Chapter 1

INTRODUCTION, OBJECTIVES AND METHODOLOGY
With the maturing of industrial civilisation in the current century, marketing has emerged as one of the most important activities of business. Today, marketing is hogging the limelight in the national and international arena as the main activity of determining consumer demand for a product or service, promoting itself and distributing it into ultimate consumption at a profit for the healthy growth of industrial enterprises in the highly competitive business environment. Naturally, marketing research is gaining momentum as an instrument for supporting and furthering marketing activities to get products or services more efficiently into the hands of the consumer. Simply producing quality and services is not enough for the survival of industrial enterprises; effective marketing backed by empirical research evidences is a latest mantra for successful business operations all over the world. In this perspective, the present research study has been undertaken to unveil research information relevant to Designing Promotional Strategies for Effective Marketing in a Competitive Environment. With this preliminary information, the first chapter has been developed in a systematic manner with a view to highlighting the following topics for providing the introductory context and explaining the research methodology of the study:

1.1. Rationale of the Study
1.2. Importance of Chemical Industry and Role of Clariant (India) Limited (CIL)
1.3. Objectives of the Research Study
1.4. Research Methodology.
1.5. Organisation of the study
1.6. Limitations of the Study
1.7. Scope for Future Research Work
1.1 Rationale of the Study

Today, companies cannot survive by simply producing goods and services in the market. They must do an effective marketing job if they want to succeed in business characterised by fierce competition and changing technology at domestic and international levels. Philip Kotler\(^1\), the acknowledged guru of marketing, has defined marketing as a social and managerial process by which the individuals and groups obtain what they need and want through creating, offering and exchanging products of value with others. Stanton et al.\(^2\) also define marketing as total systems of business activities designed to plan, price, promote, and distribute want-satisfying products to target markets to achieve organisational goals. It comprises all the activities from the time a product is conceived to the time it reaches the consumer. In its broadest sense, marketing includes the product lines to be offered, quality product design, uniqueness of the product, volume of production, research and development, the target audience, territories, time of bringing the product to the market, market segmentation, pricing, promotion and distribution. These complex issues heighten the need for effective marketing whilst expanding its scope beyond the marketing function. However in one of the most comprehensive descriptions of the marketing concept, McNamara\(^3\) has defined it as a philosophy of business management, based upon a company-wide acceptance of the need for customer orientation, profit orientation, and recognition of the important role of the marketing in communicating the needs of the market to all major corporate departments.

There is no denying the fact that effective marketing requires an integrated promotional plan. Promotional activity is aimed at fostering the consumer’s awareness of the product, knowledge about its features, interest in purchasing, and at last consuming it. Accomplishing the typically
multifaceted promotional goals means relying not just on one form of promotion but bringing together a number of different modes of promotions in a consistent, and complementary way. Two conflicting developments are forcing organisations to rethink their promotional strategies. On one hand, the highly competitive market environment compels marketers to increase their spending on the promotional mix. At the same time, promotional expenditures are being examined by top management as one of the areas left for cutting costs and increasing profits. This heightened scrutiny puts intense pressure on marketing managers to develop and implement promotional strategies that can add value to their companies within the constraints of tighter budgets.

The current millennium has unfolded new business rules, the most significant of them being the past history or experience in a given product market is no indicator of future success. Market leadership cannot be taken for granted because customer loyalty does not exist for a long time. In an era of globalised markets, the customer today has a much wider choice. Given the plethora of promotional mediums, customer wants and enjoys being wooed by the marketing people. Over a period of time, as competition intensifies wooing and cajoling the customer will also intensify. Today, the marketplace is becoming an increasingly complex arena of competitors’ activities within a rapidly changing international environment. In such a situation, marketers are using all types of promotional tools, techniques and strategies in an attempt to persuade consumers to act in a desired manner. The purpose of promotion is to directly or indirectly influence individuals, groups, and organisations to facilitate exchanges by informing and persuading one or more audiences to accept a company’s products or services.
Promotion is a key part of the marketing programme and is concerned with efficiently and effectively communicating the decisions of marketing strategy to target audiences. It is also concerned with persuasive communication of the components of marketing programme to target audiences with the intent to facilitate exchange between the marketer and the customer, which will satisfy the objectives of both the customers and the organisations. For many organizations, marketing promotions represent the most visible face of the organisation.

In this context, it is important to examine the role of promotional strategies of Clariant (India) Limited (CIL) in enhancing the operational performance of the company. It is also seen that nowadays companies are recognising the fact that emerging markets like India as well as other parts of the world have tremendous opportunities for growth. They also admit that advertising and other promotional tools will play an important role in matching the new global consumers. Driven by this consideration, the researcher in consultation with his learned supervisor and other eminent academicians has selected an important area for in-depth study despite many difficulties that stood in the way. In choosing the topic and in conducting the study, the researcher has been driven by the fundamental belief that research as an intellectual activity is the cradle of all knowledge – the knowledge which can act as a catalyst for social and economic change which we need most in the present juncture of the transformation from our status as a developing country to that of a developed one. It is felt that the topic: “Designing Promotional Strategies for Effective Marketing in a Competitive Environment: A Case Study of Clariant (India) Limited” is well chosen and expected to open up many new vistas of research. The study has been done with the data for the period from 1995 – 96 to 2004 – 05.
1.2 Importance of Chemical Industry and Role of Clariant (India) Limited

India is currently moving towards a free market economy riding on the back of liberalisation. The ultimate purpose of globalisation is to create a global economy and global market. The survival of the companies in the competitive global environment will depend very much on how they can maintain and expand its market share through the production of quality products at reasonable price and a judicious mixture of different kinds of marketing and promotional strategies, tools and techniques.

Chemical Industry represents an important manufacturing activity with enormous potential to contribute to the development of wide range of industries using speciality chemicals as their inputs. Indian chemical industry began to grow at an appreciable pace after liberalisation of the economy on and from 1991. India’s per capita consumption of industrial chemicals, even though one of the lowest in Asia, has made rapid growth over the last decade and is expected to show good growth in the next few years as well. A significant development during the last decade has been the emergence of speciality chemicals such as additives, adhesives and sealants, construction chemicals, inks, dyes and printing supplies, paints, coatings and resins, surfactants, cleaning agents and water treatment chemicals. India now produces a large number of the fine and speciality chemicals with wide applications in engineering, plastics, rubber tires, leather tanning, paints, textile and paper industries. This represents significant export opportunities for U.S. chemical suppliers, whose exports are expected to grow at 10-12 percent annually for the coming years.

The Indian Speciality Chemical Industry accounts for around 24 percent of the US$40 Indian Chemicals Industry, with the organised sector accounting for 21 percent and the unorganized sector the rest. The industry is
characterised by its unique co-existence of around 1950 units operating in small-scale sector and about 50 large organized units mainly concentrated in Maharashtra and Gujarat producing over 80,000 tonnes of dyestuff per year. In terms of profitability, global reach, customer orientation, product range, marketing power and R&D base, the organised sector reigns supreme. Obviously, the Chemical Industry is a significant component of the Indian economy. With revenues estimated over US$ 40 billion, the industry constitutes over 6 percent of India’s GDP and about 10-12 percent of total exports. The share of the speciality chemicals segment in overall chemical industry segment is about 25 percent and caters to the paints and coatings, adhesives and sealant, additives for pharmaceuticals, catalysts, water treatment, textile printing, finishing and sizing, paper coating and leather finishing segment. Domestic market for speciality chemicals constitutes 2.5 percent of the global speciality chemicals market. With immense growth prospects in textile, leather, paper and allied industries, the speciality chemical sector is well poised for impressive growth in domestic markets as well as in the international markets also.

Clariant AG, with its Indian subsidiaries Clariant (India) Limited (CIL) is the largest player in the specialty chemicals market and controls about 45 percent of the organised segment of the market. The other MNCs in the market are ICI India, Bayer, BASF and Nalco Chemicals. The major domestic companies in this sector are Pidilite Industries, Herdillia Chemicals and Sudarshan Chemicals. But CIL is the only one that demands a close watch.

In this context, we want to study promotional strategies of Clariant (India) Limited (CIL). CIL is a 51% subsidiary of Clariant AG- a leading Swiss MNC which produces and distributes speciality chemicals to textile, leather, paper and plastic industries. Clariant operates world wide with its headquarter in Muttenz near Basle, Switzerland. It has the presence in near about 60
countries in five continents and annual sales turnover 8.5 billion CHF (Swiss Franc) \( (1 \text{ CHF} = 37.02 \text{ INR}, \ 8.5 \text{ billion} \times 37.02 = 31467 \text{ Cr INR approx.)}^{11} \). The global market size of speciality chemicals is estimated at about 35 billion US dollars and India’s share in the world market is estimated at 5 to 6 percent with major export in EU countries and USA, Egypt, South Korea and Hong Kong. The share of speciality chemicals segment in overall chemical industry segment is about 25 percent in India \(^{12}\). Therefore, the study is expected to unveil some important empirical information, which will go a long-way in improving the marketing especially the promotional strategies of Indian companies aspiring to enter global market of speciality market.

CIL was originally incorporated as a company under Indian Companies Act, 1913, on 2\(^{nd}\) January 1947, as Sandoz Productose Ltd in the state of Maharastra. The name was later Changed to Sandoz (India) Limited. In the year 1995\(^{13}\), the company has been trifurcated into pharmaceutical, agro and chemicals businesses. The name of the company, which is in chemical business, was changed to Clariant (India) Limited (CIL) in 1995.

CIL’s operations in India span the length and breadth of the country. It has the offices in the five metropolitan cities, state of the art manufacturing plant and technical service centers close to its main markets. Its corporate office is in Mumbai and branch offices are in Ahmedabad, New Delhi, Kolshet, Chennai, Tirupur and Technical Service Centers are in Thane, Kanpur, Vaniyambadi and Chromepet. The company started manufacturing dyes and chemicals at Kolshet, Thane in 1962. The company is the market leader in Textile and Leather Chemicals and is an important supplies of speciality dyes and chemicals to polyester, wool, silk, leather and paper products. Export is one of the thrust areas and account for almost 32 percent turnover of CIL’s business. The business of CIL comprises of Textile Dyes (12%), Textile Chemicals (27%), Leather Dyes and Chemicals (24%), Paper (3%), Masterbatches (2%)
and Exports (32%)\textsuperscript{14}. Diagram 1.1 shows the position of different business segments and their market shares of CIL’s total business.

**Figure 1.1: Segment wise businesses of CIL**

![Pie chart showing market shares](image)

*Source: Annual Reports of Clariant (India) Limited*

The study is expected to throw sufficient light on the techniques and methods employed by the multinational companies for sustaining and expanding market share through promotional strategies. Obviously, the study will be useful for the Indian manufacturing companies who want to develop and diversify through appropriate promotional strategies. The study will also be useful to marketing managers, management consultants, research scholars & management students who are interested in expanding their domain of knowledge in the areas of marketing promotion, sales management and sales forecasting. The study will also open up a plethora of opportunities for future research in this area of knowledge and learning.

Moreover the analysis of promotional strategies with reference to Clariant (India) Limited (CIL) – a multinational company with global reach and leadership – is expected to unveil a rich treasure of marketing knowledge of far-reaching significance. We hope that the present study will yield a wealth
of empirical information, which add to the existing stock of knowledge relating to designing promotional strategies for effective marketing of goods and services of leading Indian companies.

1.3 Objectives of the Study

Identification of objectives is very important for any research study and we have identified the following prominent objectives of the study.

i) To develop a comprehensive theoretical foundation as a frame of reference for conducting the study and analysing the data.

ii) To identify the gaps in the existing knowledge in the area of promotional strategies through an elaborate survey of research literature in the relevant field.

iii) To keep abreast of latest theories and practical applications in the areas of marketing promotion as practiced by multinational companies especially CIL.

iv) To identify the important methods of promoting sales for effective marketing in the present competitive environment.

v) To make a comparative analysis of the performance of different promotional elements of CIL during the period of study.

vi) To find out the degree of association between different promotional elements and operating profit, net profit and sales, both individually and collectively.
vii) To make an attempt to forecast sales, profit and promotional expenses in order to guess the potential of the company for future growth and development.

viii) To offer suggestions for designing better promotional strategies with a view to improving the overall performance of the company.

1.4 Research Methodology

Research methodology is a crucial part of any research programme. According to Kothari\textsuperscript{15} research methodology consists of all those methods, tools and techniques, which are used for carrying out the research work. It is generally adopted by the researcher to explain the research problems, the logic behind the selection of methods and techniques for collection, analysis and interpretation of data so as to come up with a satisfactory solution to the problem envisaged. A well-planned methodology can make valuable contribution to the quality of the research work permitting sophisticated analysis and interpretation yielding valuable information. In our view, a scientific research involves an investigation into a problem or a phenomenon for expansion or modification of knowledge for the ultimate benefit of mankind. Wilkinson and Bhandarkar\textsuperscript{16} observe that a scientific investigation, to be accurate, should be based on a sound theoretical framework and a well-designed methodology for a systematic study of the problem, collection and compilation of data, their analysis and interpretation and finally a body of findings, observations and concrete conclusion.

Marketing research under modern marketing philosophy can offer current, adequate and accurate information about potential buyers and all other aspects of market environment. It is through marketing research that an organisation plans the appropriate marketing strategies, and implements the
marketing concepts and takes a scientific approach to marketing management. The relevance of marketing research in Indian markets will increase multifold as the economy opens up in the coming decades. As markets evolve and competition intensifies, marketing research will be needed more than ever before for effective and speedy decision making. In this context, the present study has been undertaken to conduct an empirical enquiry into the promotional strategies that a multinational company follows for effective marketing in a competitive environment. The promotional strategies of a company are aimed at boosting sales by capturing a greater share of the market with a view to achieving the key objectives of profitability, growth and stability.

The methodology that we have followed in our research study can be systematically presented under the following major heads:

i) Selection and statement of Research Problem.

ii) Data Collection and Data Analysis

iii) Formulation of Hypotheses of the Study.

i) Selection and Statement of Research Problem.

In a research process the first and foremost step happens to be the selection and statement of a research problem. After selecting an area, the researcher must pinpoint the problem and states it in clear terms so that it becomes the bedrock of the research. A research problem, in general, refers to some difficulty, which a researcher experiences in the field of theoretical and practical knowledge and wants to obtain a solution for the same. The research problem is undertaken for a study must be carefully identified. In our study, the problem stimulating the present investigation arises from an extensive survey of research literature in the area of promotional marketing and crystallised from discussion with the faculty members of the University of Burdwan. As an academician, specialising in marketing management, it was
natural for me to look for an interesting area of research in promotional strategies, which occupy an important position in marketing management. In this connections it is necessary to highlight in brief the importance of marketing and promotional marketing which prompted us to choose the particular topic of our research entitled, "Designing Promotional Strategies for Effective Marketing in a Competitive Environment: A Case study of Clariant (India) Limited". The study covers a period of ten years from 1995 – 96 to 2004 – 05. The justification for choosing the title of research work is further explained in the following lines.

In a developing country, like India, which is slowly emerging as an economic power to reckon with, the growth and development of speciality chemical Industry has a special role to play. There is no denying the fact that speciality chemical industry has played a significant role in generating employment, income, output and overall industrial development in the country like India. As a matter of fact, it has been increasingly contributing the fundamental strength and resilience of the Indian economy.

A new era is unfolding in the field of marketing promotions. Today marketing has emerged as the most important area of corporate business activities, which is responsible for maintaining and expanding the market share of the goods and services produced by an organisation in terms of increased sales by adopting suitable promotional campaigns and other marketing programmes. Broadly, marketing includes a number of strategies such as product strategy, pricing strategy, promotion strategy and place or distribution strategy. Among these strategies, promotional strategies enjoy special position in the overall marketing strategies because without promotional efforts no strategy can hope to succeed. For Indian companies, promotional strategies are even more important as the Indian economy is now a part of the global economy and Indian companies need to compete
globally. Therefore, we have lot to learn from the multinational companies, the art and science of designing effective promotional strategies. In this context, our study focusing on designing promotional strategies for effective marketing in a competitive environment with reference to Clariant (India) Limited is appropriate.

ii) Data Collection and Techniques of Data Analysis

Collection of data is of utmost importance for a research study. If the data are not accurate and adequate, the findings of the study are bound to be misleading. The collection of data depends on the field for which the data is to be collected and the techniques, which are to be used for its collection. Once the purpose of a statistical investigation has been defined, the problem is to collect data, which are relevant to that purpose of research, to analyse these data and to present them in a meaningful manner.

This study is basically empirical in nature. For the purpose of this study, secondary data have been mainly used. The data have been collected from published documents of the CIL. The data have also been collected from the other secondary sources such as books and journals on marketing, especially those dealing with speciality chemicals industry in India & abroad. It may be pointed out that the website of the CIL (i.e., http://www.clariantindia.com.) was particularly useful for the purpose of the research work. For research analysis, data have been properly edited, tabulated and presented in suitable tables as well as appropriate diagrams in keeping with the objectives of the study. The tabulated data have been analysed with the help of appropriate statistical tools and techniques as well as some econometric models in order to accomplish the objectives of the study. It may be noted to supplement that we collected some primary data by directly interviewing the senior executives of marketing of CIL as well as other executives belonging to the company.
For the purpose of analysing the data relating to the different kinds of promotional elements of CIL as also those relating to sales, operating profit, and net profit of CIL, we have used the following statistical tools and techniques:

(a) **Correlation Analysis (Bivariate)**

We have calculated the Pearson product-moment correlation coefficient to measure the degree of relationships between two variables. It also measures the magnitude and direction of linear relationships between two variables, $X$ [independent variables, have General Promotional Expenses, Discount on Sales and Trade Commission] and $Y$ [dependent variables, have Sales, operating Profit and Net Profit]. It is a symmetrical measure and takes values between -1 and +1. When $r = 1$ or close to 1, we can say that there is a high degree of relationship between the two variables and this indicates that the value of one variable increases with the increase of the value of the other variable.

The formula by which Pearson product-moment correlation co-efficient ($r$) has been calculated in our study is:

$$
 r = \frac{\sum_{i=1}^{n} (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\frac{1}{n} \sum_{i=1}^{n} (x_i - \bar{x})^2} \sqrt{\frac{1}{n} \sum_{i=1}^{n} (y_i - \bar{y})^2}}
$$

$$
= \frac{\sum_{i=1}^{n} (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^{n} (x_i - \bar{x})^2 \sum_{i=1}^{n} (y_i - \bar{y})^2}}
$$

Where, $r =$ Pearson product moment Correlation Co-efficient.

$X =$ Value of the independent variable.

$\bar{X} =$ Mean of the values of the independent variable.

$Y =$ Value of the dependent variable.
\[ Y = \text{Mean of the values of the dependent variable.} \]

(b) **Coefficient of Determination \((r^2)\)**

In our study, we have calculated the Co-efficient of Determination \((r^2)\) to measure the strength of linear association between the variables \(X\) [independent variables, here General Promotional Expenses, Discount on Sales and Trade Commission] and \(Y\) [dependent variables, have Sales, Operating Profit and Net Profit]. A higher Co-efficient of Determination \((r^2)\) would mean that there is a high degree of association between the two variables (one dependent and other independent). The value of \(r^2\) varies between 0 and 1. The formula by which Co-efficient of Determination \((r^2)\) is calculated here\(^{19}\) –

\[
r^2 = 1 - \frac{a \sum Y + b \sum XY - n \bar{Y}^2}{\sum Y^2 - n \bar{Y}^2}
\]

Where, \(r^2 = \text{Co-efficient of Determination}\)
- \(a = \text{Intercept of Co-efficient}\)
- \(b = \text{Slope of the Fitting estimating line}\)
- \(X = \text{Value of the independent variables}\)
- \(Y = \text{Value of the Dependent variables}\)
- \(\bar{Y} = \text{Mean of the observed values of the Dependent variables}\)
- \(n = \text{Number of observations}\).

Alternatively Co-efficient of Determination \((r^2)\) can be calculated in the following way;

\[
r^2 = \frac{ESS}{TSS} \times 100
\]

Where TSS = Total Sum of Squares of obtained original data and
- \(ESS = \text{Explained sum of squares from the Fitted Model}\).
- \(RSS = \text{Unexplained/Residual sum of squares from the Fitted Model}\)
\[ \frac{RSS}{TSS} = \frac{TSS - ESS}{TSS} = 1 - r^2 \]

Statistically, it can be interpreted that Co-efficient of Determination \( (r^2) \) means the percentage of total variation explained by the fitted model as compared to the variation present in the actual data set. When the value of Co-efficient of Determination \( (r^2) \) is greater than 75\% (Standard value), it indicates the strength of linear relationship between two variables (dependent and independent). We have used both the methods to cross check our results through appropriate computer software packages as well as manually.

(c) Hypothesis Testing

We have used ‘p – value’ (i.e. Probability values) for testing the null hypothesis \( (Ho) \). Statistically it can be said that the ‘p – value’ is the measurement of degree of support against the null hypothesis \( (Ho) \). A low p – value for the statistical test warrants rejection of null hypothesis \( (Ho) \). The ‘p – value’ is compared to the significance level \( (\beta) \), and on this basis, the null hypothesis \( (Ho) \) is either rejected or accepted. If the ‘p – value’ is less than the significance level \( (\beta) \), the null hypothesis \( (Ho) \) is rejected (i.e. if ‘p – value’ \( < \beta \), reject null). If the ‘p – value’ is greater than or equal to the significance level \( (\beta) \), the null hypothesis is accepted and the alternative hypothesis \( (Ha) \) is rejected (i.e. if ‘p – value’ \( \geq \beta \), accept null or reject alternative hypothesis). Statistical data analysis programs commonly compute the ‘p – value’ during the extension of a hypothesis test. The statistical formula for computing the ‘p –value’ is as follows:

A \( t \) – test is used to test the null hypothesis;

\[ t = \frac{r \sqrt{n-2}}{\sqrt{1-r^2}} \] with \( n-2 \) degrees of freedom.

\( r^2 = \text{Co-efficient of Determination} \)
\[ r \] = Pearson product-moment correlation Co-efficient between the two variables
\[ n \] = Number of observations.

Ho: \( p = 0 \), against Ha: \( p \neq 0 \) \{if \( p < 0.05 \), we reject Ho at 5% level of significance \( \beta \) and if \( p \geq 0.05 \), then we accept the Ho at 5% level of significance \( \beta \).

(d) Regression Analysis (Bivariate)

We have used the linear regression model for data analysis in our study to predict the values of one variable on the basis of the values of other variable.

The line along which the values of observations of two-correlated variable are concentrated is called the line of regression. The algebraic expression of this line is calculated here in the form of the equation, which is:

\[ Y = a + bX \]

Here \( Y \) = Value of the dependent variable 

[Here sales, operating profit and net profit]

\( X \) = Value of the independent variable

\( a \) = Intercept

\( b \) = Slope of the regression line.

The regression model does not necessary imply any cause and effect relationship between the two variables. However, the model implies that a change in the value of \( X \) (dependent variable) will bring about a change in \( Y \) (independent variable).

The formula of the normal equations by which \( a \) and \( b \) are calculated:

\[ \sum Y = na + b \sum X \]

\[ \sum XY = a \sum X + b \sum X^2 \]

From these equations, the values of \( a \) and \( b \) are;
Where, $\bar{X} = \frac{1}{n} \sum_{i=1}^{n} X$ and $\bar{Y} = \frac{1}{n} \sum_{i=1}^{n} Y$

and $a = \frac{n \sum Y - (n-1) \sum X}{n} = \bar{Y} - b \bar{X}$

$\bar{Y} = \text{Mean values of the Dependent variables}$

$\bar{X} = \text{Mean values of the independent variables}$

$b = \text{Slope of the regression line.}$

**(e) Paired Samples Test (Test for Equality of Two Means)**

We have also used the paired sample tests for testing the hypothesis of equality means of the two populations. To carryout the test, we have tested the hypothesis that the means are equal.

$H_0: (\mu_1 = \mu_2)$

Where $n_1$ and $n_2$ are the sizes of the populations one and two with means $\mu_1$ and $\mu_2$ respectively.

If the two population standard deviations are assumed to be equal, an "unbiased" estimator of the common variance is given by.

$$\sigma^2 = \frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}$$

Where, $s_1$ and $s_2$ are the sample standard deviations. The suitable test statistics for testing $H_0: \mu_1 = \mu_2$ is therefore

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$
Which is distributed as a t with \((n_1 + n_2 - 2)\) d. f.

Here \(\bar{X}_1\) and \(\bar{X}_2\) are the sample means from the two independent samples with sample sizes \(n_1\) and \(n_2\).

Confidence limits for \((\mu_1 - \mu_2)\) are:

95% confidence limits = \( (\bar{x}_1 - \bar{x}_2) \pm t_{0.05} \times \sqrt{\frac{1}{n_1} + \frac{1}{n_2}} \)

99% confidence limits = \( (\bar{x}_1 - \bar{x}_2) \pm t_{0.01} \times \sqrt{\frac{1}{n_1} + \frac{1}{n_2}} \)

(f) **Multiple Correlation Analysis**

In multiple correlation analysis, we study three or more variables at a time. A dependent variable is indicated by \(X_1\) and the independent variables by \(X_2, X_3, X_4, \ldots\). The coefficient of multiple correlation is represented by \(R\). If there are three variables \(X_1, X_2, X_3\) then

\[ R_{1.23} = \text{Multiple correlation coefficient with } X_1 \text{ as dependent variable and } X_2 \text{ and } X_3 \text{ as independent variables.} \]

\[ R_{1.23} = \sqrt{\frac{r_{12}^2 + r_{13}^2 - 2r_{12}r_{13}r_{23}}{1 - r_{23}^2}} \]

\[ R_{2.13} = \text{Multiple correlation coefficient with } X_2 \text{ as dependent variable and } X_1 \text{ and } X_3 \text{ as independent variables.} \]

\[ R_{2.13} = \sqrt{\frac{r_{21}^2 + r_{23}^2 - 2r_{21}r_{23}r_{13}}{1 - r_{13}^2}} \]

\[ R_{3.12} = \text{Multiple correlation coefficient with } X_3 \text{ as dependent variable and } X_1 \text{ and } X_2 \text{ as independent variables.} \]

\[ R_{3.12} = \sqrt{\frac{r_{31}^2 + r_{32}^2 - 2r_{31}r_{32}r_{12}}{1 - r_{12}^2}} \]

(g) **Multiple Regression analysis**

We have used the multiple regression equation for data analysis in our study that allows us to estimate the dependent variable. Multiple regression analyses are a set of statistical techniques, which allow one to assess the relationship
between one dependent variable and several independent variables. It is an extension of bivariate regression analysis in which several independent variables are combined to predict the dependent variable. 

The relationship is reflected by the following equation:

\[ Y = f(X_1, X_2, X_3, \ldots, X_n) \]

The multiple linear regression takes the form

\[ Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + \ldots + b_k X_k \]

The "b's" are the regression coefficients, representing the amount the dependent variable y changes when the corresponding independent changes 1 unit. The "a" is the constant, where the regression line intercepts the y axis, representing the amount the dependent y will be when all the independent variables are 0. The standardised version of the 'b' coefficients are the beta weights, and the ratio of the beta coefficients is the ratio of the relative predictive power of the independent variables. In the multiple regression analysis, a coefficient of correlation \( r \) between random variables \( X \) and \( Y \) is a quantitative index of association between these two variables. In its squared form, as a coefficient of determination \( R^2 \), indicates the amount of variance in the criterion variable \( Y \) that is accounted for by the variation in the predictor variable \( X \). In the multiple regression analysis, the set of independent variables \( X_1, X_2, \ldots \) is used to explain variability of the dependent variable \( Y \). A multivariate counterpart of the coefficient of determination \( R^2 \) is the coefficient of multiple determination, \( R^2 \). The square root of the coefficient of multiple determination is the coefficient of multiple correlation, \( R \).

For the three variables, say, \( X_1, X_2, X_3 \), the three normal equations are for calculating a, b1, b2, b3:

\[ \Sigma Y = na + b_1 \Sigma X_1 + b_2 \Sigma X_2 + b_3 \Sigma X_3 \]
\[ \Sigma X_1 Y = a \Sigma X_1 + b_1 \Sigma X_1^2 + b_2 \Sigma X_1 X_2 + b_3 \Sigma X_1 X_3 \]
\[ \Sigma X_2 Y = a \Sigma X_2 + b_1 \Sigma X_1 X_2 + b_2 \Sigma X_2^2 + b_3 \Sigma X_2 X_3 \]
\[ \Sigma X_3 Y = a \Sigma X_3 + b_1 \Sigma X_1 X_3 + b_2 \Sigma X_2 X_3 + b_3 \Sigma X_3^2 \]
Calculating this equations, we can obtain the trend value of Y where:

\[ Y = \text{the predicted value on the dependent variable.} \]

\[ a = \text{the } Y \text{ intercept, the value of } Y \text{ when all } Xs' \text{ are zero} \]

\[ X = \text{the various independent variable} \]

\[ b = \text{the various coefficients assigned to the independent variables during the regression,} \]

(h) Analysis of Variance (ANOVA)

We have carried out the Analysis of variance (ANOVA) to ascertain whether the groups under the same character are homogenous or heterogeneous. Using this technique, we have been able to draw the inferences about whether the samples have drawn from populations having the same mean. The method has been applied by comparing the sample variances using F - distribution. In our study we have applied the one-way ANOVA method to test the null hypothesis (Ho) against the alternative hypothesis (Ha).

The hypotheses are written as:

\[ H_0: \mu_1 = \mu_2 = \ldots = \mu_n \text{ (for n groups)} \]

Against \( H_a: \mu_1 \neq \mu_2 = \ldots = \mu_n \).

Where \( \mu_1, \mu_2 \ldots \mu_n \) are the population means.

The test procedure involves F - test (Mean sum of Squares between Groups (MSB)/ Mean sum of Squares within Groups (MSW). We have found a calculated F from the observed data, which is verified against a critical value of F with corresponding degrees of freedom of groups and error, corresponds to certain predefined level of significance (\( \beta \)). If it is found that the observed value of F is less than the tabulated value of F, then we can conclude that null hypothesis (Ho) is accepted implying all the groups are statistically homogenous. On the other hand, if A is found that the observed value of F is coming to be equal or greater than the corresponding tabulated value of F, then we conclude that the null hypothesis is rejected implying alternative
hypothesis (Ho) is accepted. The acceptance of alternative hypothesis concludes that the groups differ significantly among themselves. If we have \( n \) observations classified into \( k \) groups then the table format of one-way ANOVA is shown below:

**TABLE 1.1: ANOVA ANALYSIS**

<table>
<thead>
<tr>
<th>Source of variation</th>
<th>d. f. (degrees of freedom)</th>
<th>SS (sum of squares)</th>
<th>MS (Mean squares)</th>
<th>( F ) – ratio (Observed)</th>
<th>( F ) tabulated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups (SSB)</td>
<td>( k - 1 )</td>
<td>SSB</td>
<td>( \frac{SSB}{(k-1)} )</td>
<td>( F = \frac{MSB}{MSW} )</td>
<td>( F_{0.05,k-1,n-k} )</td>
</tr>
<tr>
<td>Within Groups (Error) (SSW)</td>
<td>( n-k )</td>
<td>SSW</td>
<td>( MSW = \frac{SSW}{(n-k)} )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>( n-1 )</td>
<td>SST</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Here \( SSB = n_1 \left( \bar{X}_1 - \overline{X} \right)^2 + n_2 \left( \bar{X}_2 - \overline{X} \right)^2 + \ldots + n_k \left( \bar{X}_k - \overline{X} \right)^2 \)

*(SSB = Sum of Squares between Groups)*

Here \( \bar{X}_i \) denotes the mean of each sample groups and \( \overline{X} \) denotes the mean of the sample means.

Also \( SSW = \sum (X_{ij} - \bar{X}_1)^2 + \sum (X_{ij} - \bar{X}_2)^2 + \ldots + \sum (X_{ij} - \bar{X}_k)^2 \)

\( i = 1, 2, 3, \ldots \)

*(SSW = Sum of Squares within Groups)*

\( SST = \) Sum of Squares for total variance

\[ = \sum (X_{ij} - \overline{X})^2; \quad i = 1, 2, 3, \ldots \]

\[ j = 1, 2, 3, \ldots \]
The degrees of freedom (d.f.) for total variance will be equal to the number of items in all samples minus one i.e., \((n - 1)\). The degrees of freedom for between and within must add up to degrees of freedom for total variance i.e.,

\[(n - 1) = (k - 1) + (n - k)\]

The observed values of \(F\) will be obtained on dividing \(MSB\) by \(MSW\):

\[F = \frac{MSB}{MSW}\]

Compare the \(F - \) observed and \(F - \) critical value at 5% and 1% level of significance corresponding to the degrees of freedom \((k - 1, N - k)\). If the observed value of \(F\) equals or exceeds the tabulated value of \(F\), we reject the null hypothesis, and conclude that all the populations’ means are not equal.

(i) Locating Unequal Pair of Means

In the Analysis of variance, if the observed of \(F\) is found to be significant, the correlation is that all the populations’ means are not equal. This however does not rule out the possibility that some of them are equal, while others are different. In such a case, we may be interested to find which pairs of means differ. If the number of observations in each sample is the same, then the appropriate statistic for testing the equality of mean \(\mu_i\) and \(\mu_j\) is

\[t = \frac{x_i - x_j}{S \sqrt{\frac{1}{n} + \frac{1}{n}}} = \frac{x_i - x_j}{S \sqrt{\frac{2}{n}}}\]

Where \(S^2\) is the unbiased estimator of the common (but uncommon) population variance \(\sigma^2\). In the analysis of variance tests, \(\sigma^2\) is estimated by the Mean Square Error (MSE) -

\[S^2 = MSE\]

The population means \(\mu_i\) and \(\mu_j\) will be considered to be equal at 5% level of significance, if \(|t| \leq t_{0.025}\) where \(t_{0.025}\) denotes the upper 2.5% value of \(t\) distribution with \(N - k\) degrees of freedom.
Therefore, 
\[ \left| \bar{x}_i - \bar{x}_j \right| 
\leq t_{0.025} \frac{2}{\sqrt{n}} \]

\[ \left| x_i - x_j \right| \leq S \sqrt{2n} t_{0.025} \]

Multiplying both sides by n,

\[ |T_i - T_j| \leq S \sqrt{2n} t_{0.025} \]

Where, \( T_i \) and \( T_j \) represent the totals of the i-th and j-th samples respectively.

The critical difference between sample totals

\[
\text{Critical difference (C.D)} = S \sqrt{2n} t_{0.025}
\]

The differences between all pairs of sample totals \( |T_i - T_j| \) are now compared with C.D. If the difference between any particular pair exceeds the C.D. then we conclude that the concerned population means are to be unequal.

(j) **Time Series and Forecasting**

We have used time series analysis to detect patterns of change in statistical information over regular intervals of time. We project these patterns to arrive at an estimate for the future. In the data analysis, we have calculated the predicted values for future on Sales, Operating Profit, Net Profit, General Promotional Expenses, Discount on Sales and, Trade Commission by the regression techniques

Which is of the form:

\[ \hat{Y} = a + bX \]

Where \( \hat{Y} \) = Estimated value of the dependent variable

\( X \) = Independent variable (time in trend analysis)

\( a \) = \( Y \)-intercept (the value of \( Y \) when \( X = 0 \))

\( b \) = Slope of the trend line.

Regression techniques, when applied to forecasting, take into account the relationship between the variables being forecasted, i.e. the dependent
variable and other independent variables that can be expected to influence its performance. The value of the dependent variable is then forecasted by fitting time series data values in the equation.

Now to determine the values of a and b, we solve the two normal equations, which are

\[ \Sigma Y = na + b \Sigma X \]
\[ \Sigma XY = a \Sigma X + b \Sigma X^2 \]

The values of a and b are

\[ b = \frac{\Sigma XY - n \bar{X} \bar{Y}}{\Sigma X^2 - n \bar{X}^2} \]

And \[ a = \bar{Y} - b \bar{X} \]

Where \( b \) = Slope of the best fitting regression line
\( a \) = Y - intercept of the best fitting regression line
\( \bar{Y} \) = Mean of the values of the dependent variable
\( \bar{X} \) = Mean of the values of the independent variable
n = Number of the data points in the time series.

Once a and b are known, we calculate the trend equation. By suitable choice of origin we put \( \Sigma X = 0 \). Then from the two normal equations, we get

\[ a = \frac{\Sigma Y}{n} \]

and \[ b = \frac{\Sigma XY}{\Sigma X^2} \]

iii) Formulation of Hypotheses of Research Study

The next important part of a research work is the formulation of hypothesis. A hypothesis is an assertion that the researcher seeks to investigate. A scientific research study requires the formulation of well-conceived hypothesis for empirical testing. As a part of sound research methodology, a number of hypotheses have also been formulated with reference to the objectives of the study and tested with the help of suitable statistical
technology. In the research literature, a hypothesis is defined as a formal tentative statement about the outcome of the relationship between two or more variables related to the study in question. A hypothesis directs the investigation to a specific problem with defined objectives and seeks to determine what observations or measures need to be tested for achieving the objectives of the research study.  

As a part of research methodology, we have formulated a number of null hypothesis ($H_0$) for the purpose of our research work to facilitate the investigation into the degree of association between the independent variables (here General Promotional Expenses, Discount on Sales and Trade Commission) and dependent variables (here Sales, Operating Profit and Net Profit). $H_a$ is denoted as the alternative hypothesis. For correlations analysis, we have developed the following null hypotheses ($H_0$):

i) There is no significant relationship between $Y$ (dependent variable, here sales) and $X$ (independent variable, here General Promotional Expenses) during the period of study (i.e., 1995-96 to 2004-05).

ii) There is no significant relationship between $Y$ (dependent variable, here Sales) and $X$ (independent variable, here Discount on sales) during the period of study (i.e., 1995-96 to 2004-05).

iii) There is no significant relationship between $Y$ (dependent variable, here Sales) and $X$ (independent variable, here Trade Commission) during the period of study (i.e., 1995-96 to 2004-05).

iv) There is no significant relationship between $Y$ (dependent variable, here Operating Profit) and $X$ (independent variable, here General Promotional Expenses) during the period study (i.e., 1995-96 to 2004-05).

v) There is no significant relationship between $Y$ (dependent variable, here Operating Profit) and $X$ (independent variable, here Discount on Sales) during the period of study (i.e., 1995-96 to 2004-05).
vi) There is no significant relationship between $Y$ (dependent variable, here Operating Profit) and $X$ (independent variable, here Trade Commission) during the period of study (i.e., 1995-96 to 2004-05).

vii) There is no significant relationship between $Y$ (dependent variable, here Net Profit) and $X$ (independent variable, here General Promotional Expenses) during the period of study (i.e., 1995-96 to 2004-05).

viii) There is no significant relationship between $Y$ (dependent variable, here Net Profit) and $X$ (independent variable, here Discount on Sales) during the period of study (i.e., 1995-96 to 2004-05).

ix) There is no significant relationship between $Y$ (dependent variable, here Net Profit) and $X$ (independent variable, here Trade Commission) during the period of study (i.e., 1995-96 to 2004-05).

For multiple correlation analysis, we have developed the following null hypotheses ($H_0$):

i) There is no significant relationship between General Promotional Expenses, Discount on sales and Trade Commission with the Sales of CIL during the study period.

ii) There is no significant relationship between General Promotional Expenses, Discount on sales and trade Commission with the Operating Profit of CIL during the study period.

iii) There is no significant relationship between General Promotional Expenses, Discount on sales and trade Commission with the Net Profit of CIL during the study period.

For ANOVA analysis, we have developed the following null hypothesis:

i) There is no significant difference between the means of General Promotional Expenses, Discount on Sales and Trade Commission during the period of study from 1995 – 96 to 2004 – 05.
1.5 Organisation of the Study

The entire study has been divided into the following seven chapters for better understandings and presentations of the research work. A brief outline of the organisation of the study is presented as under:

The first Chapter entitled "Introduction, Objectives and Methodology", presents an overview of the research study by way of introduction. It also explains the rationale of the study and sets out the objectives with which the study has been undertaken. This chapter, moreover, relates the methodology of the study that includes the statement of the problem, techniques of data analysis and hypothesis of the study. Besides, the chapter also seeks to point out some of the important limitations including the scope of further research work.

Chapter two, entitled "Literature Review", focusses on reviewing the various research works done in the area of general marketing and as well as marketing promotion. The objective of literature review is to gain knowledge of various researches done in the relevant field and to identify the gap in the existing knowledge in the area of promotional strategies.

The third chapter which is captioned as "Profile of Clariant (India) Limited", presents a detailed picture of the profile of Clariant (India) Limited, including its origin, growth & development and present operations.

Chapter four entitled "Marketing and Marketing Strategies: A Conceptual and Theoretical Foundation" highlights theoretical concepts as well as the various tools & strategies in marketing which are generally followed by the companies for effective marketing in competitive environment.
Chapter five is titled “An Overview of Promotional Tools and Strategies with Reference to Clariant (India) Limited”. It provides a fascinating promotional strategies, tools and techniques with reference to the focused company i.e., Clariant (India) Limited.

The Sixth Chapter is entitled “Analysis, Interpretation of Data: A Framework of Statistical Tools and techniques Used”. In this chapter analyses have been done with the help of appropriate statistical tools, techniques, methods and relevant inferences drawn. An outline of the analytical framework has been provided at the beginning of the chapter to provide a frame of reference to facilitate the comprehension of the work done and findings arrived it.

In the last and final chapter, we have presented the findings of the study as well as the suggestions that we think we ought to offer for improving the performance of the chemical companies in India, big or small, in the context of our analysis in promotional elements for designing promotional strategies. Furthermore, we have completed the study with the conclusion reflecting on the entire research work and highlighting the opportunities that still exist for further research work in the area.

1.6 Limitations of the Study

Honestly speaking, there is no research study, which is totally free from limitations. The present study is no exception. It has also its share of limitations. Though the study is highly important, we can mention the following limitations that should be taken into considerations for meaningful interpretation and proper application of the results of the investigation.

(i) The study covers a limited time period of ten years operations of the CIL from 1995 – 96 to 2004 – 05. Here the results of this study are valid for this
particular period and prediction beyond this time period may not be reliable. Statistically speaking, longer the period of analyses greater is the reliability of the findings. In this sense, the study also suffers from the limitation of time, which is inescapable in a research study like this. Besides, we had to complete the study with the constraints of limited time, space and resources that put some unavoidable restrictions on our study.

(ii) Secondary sources of data such as CIL’s Annual Reports, CIL’s in-house magazine (CLAP), chemical industry’s journals, research publications, books etc. and also the website of CIL (http://www.clariantindia.com) are always open to question because of the methodological deficiencies, error in printing and in some cases non-availability of data. Though we have tried our best to eliminate error through repeated editing and relevant statistical technique, the general weaknesses associated with the secondary data could not be removed altogether.

(iii) As it was not possible to gain access to the confidential decisions and policies of the CIL’s marketing and management operations. The interpretations of the data and observations about our findings are based on whatever information we could gather from conversations with the officials of the company. Obviously, the findings do not tell the whole truth. The limitations are probably common to all research studies based on case studies.

(iv) This study was also hamstrung by the fact that there was no previous study done exactly on the same theme. Thus, we had no trailblazer to develop our hypothesis and test our results against previous benchmarks. We had to develop our own methodology and analytical framework that also, in a way, acted as a constraint.
In spite of all the foregoing limitations, the study has succeeded in yielding some groundbreaking findings which, we hope, will go a long way in designing promotional strategies for effective marketing in a competitive environment by companies, including Clariant (India) Limited, in India and elsewhere.

1.7 Scope for Future Research Work

The study will open up ample scope for further research in the area of marketing promotions in speciality chemical industries as well as other big industries in India also. The objective of our research work was to make analysis of promotional elements of CIL for designing better promotional strategies for effective marketing in a competitive environment. The promotional elements especially advertising, sales promotion, direct marketing, database marketing, customer relationship marketing deserves special attention for the purpose of future research. Moreover, the companies, which are burdened with obsolete technology, surplus manpower and operational problems in marketing, can also be taken up for investigation.

As chemical industries will continue to play a vital role in the economic development of the country, there is a compelling necessity to examine and reexamine their problems and activities on continuing basis so as to come-up with appropriate solutions which may prove invaluable to the decision makers and marketers at the macro and micro level throughout the length and breadth of the country.
References:


7. Ibid.

8. Ibid.

9. www.thehindubusinessline.com


17. Ibid.


20. Ibid., p.866