the new and already existing opportunities.

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