A STUDY ON COST VOLUME PROFIT ANALYSIS AS A TOOL TO MEASURE THE EFFECTIVENESS OF PROFIT PLANNING AND CONTROL

(With Reference to Bottlers Nepal Limited)

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RECOMMENDATION

This is to certify that the thesis

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has been prepared as approved by this Department in the prescribed format of Faculty of Management. This thesis is forwarded for examination.

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VIVA-VOCE SHEET

We have conducted the viva-voce examination of the thesis presented by

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and found the thesis to be the original work of the student written according to the prescribed format. We recommend the thesis to be accepted as partial fulfillment for

Master's Degree in Business Studies (M.B.S.)

Viva-Voce Committee

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DECLARATION

I hereby, declare that the work reported in this thesis entitled **"A Study on Cost-Volume Profit Analysis as a Tool to Measure the Effectiveness of Profit Planning and Control (With Reference to Bottlers Nepal Limited)"** submitted to Central Department of Management, University Campus, T.U., Kirtipur is my original piece of work done in the form of partial fulfillment of the requirement for the Master's Degree in Business studies under the supervision and guidance of Prof. Dr. Balkrishna Shrestha, Central Department of Management.

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ABBREVIATIONS

B.S.	Bikram Sambat
BEP	Break-Even Point
BNL	Bottlers Nepal Limited
C.V.	Coefficient of Variation
CM	Contribution Margin
CMPU	Contribution Margin Per Unit
Co.	Company
Coef.	Coefficient
CVP	Cost-Volume-Profit
DPAT	Desired Profit After Tax
DPBT	Desired Profit Before Tax
e.g	Example: for example
ELS	Econoimc Lot Size
eqn.	equation
et al.	et alia
etc.	etcetera, and other similar things
F/Y	Fiscal Year
FC	Fixed Costs
Fig	Figure
i.e.	that is
Ltd.	Limited
Min.	Minimum
MOS	Margin of Safety
No.	Number
P.E.	Probable Error
PPC	Profit Planning and Control
PPU	Profit Per Unit
Prodn.	Production
PV	Profit Volume
Pvt.	Private
Regd.	Registration

Rs.	Rupees
S.D.	Standard Deviation
SPPU	Selling Price Per Unit
SQ	Selling Quantity
SR	Sales Revenue
TC	Total Cost
TU	Tribhuvan University
Var.	Variance
VC	Variable Cost
Vol.	Volume

CHAPTER-I

INTRODUCTION

1.1 Background of the Study

Every business organization has limited resources; the main problem lies in better utilization of available resources so that competitive advantages can be achieved. Among the various tools and techniques, management accounting tools have proved beneficial in every aspect of management activities from planning to decision making. Cost-Volume-Profit analysis is the most important management accounting tool of profit planning and decision making means of predicting the effects of changes in cost and sales level on the income of business. In this simplest form, it involves the determination of sales level at which a company neither earns profit nor incurs a loss, or in the other words, the point at which it breaks even. Break-even point is only a special case of CVP analysis. However, CVP analysis included to find out sales volume to earn zero profit or desire profit, to affect income by changes in selling price, to check income if new machine will be installed, to examine operating profit if fixed cost as well as unit variable cost will be changes etc.

CVP analysis is an analytical tool for studying the relationship between volume, cost and profit. There are three factors of CVP analysis which are interconnected and dependent on one another. CVP analysis examines the behavior of total revenues, total cost and operating income as changes occur in the output level, the selling price, the variable cost per unit and fixed cost of a product. CVP also helps to make or buy decision on sub-assemble or part.

Cost volume profit analysis is a management accounting tool to show the relationship between the ingredients of profit planning. Profit planning is function of selling price of the product, the variable costs and volume to be sold. The scope of profit planning associated with CVP relationship is break-even analysis. Break even analysis is concerned with the study of revenues and costs in relation to sales at which the firm's revenue and total cost will be exactly equal (or net income is zero). Thus the break even point (BEP) may be defined a point at which the firm's total revenues are

exactly equal to total costs, yielding zero income. The “no profit no loss” is a break-even point or a point at which losses cease and profit begins.

CVP analysis is a systematic method of examining the relationship between changes in activity (i.e. output) and changes in total sales revenue, expenses and net profit. As a model of these relationships CVP analysis simplifies the real world conditions that a firm will face. Like most models, which are abstractions from reality, CVP analysis is subject to a number of underlying assumptions and limitations. Nevertheless, it is a powerful tool for decision making, in certain situations *(Drury, 2000:235).*

Hence, a company may use CVP analysis, as a planning and decision making tool when the sales volume is known and management need to find out how much profit will result. Another way of planning is to begin with a target profit. Then through the CVP analysis a company can decide the level of sales needs to reach that profit. Similarly, for the cost control purpose, CVP analysis is a way to measure how well different departments in the company are doing. At the end of a period, the company analyzes sales volume and related actual costs to find out the actual profit. It measures performance by comparing actual cost with expected cost. These expected costs are computed by applying CVP analysis to the actual sales volume. The result is a performance report on which management can base the control of operations.

Decision making is a fundamental part of management. Decision about the acquisition of equipment, mix of product, method of production, and pricing of product and services confronts manager in all types of organizations *(Hilton 2002)*

Decision making is one of the most crucial tasks of management. Manger is constantly failed with problems of deciding what products to sell, what production methods to use, whether to make or buy component, parts what prices to charge, what channels of distribution is to use, whether to accept special orders at special prices and so forth. In decision making, cost is always a key factor. The cost of one alternatives must be compared against the cost of other alternatives as one step in the decision making process. To be successful decision making, manager must have tools at their disposal to assist them *(Bajracharya, et all, 2005: 344).*

1.1.1 Introduction to Bottlers Nepal Limited

1) An Overview of Company

BNL is one of the manufacturing and processing companies. It is established in 1979 AD under the company Act 1964 A.D. It is initially started as a private enterprise in 1985 by issuing shares to public. It was established with the objective of producing and bottling soft drinks under the brand name of Coca Cola Sabco Asia Ltd. The company also makes and sales soft drinks under the registered trademarks of Coca Cola managed by Dubai based Coca Cola Sabco Asia Ltd. The company is located at Balaju, Kathmandu; in an area covering 10.648 square meters of land and the buildings of the company covers 5,828 squares meters. The company has been launching various types of promotional activities with financial and technical support from the Coca cola Sabco Asia Ltd. Dubai *(BNL Annual Report 2003/04:21).*

2) Share Capital of BNL

The BNL was started with an authorized capital of Rs. 30,250,000. In the initial period, its paid up capital was Rs.10, 500,000 of Rs.100 per share. Now the company has authorized capital of Rs.430,000,000, issued capital of Rs.370,000,000 and paid up capital of Rs.194,889,000 *(BNL Audit Report: 2005/06:11).*

3) Subsidiary Company of BNL

Bottlers Nepal (Tarai) Ltd. is operated as a subsidiary company of BNL, Balaju. BNL (Tarai) Ltd. was established in 1986 under the company Act, 1964 with the object of producing and bottling soft drinks under the brand name of Coke, Fanta and Sprite. The company is situated in Chitwan district. It is managed by Coca-Cola Sabco Asia Ltd., Dubai. The installed capacity of plant is 350 bottling per minute. BNTL belongs to 92% (nearly) of equity shares to holding company BNL, Balaju. The company has increased investment on the subsidiary company by acquiring additional shares from open market. The company's equity interest has increased to 91.78% after the new acquisition of shares in BNTL *(BNL Audit Report 2005/06:12).*

4) Product Line

BNL produces Coke, Fanta and Sprite in returnable glass bottle as well as non-returnable bottles. Upgrading the product lines, the company has already upgraded its 430 bottles per minute line to produce 175ml. package in returnable glass bottle. Considering the market demand, the company has also invested in pet line to produce 1.5 liter packages in non returnable bottles. The lines have commenced production and they have started sales of locally manufactured pet since the previous year. So, the company has been able to increase the production efficiency of the plant giving better outputs as compared to the previous year. The company is able to fulfill the market demand without any production constraints after the installation of new plant *(BNL Audit Report 2005/06:13).*

5) Profit Position

BNL is one of the top ten companies listed on the NEPSE in terms of market capitalization. The company produces soft drink named Coca-Cola, Fanta Orange, Fanta Lemon and Sprite. Despite several market competition and disturbances in the market due to the external factors, the company has been able to increase sales volume by 3.68% compared to previous year. However, the profit after tax of the company has increased by 11.48% *(BNL Audit Report 2005/06:14).*

6) Distribution Policy

The company does not have direct distribution to the consumer. The strategic long term plan is used in the company. As mentioned above, the company uses two types of distribution channel i.e. through the dealer and retailer to consumer. Since the company doesn't sell the products by itself but it uses some kinds of commission system. But, it does not offer any kind of discounts and incentives. The company provides 8% commission on sales price is given to distributor whereas nearly 13.30% commission on sale is provided for retailer. In order to stay ahead of the competition, the company had launched several programs with financial and technical support from the Coca-Cola Company. The objectives of those programs are to increase the per capital consumption of its beverages in the market. This company will continue to promote all its products as before.

1.2 Focus of the Study

Industrialization is an important factor for achieving the basic objective of a country's economic and social progress. But manufacturing organizations are facing so many problems in Nepal. Most of the organizations are getting sick and not able to meet their desired profit in the lack of effective planning and control.

1.2.1 Profit Planning and Control

Profit planning is the estimation and predetermination of revenues and expenses that estimate how much income will be generated and how it should be spent in order to meet investment and profit requirement. In the case of institutional operation, it presents a plan spending income manner that does not result in a loss. The profit plan tells managers how much money remains to be spent in each expense category.

Profit planning or budgeting is forward planning and involve the preparation in advance of the quantitative as well as financial statements to indicate the intention of the management in respect to the various aspects of the business. Profit planning in fact, a management techniques and a business budget, is such a written plan in which all aspects of business operations with respect to a definite future period are included. It is a formal statement of plan, policy, goal and objectives established by the top management in respect of some future period. Thus, profit planning and control is an important approach, mainly in profit-oriented enterprises. Profit planning is merely a tool of management. It is not an end of management or substitute of management. It facilitates the managers to accomplish managerial goals in a systematic way.

1.2.2 Cost-Volume-Profit Analysis

Cost-volume-profit analysis applies the variable costing approach to analyze the built in relationship between cost, volume and profit. It makes use of the principles of marginal costing. The systematic relationship between cost, volume and profit is known as CVP analysis. It is an analytical tool for analyzing the relationship among cost, price, profit, sales and production volume. It is analysis of three variables viz. cost, sales or production volume and profit which explores the relationship existing

among costs, revenue, activity levels and the resulting profit. All these terms are interrelated and depended on each other. For instance, profit per unit of a product depends on its selling price and its cost. The selling price to a greater extent depends upon the cost and cost depends upon the volume of production.

A dynamic management, therefore, uses CVP analysis to predict and evaluate the implications of its short-run decisions about fixed costs, variable costs, volume and selling price for its profit plans on continuous basis.

1.2.3 CVP Analysis in Profit Planning and Control

Out of various profit planning tools, cost-volume-profit analysis is the most important tool. CVP analysis is a greater helpful in managerial decision making, especially cost control and profit planning.

It provides attention-directing and problem solving backgrounds for important planning decisions, such as selecting distribution channels, pricing, special promotions and personnel hiring. "Know your cost" is an essential theme for any managers. And CVP analysis helps to direct managerial attention to important problems and paves the way to their solution *(Horngren, 1970:207).*

Hence, accompany may use CVP analysis as a planning tool. When the sales volume is known, management needs to find out how much profit it will result. Another way of planning is to begin with a target profit. Then, a company can decide the level of sales needed to reach that profit through CVP analysis. Similarly, for the cost control purpose, CVP analysis is a way to measure how well different departments in the company are doing. At the end of a period, the company analyzes sales volume and related actual costs to find actual profit. It measures the performance by comparing actual costs with expected costs. These expected costs are computed by applying CVP analysis to the actual sales volume. The result is a performance report on which management can base the control of operations.

1.3 Statement of the Problem

Nepal is in infancy period of industrialization. The manufacturing sector is very small. In recent years, the growth rate is relatively more satisfactory. The manufacturing sector has to face numerous problems which have acted as constraints in the growth of manufacturing industries. Mainly, such problems are caused by the land locked situation of the country, undeveloped situation of the country, undeveloped situation of physical, human, financial and administrative infrastructure and energy at high rates, non availability of trained and skilled manpower, shortage of capital, small size of market, unawareness of the industrial potential, higher cost of production, low productivity of inputs, manpower and technology, instabilities in government policy etc.

The industrialization process in Nepal is being developed very slowly. In spite of various attractive policies of the government in respect to the industrialization, new investment made on industrial sector is not satisfactory. The financial performance of established manufacturing industries is also not good. Most of the industries are operating in losses and such condition of the established industries discourages the new investment both in manufacturing and non -manufacturing sector. There may be various and different reasons for the poor performance of manufacturing industries. Such reasons should be investigated and corrective actions should be taken for the improvement of their performance.

Like every business organizations, Bottlers Nepal Limited is also established to earn profit. Mostly, success is measured in terms of profit. To earn desired level of profit, it is to be planned and managed. CVP analysis provides the techniques of profit planning framework based on the annual report published. Performance of Nepalese industries cannot be considered as satisfactory. Poor performance is the outcome of poor planning, controlling and decision-making. This has raised the question whether Nepalese mangers are competent enough? Do they practice CVP tools and techniques to carryout planning, controlling and decision-making function? BNL is currently facing problem to have fair estimate of total cost, total revenue and profit at various sales volume. Due to the lack of application of profit planning tools, they can't forecast budgeted sales to recover total cost and to achieve profit.

Hence, this research is more concerned with the use of CVP analysis in profit planning process. So, this importance of CVP analysis in PPC for a firm and the problems that arises in this field has led to the selection of this topic for study. This study is basically designated to solve the following problems:

- Is BNL practicing CVP analysis for its profit planning?
- What are the major problems faced by BNL during the application of cost-volume-profit analysis?
- Are the costs incurred by BNL realistic on the basis of cost-volume-profit relationship?
- Is profit earning made by BNL satisfactory or not?
- What sales volume is needed to achieve break even and what should be the sales volume to earn a desired profit?
- How is the risk associated with BNL?
- What will be the chance of meeting the desired profit for BNL?
- Is there any significant difference between budgeted and actual sales of BNL?

1.4 Objectives of the Study

The basic objective of this study is to compare the existing cost-volume-profit analysis system applied by Bottlers Nepal Ltd. and its impact towards its profit planning and control. A question may arise, "Why is a multinational company selected for the purpose and not a Nepalese company?" The reason is quite obvious. It is an attempt to study what kind of "Profit Planning and Control" system a multinational company follows in the Nepalese business environment and becomes more successful than other similar national companies. The study, however, does not compare the Profit Planning & Control system of this multinational company with any other national company.

So, the prime objective of this research is to study how efficiently multinational companies manage their planning process and what basic problems do they face in this field. Some other specific objectives can also be outlined that in overall

contribute to the attainment of these prime objective. Those specific and functional objectives of this study are as follows:

- To study the application of CVP analysis as a tool of profit planning and control in terms of efficiency and cost effectiveness towards profitability of BNL.
- To evaluate the CVP analysis of BNL.
- To compare Profit Volume Ratio, Break Even Point, Margin of Safety, Capacity Utilization and Sales Volume among different five fiscal years of BNL.
- To examine and assess the risk of BNL with the help of operating leverage technique.
- To evaluate & compare the performance report of BNL.
- To make a correlation analysis of profit with sales and operating expenses.
- To test whether there is significant difference between budgeted and actual sales or not with the help of t-Test.
- To indicate required improvements and provide suggestions, if any on the basis of major findings of the study.

1.5 Significance of the Study

Because of the globalization, market has become very competitive. A few studies have been made in relation to the tool of profit planning of multinational companies in Nepalese environment & context. Multinational companies in Nepal deserve a crucial role for the socio-economic development of our country. The main role and objectives of multinational companies are to increase the rate of economic growth, develop infrastructure, contribute huge amount in national fund, provide necessary goods and services to the public, and develop the nation equally by paying huge amount of tax to the government of Nepal.

CVP analysis is one of the tools in profit planning and control. CVP analysis helps to determine the minimum sales volume to avoid losses and the sales volume at which the profit goal of the organization will be achieved. It helps management in seeking

the most profitable combination of cost and volume. It also helps short run decision about fixed costs, variable costs, volume and selling price for its profit plan on a continuous basis.

So, every organization has to pay attention towards their cost-volume-profit analysis system. This study of CVP analysis of BNL helps to know BEP level, required sales revenue to achieve target profit, safety margin and other information to take correct action to control unusual cost for the company. In this way, it helps BNL to formulate and implement the profit plan. Hence, the policy makers in the area of multinational companies would be benefited from this study. The importance of the study can be pointed out as follows:

- This report serves the purpose of fulfilling the compulsory requirement for the MBS degree.
- The research attempts to find out the strengths and weaknesses of sales plan and production plan. It also deals with probability to achieve the sales, production and profit targets. So, it is very-useful for the company to identify areas that requires further deep study and research. The report can also help the company management for decision making purpose.
- The study would be very useful for entrepreneurs, decision makers, researchers and the managers because it deals with the practices of CVP analysis in multinational company as a very important tool of PPC.
- The report is also useful for library purpose as well as helpful for future students and researchers who wish to carry similar kinds of researches.
- The report also gives the big opportunity to apply the theoretical concept in the real practical life.
- The report develops the research skills as well as interpersonal communication skills through interfacing with people of community and organization.

1.6 Limitations of the Study

Each and ever research has some limitations. Basically, not availability of required data and information would be the major limitations of the study. Beside this, there

are few things that played an important role to limit the area of study. They are pointed out below:

- This study examines only in the area of cost-volume-profit analysis of Bottlers Nepal Limited.
- The researcher felt inadequacy of time and also lack of required conceptual And practical knowledge to be involved in a detailed investigation
- Companies in Nepal are always reluctant to reveal in depth information of their production and other process. Due to their reluctance, it is very difficult to achieve clear information for study.
- Analysis is concentrated in some managerial, financial and accounting aspect and it does not cover all areas of enterprise.
- It is very difficult to separate cost as fixed, variable & semi variable, and also difficult to allocate cost to different products.
- Major portion of analysis and interpretation will be done on the basis of available secondary data and information, which are provided by Bottlers Nepal Limited.
- The accuracy of the study depends on the reliability of information provided by-personnel of the company.
- The time period of the study is limited only to last five years.
- Due to the short span of time, the researcher is unable to sketch much more information related to the study. Hence, the time duration for this work may not be sufficient to make the study more realistic and wide coverage.
- This study is carried out for academic reason. So, the outcomes may differ if carried out reasons by other scholars or experts.

1.7 Organization of the Study

The entire study has been organized into five chapters viz. introduction, review of literature, research methodology, presentation and analysis of data, and summary, conclusion &recommendations.

The first chapter contains the introductory part of the study. This chapter is concerned with reasons behind the selection of topic. It has included background of the study, focus of the study, statement of the problem, objectives of study, significance of the study, and limitations of study which are presented in detail.

The second chapter reviews the existing literature in the relevant area. Mainly, it includes review of theories and journal. Review of previous research work and research gap. The chapter does not explain in detail all the tools available, but only explains those that are used in chapter IV for analysis purpose.

The third chapter explains the research methodology used in the research for collection, presentation and analysis of data. This chapter deals with methodology that includes research design, sources of data, data collection techniques, method of analysis and research variable.

The fourth chapter presents the information gathered and interprets the data available about the concerned topic and company. For this purpose various analytical tools have been used. It also summarizes the main findings of the study.

The fifth chapter presents a brief summary of the whole study and points out the weaknesses and strengths of the organization. It includes summary and conclusion of the study and recommendations made to the organizations.

An extensive bibliography and appendices are included at the end. Documents and books reviewed, calculations done etc. are separated shown in appendices.

CHAPTER-II

REVIEW OF LITERATURE

2.1 Conceptual Framework

An organization is established to achieve some goals. It has its own objectives. Organization should clearly mention its objectives to achieve its goals. In this competitive globalize business age an organization whether it is public or private, profit is essential. Profit is not chance, it is result of successful management. The management of an enterprise requires continuing performance of certain managerial responsibilities. These responsibilities collectively are called the function of management. Planning, organizing, staffing and human resource management, leading and interpersonal influence and controlling are major functions of management. Planning is process of developing enterprises objectives and selecting future course of action to accomplish them. It reduces uncertainty and provides effective direction to the employee by determining the course of action in advance, controlling means evaluating the firm's activities against the plan and deciding what should be done if the plan is not being followed.

In business organization there may involve various parties like competitors, employees, trade union, government society, investment analysts, suppliers, financial institutions, managers, owners, customers etc. All these parties need to analyze the financial position of the firm before any decision made regarding the firm. Actual position of the enterprises can be found from financial statement. So, financial statement should be analyzed to know the performance and current position of the organization. There are various tools and techniques to measure and analyze the financial performance. Cost-volume-profit analysis is one of the major and popular tools to analyze the financial statement of the firms which is the important part of profit planning and control.

2.1.1 Profit Planning and Control

In these modern days, businesses except very small companies, it is virtually impossible for the top manager to have firsthand knowledge of all the relevant factors

operating throughout a business. Nor can a single lower-level manager be expected to have the range of knowledge, experience and competence to make all the decisions for the large segments of a company, either as a source of reliable information or as a participant in decision-making. The quality of the judgments of the total management effort will continue to distinguish the better managed and more successful companies. Profit planning and control is the tool that is used to increase significant effectiveness of a management and to place managerial judgments, on a more objective and informed foundation.

Profit planning involves streaming activities in order to get target profit and to secure maximum benefit from minimum effort and expenditure. A best result seems to be obtained from a single product. The planner is a given the right to prove economies of the organization, the mode of operation, the determination of pricing, the marketing or any other fact of making and selling the product that affects profit acquiring from the product. The concentration of efforts upon gross traditional boundaries of the enterprises should be directed to translate needs from one group to another and to obtain consumed profit building efforts among those who can affect profits. And profits are the fundamental factors that contribute to the success of profit planning.

Profit planning is a comprehensive plan expressed in financial terms by which an operating program is effective for a given period of time. Business managers are continually involved in planning, organizing and controlling the operation of both large and small business organizations. Budgeting is one of the most important management tool used to plan and control business operations. Budgets are financial plans prepared as a guide to plan and control business operations. A financial plan must be designed to serve as a guide for the activities. Best results are obtained when the planning period is the same as the company's fiscal year. The annual budget is broken down by months, weeks and days of operations. The budget should be designed to co-ordinate the effort of the sales department, production department and all other departments *(Bajracharya, et all, 2005: 344).*

Controlling means evaluating the firm's activities against the plan and deciding what should be done if the plan is not being followed. It is a process of ensuring that actual

activities confirm to plan activities. Control helps in correction. Therefore, planning and controlling are the major functions of management *(Lynch & Williamson, 1999: 112).*

Koontz and O' Donnel have given emphasis on planning and control function of management. The role of management on profit planning and control has been defined and the assumption that management can plan and control long term destiny of an organization through perfect decision making process. In favor of planning and control, economist and the management experts have said that planning means prosperity and unplanned means happenstance. So, a modern management expert has given more importance to profit planning and control. Profit planning and control has been regarded importance to profit planning and control. Profit planning and control has been regarded as a basis for perfect decision-making. Profit planning and control, also known as comprehensive profit planning and control, is a new term in the literature of business. Though it is a new term but it is not a new concept in the management. Comprehensive profit planning and control or PPC on other terms are business budgeting, managerial budgeting and budgeting. It is an integral part of management.

Profit plan is a financial and narrative expression of the expected results from the planning decisions. It is called the profit plan (or the budget) because it explicitly states the goals in terms of time expectations and expected financial results (return on investment, profit, and cost) for each major segments of the entity. Typical profit plans establish the content and format of the internal-control reports with respect to operations, inputs, outputs and financial position developed by the entity for monthly performance reporting to the various levels of management *(Welsch, et all, 2000:34).*

In comprehensive sense, we can say that PPC is one of the most important approaches that have been developed to facilitate effective performance of the management process.

2.1.1.1 Principle & Purpose of PPC

The main principle and purpose of profit planning are as follows:

- To provide a realistic estimate of income and expenses for a period and the financial position at the close of the period detailed by areas of management responsibility.
- To provide a co-ordinate plan of action which is designed to
- Activate the estimates reflected in the budget.
- To provide a comparison of actual results with those budgeted and an analysis and interpretation on deviation on by the responsible heads to indicate course of corrective action and to make improvements in procedures in preparing future plan.
- To provide a guide for management decision in adjusting plans and objectives as the change in uncontrollable condition.
- To provide a basis for making forecasts during the budget period and to guide management to make day-to-day decisions *(Welsch, et all, 2000:255).*

2.1.1.2 Importance & Advantages of PPC

A profit planning is financial narrative expression of the expected results from the planning decision. It is called the profit plan or budget because it states the goals in terms of time expectations and expected financial result for each major segment of entity. Many benefits are derived from budgeting although it is a means not as end in itself. PPC is a feed forward process. It involves the evaluation of the variables likely to affect future operations of the enterprises. It predicts future with reasonable precision and removes uncertainty to a great extent.

The main advantages or importance of comprehensive profit planning and control are as follows:

- PPC focuses basic policies to initiatives.
- It sets responsibilities of employees in relation to each function.
- It creates the feeling of co-operation and understanding between different departments of enterprises.
- It leads to maximize and most economical utilization of material, labor, capital and other sources with a view to ensure maximum return.

- It forces the management to keep adequate and correct historical data in the business.
- In competed management to plan future, the budgeting process forces management to look a need and become more effective and efficient administration in the business operations.
- It forces the management to take necessary steps for getting satisfactory results.
- It improves the quality of communication. The organizational objectives, goals, plans, authority and responsibility and procedures to implement plans are clearly written, so it is very easy to communicate budget to all individuals in the enterprise. This results better understanding and harmonious relationship among top-level managers and their sub-ordinates.
- It develops the atmosphere of profit and cost consciousness in the mind of employees.
- It highlights upon the lack of efficiency in the business if any and thus helps the management to take remedial action immediately.
- Profit planning necessitates a periodical and critical appraisal of every elements of a business.
- It tends to remove the cloud of uncertainty that exists in many firms especially among lower levels of management related to basic policies and objectives of enterprises.

2.1.1.3 Basic Assumption & Limitation of PPC

There are so many assumptions for using profit-planning programs. Firstly, it is required to measure the basic plan in terms of money. Secondly, there should be good co-ordination in every aspects of the business for the optimum profit goals and thirdly, profit gives guidelines about what to do? It is happened as forecast but it also gives guidelines of things work out differently from the forecast. The limitations of PPC are as under:

- The profit plan is based on estimates. The success of profit planning and

control depends to a large degree on the accuracy with which the basic estimate will be made.

- PPC is an estimation and quantitative expression of all relevant data. So, there can be the tendency to attach some sort of rigidity or finality to them.
- The installation of a complete PPC is not possible in a short period. It should be continuously used in the business, and should be revised and modified with the changed situation in the business.
- Execution of a profit plan will not occur automatically. So, askillfully prepared PPC will not itself improve the management of an enterprise, unless it is properly implemented.
- PPC is a tool. It is not a substitute for the management.
- The installation of a PPC system is an elaborated process involving too much time and costs.
- Unrealistic targets should not be set and used as a pressure tactic. By doing it. PPC will lower morale and productivity.
- In the absence of proper evaluation, PPC will hide inefficiencies. So, there should be continuous evaluation of the actual performances. Standards also should be re-examined regularly.

2.1.1.4 Application of PPC to Various Types of Organization

Some people say that comprehensive profit planning and control is applicable only to large and complex organizations. Comments like "comprehensive budgeting is a fine idea for most businesses, but ours is different," or "it is impossible to project our revenues and expenses," and so on. Such types of comments are common regarding non-manufacturing enterprises, service organizations, financial institutions, hospitals, certain retail business, construction companies, and real estate enterprises. On the contrary, profit planning and control can be adapted to any organization (profit or non-profit, service or manufacturing), regardless of size, special circumstances, or conditions. The fact that a company has peculiar circumstances or critical problems is frequently a good reason for the adoption of certain profit planning and control procedures. In respect to size, when operations are extensive enough to require more

than one or two supervisory personnel, there is a need of profit planning and control applications. The smallest company certainly has different needs in this respect than a large one. As with accounting, a single profit planning and control system that is appropriate for all enterprise cannot be designed. A profit planning and control system must be tailored to fit the particular enterprise, and it must be continually adapted as the enterprise and its environment change.

2.1.1.5 Different Tools to Measure the Effectiveness of PPC

PPC is used for the development and acceptance of objectives and goals. The broad concept of PPC entails an integration of numerous managerial approaches and techniques, such as sales forecasting, sales quota system, capital budgeting, cash flow analysis, cost-volume-profit analysis and variable budget, time and motion study, standard cost accounting, strategic planning, production planning, management by objectives, organizational planning, managerial planning and cost control, PPC has wide application. It can be applied in profit and non-profit, manufacturing and non-manufacturing organization.

2.1.1.6 CVP Analysis as a Tool of PPC

Out of various profit planning tools, CVP analysis is the most important tool. It provides the information about the behavior of cost in relation to volume, volume of production or sales where the business will break-even point, sensitivity of profit due to variance of output , amount of profit for a projected sales volume and quantity of production and quality of production and sales for the target profit level etc. Therefore CVP analysis may be defined as a managerial tool showing the relationship between various ingredients of profit planning. CVP analysis is an important media through which the management can have an insight into effects on profit on account of variance in cost and sales and take appropriate decisions. CVP analysis is great helpful in managerial decision-making. Especially cost control and profit planning is possible with the help of CVP analysis. Profit planning can be done only when the management has the information about the cost of product and selling price of the product.

2.1.2 Cost-Volume-Profit Analysis

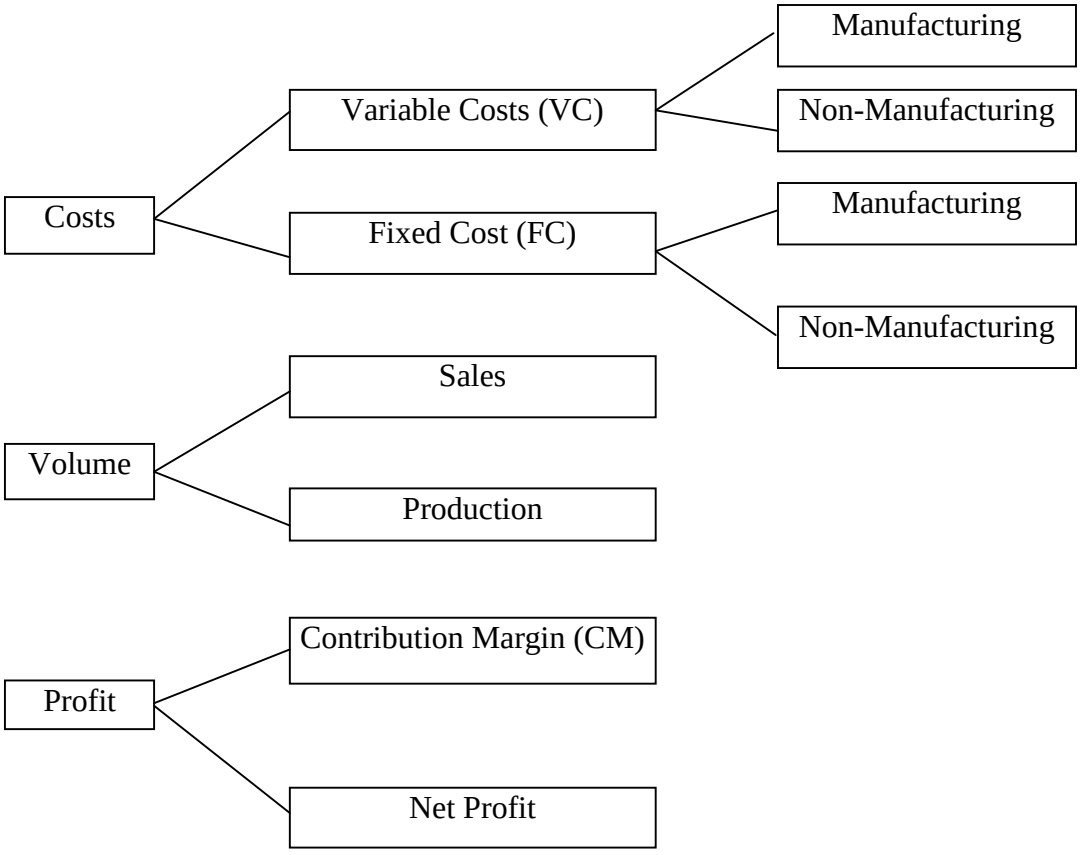
There are three words viz. cost volume and profit.

In general, cost is the amount of expenditure (actual or notional) incurred on or attributable to a given thing. Cost as a verb can be the process of ascertaining the total amount of money that needs to be spent by a business. It is the key players of every management decision.

In general **volume** is the level of production or scale of production or level of output.

And **profit** is the money that is made in business or by selling things, especially after paying the costs involved. It is the premium for the producers for the act of producing the given products. In other words it's the incentive to the producers.

Figure No. 2.1: Classification of Cost, Volume &Profit



Cost volume profit analysis is the process of examining the relationships among revenues cost and profits for a relevant range of an activity and a particulars time frame. It is one of the most important and powerful tools that manager have at their

command in short term planning. It helps managers to understand inter relationship between cost, volume and profit in an organization.

Cost-volume-profit (CVP) analysis examines the behavior of total revenues, total costs, and operating income as changes occur in the output level, the selling price, the variable cost per unit, and/or the fixed costs of a product *(Horngren et all, 2003).*

Cost-volume-profit analysis is a systematic method of examining the relationship between changes in activity (i.e. output) and changes in total sales revenue, expenses and net profit. As a model of these relationships CVP analysis simplifies the real-world conditions that a firm will face. Like most models, which are abstractions from reality, CVP analysis is subject to a number of underlying assumptions and limitations, nevertheless, it is powerful tool for decision making in certain situations *(Drury, 2000: 112).*

CVP analysis is the analysis of three variables cost, volume and profit. Such an analysis explores the relationship existing amongst cost, revenue, activity levels and the resulting profit. It aims at measuring variances of cost with volume. On the profit planning of a business, cost volume profit relationship is the most significant factor. The CVP analysis is an extension of marginal costing. It makes use of principle of marginal costing. It is an important tool of planning. It is quite useful in making short-run decision *(The Institute of Chartered Accountants of India. 2004: 216)*

Most of the business fails after a few years, sometimes months, of starting because they tend to do anything for volume without thinking how it's going to affect the bottom line. Cost-volume-profit analysis is a management accounting tool to show the relationship between the elements of profit planning. Profit planning is the function of the selling price of product, demand, variable costs, fixed costs, taxes, etc. The whole picture of profit planning is associated with cost-volume-profit interrelationships *(Bajracharya, et. all, 2005: 225).*

The key motive of business enterprises is to make and maximize profit. Profit does not happen by chance. It is to be managed. Cost-volume-pro fit analysis is a supplementary tool of planning for profit. CVP is immensely helpful for

developing alternative strategies in sales planning and cost estimation. CVP analysis is an accounting technique showing the relationship between variables.

2.1.2.1 Cost-Volume-Profit Relationship

It is the analysis of three variables viz. cost, volume and profit, which explores the relationship existing amongst costs, revenue, activity levels and the resulting profit. Profit, as a variable, is the reflection of a number of internal and external conditions, which exert their influence on sales revenue and costs. Revenue depends upon selling prices, costs, volume of sales, demand, competition, etc. Although none of these can be singled out as the most important, the volume is considered to be a dominant factor. This is probably because changes in volume is more frequent, takes place rapidly and is outside the purview of management control. Further costs rarely vary in direct proportionate effect on profits than the other factors outlined above. It is thus, the volume which is perhaps the largest single factor which influences costs. As such, an intimate relationship exists amongst costs, volume and profit. The cost-volume-profit analysis is an extension of marginal costing. It makes use of the principles of marginal costing. It is an important tool of short term planning and is more relevant where the proposed changes in the level of activity are relatively small. It is useful in making short-run decisions.

2.1.2.2 Importance & Use of CVP Analysis

Planning, controlling and the decision-making are the essential managerial functions. Cost-volume-pro fit analysis helps the managers to plan for profit; to control cost and make decision as such it helps to:

- To determine the break-even point in terms of unit or sales value.
- To determine the margin of safety.
- To estimate profits or losses at various level of output.
- To help management to find the most profitable combination of costs and volume.
- To assess the likely effects of management decisions such as increase or decrease in selling price, adoption of new method of production to reduce

direct labor and increase output.

- To determine the optimum selling price.
- To determine, the sales volume at which the profit goal of the firm will be achieved.
- To determine the most profitable and least profitable product.
- To determine new BEP for changes in fixed or variable cost.

2.1.2.3 Assumption & Limitation of CVP Analysis

CVP analysis is a vital technique that provides supplementary information for profit planning. Every business starts with the target O break-even and then it aims to earn profit over its life. But the business firm passes through many ups and downs. CVP analysis helps to plan for every set of goals in the short-run. But the CVP analysis encompasses the following assumptions and limitations:

- All costs can be classified into fixed and variable components.
- The behavior of variable cost should be linear.
- Fixed costs will be remained the same in the short-run up to maximum level of output or entire range of output.
- Selling price should be constant for any volume of output in the short-run.
- Planned selling price and actual selling price are homogeneous.
- There is no effect of the size of inventory on net income.
- CVP analysis is a short-term planning tool.
- The ratio of each product on total sales will be in accordance with a predetermined sales mix either a single product is sold or more products are sold.
- Cost of raw material, wage rate, methods of production design of the product will not be changed as well as any change in productivity and efficiency.

2.1.2.4 Application of CVP Analysis

Business organization is established to earn a profit. Planning is the fundamental part of the overall management function. Profit planning can be done only when the management has the information about the cost of product, variable cost, fixed cost and selling price of the product. Profit of a business organization is affected by selling price of the product, volume of sales, unit variable cost, fixed cost and sales mix. The most important factor that affects the planning for profit is cost and volume of sales. The cost-volume-profit relationship will be established by break-even analysis. Cost-volume-profit analysis is applied especially for:

- It helps in profit planning and cost controlling process.
- It also assists the management in understanding the behaviors of cost and helps in budgeting control.
- It helps to fix selling price to meet the desired profit.
- It helps to determine the level of output where all the costs can be met with revenue i.e. break-even point.
- It helps to determine the required sales volume to meet the desired profit.
- It assesses the business risk associated with enterprises thorough margin of safety analysis.
- It assesses the business risk in different cost structures.
- It assesses the impacts of the changes in cost-volume-profit variables (Sensitivity Analysis).
- It helps to make managerial decisions regarding the alternative choices such as make or buy a part, drop or continue a department/product line, accept or reject a special order, selection of profitable product mix etc.
- It helps to determine the optimum sales-mix in multi-product firm.
- It also deals with the optimum allocation of constraint resources to different product lines.

2.1.2.5 Contribution Margin Analysis

Contribution margin is the excess of sales revenue over variable cost. So, contribution margin means how much is left from sales revenue, after covering variable expenses that are contributed toward the covering of fixed expenses and then toward profit for the period. Contribution margin is used first to cover the fixed expenses, and then whatever remains, after the fixed expenses are covered, goes toward profit. If the contribution margin is not sufficient to cover the fixed expenses, then a loss occurs for the period. Basically, contribution margin indicates why operating income changes as the volume of sales changes. It can be expressed as:

1. Contribution Margin (CM) =Sales Revenue (SR) - Variable Cost (VC).
2. Contribution Margin (CM) =Fixed Cost (SR) $\pm$ Profit/Loss.
3. Contribution Margin per Unit (CMPU) = SPPU-VCPU
4. Contribution Margin per Unit (CMPU) = $\frac{Change\ in\ Profit}{Change\ in\ Sales\ (Units)} X \frac{\zeta\ Profit}{\zeta\ Sales\ (Units)}$
5. Contribution Margin per Unit (CMPU) = $\frac{Net\ Profit\ before\ Tax\ (NPBT)}{Margin\ of\ Safety\ (Units)}$
6. Contribution Margin Ratio (C/M Ratio) = $\frac{Contribution\ Margin\ (CM)}{Sales\ Revenue\ (SR)}$ or, $\frac{CMPU}{SPPU}$
7. Contribution Margin Ratio (C/M Ratio) = $\frac{Change\ in\ Profit}{Change\ in\ Sales\ (Rs)} X \frac{\zeta\ Profit}{\zeta\ Sales\ (Rs)}$
8. Contribution Margin Ratio (C/M Ratio) = $\frac{Net\ Profit\ before\ Tax\ (NPBT)}{Margin\ of\ Safety\ (Rs)}$

2.1.2.6 Break-even Analysis

Break-even analysis uses the same concepts as contribution analysis. However, it emphasizes the level of output or productive activity at which sales revenue exactly total costs that is there is no profit or loss. Break-even analysis rests upon the

foundation of cost variability, separate identification and measurement of the fixed and variable components of cost. It is usually applied on a "total company'" basis *(Saksena, 1995: 112).*

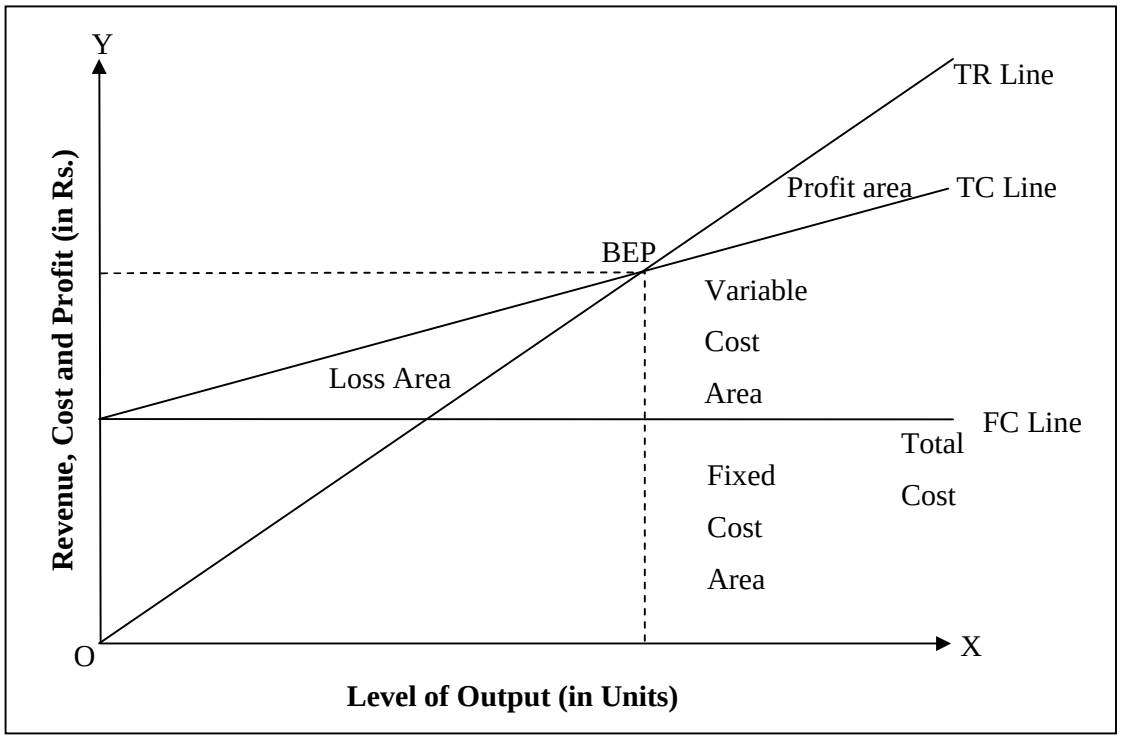
The break-even point is that point where total revenue equals total costs incurred. There is neither a profit nor a loss at the BEP. Although management typically plans for a profit each period, the break-even point should be concerned. If sales fall below the BEP, losses are incurred. Management must determine the break-even point in order to compute the margin of safety. Management can quickly measure the likelihood success of new ventures or product lines by finding its BEP.

Approaches to Break-even Analysis:

1. The Graphical Approach

The BEP can be computed graphically. A break-even chart portrays a pictorial view of the relationship between costs, volume and profit. The indicated BEP in the chart will be one at which total cost line and total sales line intersect with each other.

Figure No. 2.2: Graphical Approach of BEP



2) Algebraic Equation Approach

The most popularly practiced approach to the break-even point and cost-volume-profit analysis is the formula, also known as the equation. The formula approach uses an algebraic equation to calculate the break-even point. The answers provided by solving the equation may, sometimes, need to be rounded to whole numbers of units or lot sizes. The rounding of break-even point is always done upward because this will provide a small profit rather than the small loss that would be shown from rounding downward *(Rainborn, et all, 1993: 89).*

Table 2.1: Contribution Margin Income Statement

Particulars	Symbol For Equation
Sales Volume (Units)	Q
Selling Price per Unit	SPPU
Sales Revenue (Rs)	Q| | SPPU
Less: Variable Costs	Q | VCPU
Contribution Margin	Q |SPPU-Q |VCPU
Less: Fixed Costs	FC
Net Profit	Q |SPPUZQ |VCOY-FC

… Sales Revenue (SR) - Total Cost (TC) = *Profit*/Loss

Or, SR - (FC + VC) = Profit/Loss

Or, SPPU x Q - (FC + VCPU x Q) = Profit/Loss

Or, SPPU x Q - VCPU x Q - FC = 0 [Profit/Loss = 0]

Or, Q (SPPU - VCPU) = FC

$$\text{Or, } Q = \frac{FC}{SPPU\ ZVCPU} \text{ X} \frac{FC}{CMPU}$$

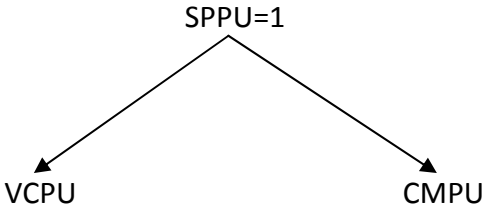
$$\text{…BEP (Units)} = \frac{FC}{CMPU} \quad and \quad BEP(Rs)\,\text{X}\frac{FC}{C/M\ \ Ratio}$$

3) Contribution Margin Income Statement Approach

The contribution margin income statement approach to CVP analysis allows the preparation of pro forma (projected) statement from the available information. BEP and Other required CVP relationships can be explained through a contribution margin statement. A contribution margin statement is the variable costing income statement whose philosophy is all fixed costs are period costs that should be deducted from the contribution margin of the same period. Only the variable costs vary proportionality to the level of outputs or sales.

Sales Revenue (Rs)	XXX	BEP (Rs)
Less: Variable Costs	XXX	
Contribution Margin	XXX	
Less: Fixed Costs	XXX	
Profit	Nil	

Then,



…V/C Ratio = $\frac{VCPU}{SPPU}$ C/M Ratio = $\frac{CMPU}{SPPU}$

Now,

…Sales Revenue (SR) = Total Costs (TC) ± Profit/Loss

Or, SR = (FC + VC) ± Profit/Loss

Or, SR = FC + SR x V/C Ratio ± Profit/Los

Or, SR- SR x V/C Ratio = FC ± Profit/Los

Or, SR (l-V/C Ratio) = FC ± 0 [Profit/Loss = 0]

$$\text{Or, SR} = \frac{FC}{1 - V/C\ Ratio}$$

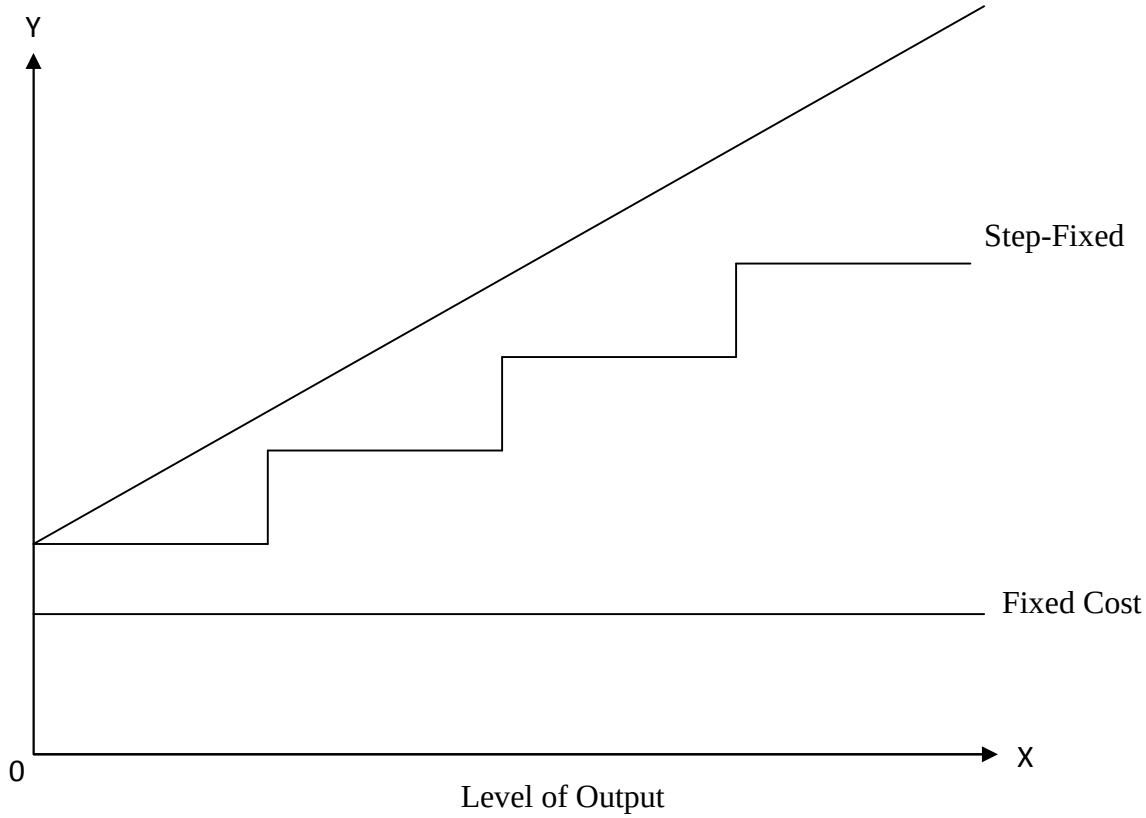
$$\text{Or, SR} = \frac{FC}{C/M\ Ratio}$$

$$\therefore \text{BEP (Rs)} = \frac{FC}{C/M\ Ratio} \quad \& \quad \text{BEP (Units)} = \frac{FC}{CMPU}$$

Step Fixed Costs & BEP Analysis

Step fixed costs are those which neither remain the same for all levels of output nor change proportionately. Step fixed costs jump if the level of activity exceeds a certain level. So, these costs are unknown before estimating the required level of sales. Step fixed costs are to be critically estimated at the problem. It is particularly because these are unknown previously for the required level of activity.

Figure No. 2.3: Step Fixed Costs



BEP is calculated through the following steps:

Step 1: Assume all step fixed as variable for some time.

Step 2: Find out assumed CMPU.

Step 3: Find out BE range.

Step 4: Estimate total fixed cost for BE range.

Step 5: Determine actual BE sales volume according to determined fixed cost.

Step 6: If this calculated BEP doesn't satisfy step fixed cost, then again determine fixed cost according to this BEP unit.

BEP Analysis with LIFO-FIFO Consideration

1) If the Company uses FIFO Method

$$\text{BEP (Units)} = \text{Beginning Inventory} + \frac{FC - CM\ of\ Begining\ Inventory}{CMPU\ of\ This\ Year}$$

$$\text{BEP (Rs)} = \text{Beginning Inventory x SPPU} + \frac{FC - CM\ of\ Begining\ Inventory}{C/M\ Ratio\ of\ This\ Year}$$

2) If the Company uses LIFO Method

$$\text{BEP (Units)} = \text{Production Units} + \frac{FC - CM\ of\ Begining\ Inventory}{CMPU\ of\ This\ Year}$$

$$\text{BEP (Rs)} = \text{Production Units x SPPU} + \frac{FC - CM\ of\ Begining\ Inventory}{C/M\ Ratio\ of\ This\ Year}$$

BEP Analysis with Non-Operating Income & Expense Consideration

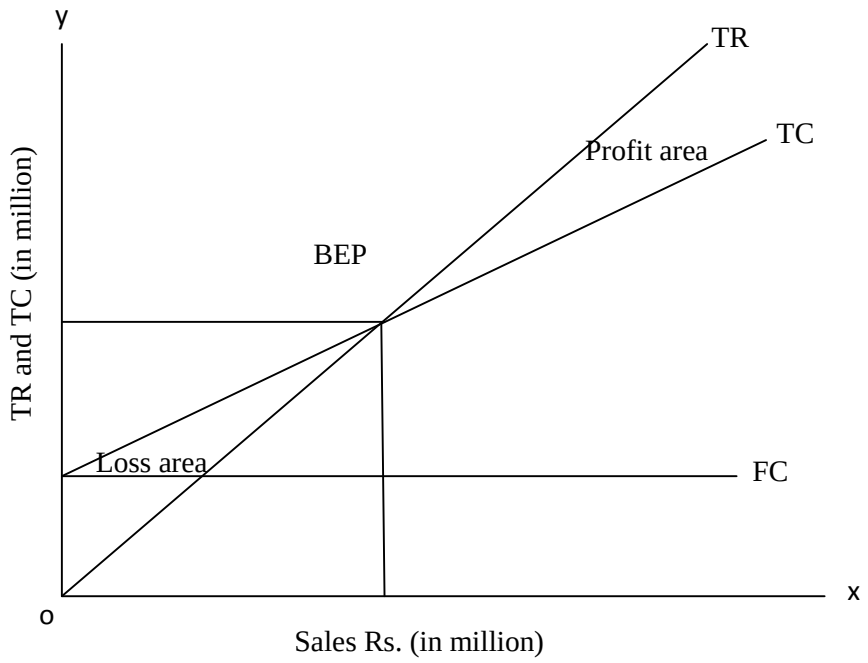
$$\text{BEP (Units)} = \frac{FC - Non\text{-}Operating\ Income + Non\text{-}Operating\ Expenses}{CMPU}$$

$$\text{BEP (Rs)} = \frac{FC - Non\text{-}Operating\ Income + Non\text{-}Operating\ Expenses}{C/M\ Ratio}$$

2.1.2.7 Economic Characteristics of CVP Analysis

Where costs are reasonable accurate, they can help management in decision-making. Essentially, cost-volume-profit analysis offers greater insight into the economic characteristics of a company and may be used to determine the approximate effect of various alternatives. CVP analysis is based on estimates; however, the arithmetical manipulations generally involve averages, and hence the results should never be interpreted as precise. Rather, the analysis may be characterized approximately as a 'slide-rule' approach that may be used to develop a test with a minimum of effort and the approximate effect on cost and profit of several types of management decisions *(Welsch et all, 1979: 467-468).*

Figure No. 2.4: Break-Even Chart



Above break-even chart with economic characteristic indicates few of the economic cartelistic of a business, "which are:

- Fixed cost, variable costs and total costs at varying volumes.
- The profit and loss potential before and after income taxes at varying volumes.
- The margin of safety is the relationship of budget volume to break even volume.

- The preferred dividend or danger point below which preferred dividends are not earned.
- The dead point, the point where management earns only the "going'" rate in the investment.
- The common dividend or unhealthy points below earnings are insufficient to pay the preferred dividends and the expected dividend on the common stock.*(Welsch, et all, 1979: 468)*

All these points and as other can be completed if data are developed for cost volume profit purposes.

2.1.2.8 Required Sales for Desired Profit

Desired profit of the firm may be the 'Profit before Tax', Profit after Tax', '% of Profit on Sales Revenue', '%of Profit on Investment Amount' etc.

1. If the company wants to earn certain amount of profit before tax:

$$\text{Required Sales (Units)} = \frac{FCDPBT}{CMPU}$$

$$\text{Required Sales (Rs)} = \frac{FC\,\Gamma\,DPBT}{C/M\,Ratio}$$

2. If the company wants to earn certain amount of profit after tax:

$$\text{Required Sales (Units)} = \frac{FC\,\Gamma\,\frac{DPAT}{1\,\mathrm{Z}\,Tax}}{CMPU}$$

$$\text{Required Sales (Rs)} = \frac{FC\,\Gamma\,\frac{DPAT}{1\,\mathrm{Z}\,Tax}}{C/M\ Ratio}$$

3. If the co. wants to earn certain % of profit before tax on sales revenue:

$$\text{Required Sales (Units)} = \frac{FC}{CMPU\ \mathrm{Z}\,PPU}$$

Required Sales (Rs) = $\frac{FC}{C/M ratio - Profit\ Ratio}$

4. If the co. wants to earn certain % of profit after tax on sales revenue:

Required Sales (Units) = $\frac{FC}{CMPU - \frac{PPU}{1-Tax}}$

Required Sales (Rs) = $\frac{FC}{C/M - \frac{Profit\ Ratio}{1-Tax}}$

5. If the co. wants to earn certain % of profit after tax on sales revenue:

Required Sales (Units) = $\frac{FC + Investment \times ROI}{CMPU}$

Required Sales (Rs) = $\frac{FC + Investment \times ROI}{C/M\ Ratio}$

2.1.2.9 The Margin of Safety

Margin of safety is the excess of budgeted (or actual) sales over the break-even volume of sales. It is the difference between the BEP and actual sales revenue. It is a position above the BEP. It states the amount by which sales can drop before losses begin to be incurred. It gives management a feel for how does projected operations are to be organization's BEP. Manager often considers the size of the company's margin of safety for making any decisions regarding about various business opportunities. Margin of safety is the amount that sales can drop before reaching the break-even point and thus provides certain amount of 'cushion' from losses. The margin of safety can be expressed in units, value or a percentage *(Munankarmi, 2003: 405).*

…Margin of Safety = Total Sales - BE Sales

Or. Margin of Safety = $\frac{FC + Profit}{CMPU} - \frac{FC}{CMPU}$

Or, Margin of Safety = $\frac{1}{CMPU}(FC \Gamma \Pr ofit \, Z FC)$

Or, Margin of Safety = $\frac{\Pr ofit}{CMPU}$

…Margin of Safety (Units) = $\frac{\Pr ofit}{CMPU}$ & Margin of Safety (Rs) = $\frac{\Pr ofit}{C/M\ Ratio}$

Margin of Safety Ratio = $\frac{M \arg in\, Saety}{Total\ Sales}$ X1Z $\frac{BE\ Sales}{Total\ Sales}$

2.1.2.10 Sensitivity Analysis

Sensitivity analysis is the measurement of elasticity of the change in cost-volume-profit factors on break-even point or given profit. The strategist should focus more on the factor, which is more sensitive or responsive for profit. To measure the sensitivity of cost-volume-profit factors, one can see the impact of certain percentage or amount change in volume, price or cost factors on net profit. In other words, sensitivity analysis is the measurement of responsiveness in outcome with the changes in determinant variables. We know that the goal of business enterprise is to maximize profit. Profit is the excess of revenues over the total costs.

|…Net Profit =Total Sales Revenue - Total Costs - Taxes

Or, Net Profit = Total Sales Revenue - (Fixed Cost + Variable Cost) - Taxes

Or. Net Profit = Total Sales Revenue - (Fixed Cost + Variable Cost) -Taxes

Or. Net Profit = Sales Units x SPPU - (Fixed Cost + Sales Units x VCPU) -Taxes

So that, Profit = f {Sales Volume, Selling Price, VC, FC, Taxes, etc.}

Means, profit is the function of volume, price, VC, FC, Taxes & so on.

Effect of Price Change: Other things remaining the same, an increase in selling price will result an increase in contribution margin and P/V ratio. It results the decrease in

BEP & increase in profit. On the contrary, a reduction in the selling price will result in decrease in CM and thus *P/V* ratio.

Effect of Volume Change: A change in volume, no accompanied with a change in the selling price and the costs, will not affect P/V ratio. As a result the BEP remains unchanged. Profit will increase with an increase in volume and will be reduced with a decrease in volume.

Effect of Variable Cost Change: An increase in variable cost will result the decrease in contribution margin and then P/V ratio will also decrease. It results the increase in BEP & decrease in profit.

Effect of Fixed Cost Change: Any change in fixed cost will not affect the contribution margin. Therefore, the P/V ratio will not change. A fall in fixed cost will however reduce BEP but raise profit. Similarly, increase in fixed cost will reduce profit but raise BEP.

2.1.2.11 Risk Measurement: Operating Leverage & BEP

Operating leverage tells us how profit change with the change in sales. It is evident that profit changes more rapidly than sales. Why do profit change more rapidly than the sales? It is because some costs do not change. Say, if sales decline, variable costs also decline in the same ratio so that contribution margin also declines proportionately. But fixed costs do not decline. So the net operating income declines more rapidly. The same thing applies in the case of increase as well as Sales revenues changes, but some part of costs, known as fixed costs, remain unchanged. That is why net operating income changes more rapidly. This change is called the operating leverage.

Operating leverage can be measured in terms of the *"Degree of Operating Leverage"* (DOL). A degree in operating leverage shows the times of percentage change in net operating income of the given percentage change in sales. Degree in operating leverage may be defined as the percentage change in net operating income (NOI) or EBIT associated with a given percentage change in sales *(Pandey, et all, 2004).*

$$\text{DOL} = \frac{\%\,Change\,in\,Operating\,Income\,or\,EBIT}{\%\,Change\,in\,Sales} \text{ X} \frac{\zeta\,EBIT\,/\,EBIT}{\zeta\,Sales\,/\,Sales}$$

Alternatively;

$$\ldots\text{DOL} = \frac{Contribution\,M\,\arg in\,(CM)}{Net\,Operating\,Income\,(EBIT)}$$

$$\text{Or, DOL} = \frac{Qf SPPU\ ZVCPU\,\text{A}}{Q(SPPU\ ZVCPU)\,\text{Z}FC}$$

As we know;

$$\ldots\text{BEP} = \frac{FC}{SPPU\ ZVCPU}$$

DOL & BEP Relationship: Leverage decision is meant to substitute variable costs by the fixed costs. To create a degree of operating leverage means the employment of higher amount of fixed costs, which eventually increases the break-even point also. Higher fixed costs increase the DOL and they increase the BEP. BEP will be '0' when DOL becomes T. Increase in DOL results the increase in BEP & decrease in DOL results the decrease in BEP.

Decision: A high DOL & a high BEP both are the indicators of higher risk. A decision to select a DOL depends upon the future likelihood. If the future is likely to be favorable, then it is better to choose high fixed cost alternative that is high DOL since a high DOL firm goes into loss sooner as sales decline and earns more as sales increase. If it is likely to be unfavorable, then it is safe to operate with a small or no amount of fixed costs that is less DOL. Secondly, the selection of a DOL is sometimes subjective. A risk taker may prefer a high DOL but a risk averter prefers a small DOL.

2.1.2.12 CVP Analysis for Multi-Product Firms

Sales mix can be defined as the relative combination of two or more products represented in total. It is not only the sales revenue that makes profit. The proportion the sales contributed by different products greatly changes the amount of profit.

Managers try to achieve that combination, or mix, that will yield the greatest amount of profit. If a company sells more than one product, these may not be equally profitable. So the company's profit will depend upon the ratio of each product's sales to total sales revenues. Profit will be greater if high margin items make up a relatively large proportion of total sales than if sales consist mostly of low margin items. Changes in sales mix can cause great variations in a company's profit. A shift to low-margin items can cause the total profit to decrease even through total sales increase. On the contrary, a shift in the sales mix from low-margin items to high margin items can cause the reverse effect-total profit may increase even through total sales decrease.

Factors to be considered:

- Product wise Selling Price.
- Product wise Variable Cost.
- Fixed Cost: (a) Product wise FC / Departmental FC
  (b) Jointed FC / Allocated FC
- Sales Volume / Sales Mix: (a) Insignificant Mix
  (b) Significant Mix:
  (i) Sales Unit Mix
  (ii) Sales Revenue Mix

Then, BEP & Required sales can be calculated as:

1. If Sales Mix is Insignificant:

Overall BEP = Sum of Individual Product BEP = $BEP_A + BEP_B$

2. If Sales Mix is Signified:

$$\text{Overall BEP (Units)} = \frac{Total\ FC}{Weighted\ CMPU}$$

$$\text{Overall BEP (Rs)} = \frac{Total\ FC}{Weighted\ C/M\ Ratio}$$

Where, Total FC = Departmental FC + Joint FC

Weighted CMPU = W $(Unit)_A$| | $CMPU_A$ + W $(Unit)_B$ | $CMPU_B$

$$\text{Weighted CMPU} = \frac{Total\,CM}{Total\,Sales\,(Units)} \text{ X} \frac{CM_A \Gamma CM_B}{Q_A \Gamma Q_B}$$

Weighted C/M Ratio = W $(Rs)_A$ | C/M $Ratio_A$ + W $(Rs)_B$ | C/M Ratio

$$\text{Weighted C/M Ratio} = \frac{Total\,CM}{Total\,Sales\,(Rs)} \text{ X} \frac{CM_A \Gamma CM_B}{SR_A \Gamma SR_B}$$

2.1.2.13 CVP Analysis under Condition of Uncertainty

CVP analysis can be used for various purposes such as between machine and products, planning of profit and cost significant fixing up of selling price. Management uses this as a convenient tool of profit planning with giving consideration of risk and uncertainty involved in it.

Although, margin of safety ratio explains the degree of sensitivity of the project and product in general but it fails to explain certainty in the product and also between the alternatives. To overcome such a difficulty, risk and uncertainty analysis like in any other management decision making can also be used in CVP analysis. The objective in CVP analysis under condition of uncertainty is to assess the probability distribution of the profit volume under given distribution of one or more factors like sales, price, or profits.

Probability distribution approach is a simple statistical tool which may be used to measure the risk and uncertainty involved In CVP analysis. A probability distribution theory normally suggests for postulation of various possibility of happening the event in consideration. This may be done either taking into considerations of the experience in the past or may be done by considering the personal intuition of the persons doing so. In business, reference of past experience is hardly available not a person is likely to behave in the same manner in the similar situation in different time. Therefore, personal judgments plays significant role in the managerial decision making. The conditions thus postulated are assigned probability (i.e. ones judgments

towards likeliness of happening of the condition forecasted). It must be understood that probability assigned here is subjective probability based in personal judgments of the man making such an analysis *(Pandey, 2003: 17).*

Normally, in CVP analysis, sales volume is treated as a random variable. A random variable can be thought of as an unknown quantity. Therefore, the outcome and the decision under CVP are based on the random sales volume of each product. The simplest and widely adopted approach to business decision making under uncertainty is to estimate the likelihood that the random variable will take on various possible values. Such an estimate is called a subjective probability distribution. The decision is then made by choosing that alternative which has the highest expected monetary value.

2.1.3 Use of CVP Analysis in Short-term Profit Planning & Control

Profit planning in fact is a managerial technique and is such a written plan in which all aspects of business organization with respect to definite future period are included. It is a formal statement of policy; plan objective and goal established by the top management in respect of some future period. Profit plan is a pre-determined detailed plan action developed and distributed as guide to current operation and as a partial basis for the subsequent evaluation of performance. Thus, we can say that profit plan is a tool, which may be used by management in planning the future course action and in controlling the actual performance *(Gupta, 1992:522).*

The fundamental concept of PPC includes the following activities of tasks that must generally be carried out to attain maximum usefulness from PPC:

- A management process that includes planning, organizing, staffing, leading and controlling.
- A managerial commitment to effective management participation by all level in the entity.
- An organization structure that clearly specifies assignments of management authority and responsibility at all organization levels.
- A management planning process.

- A management control process.
- A continuous and consistent coordination of all the management functions (Continuous feedback, follow-up and re-planning through defined communication channels (both downward and upward).
- A strategic profit plan.
- A tactical plan.
- A responsibility accounting system.
- A continuous use of the exception principle.
- A behavioral management program.

CVP analysis is analytical tool for studying the relationship between volume, cost, price, and profit. Basically, CVP analysis is the technique involves finding the most favorable combination of different types of costs. CVP analysis provides the managers with a powerful tool for identifying those courses of action that will or will not increase profitability. CVP analysis is the technique that explores the relationship, which exists, between cost, revenue, output level and resulting profit. CVP analysis can be extended to cover the effects on profit of changes in the selling prices or service fees, cost, income tax rate, total cost, total revenue, and profit at various sates volumes. CVP analysis provides the management with a comprehensive overview of the effects on revenue and costs of all kinds of short-run financial changes. It is related to profit, sales volume and cost. CVP analysis provides information regarding:

- Minimum level of sales to avoid losses.
- Sales level to earn target profit.
- Effects of changes of price, cost and volume towards profit.
- New break-even point for changes.
- Impact of expansion plan on CVP relationship.
- Products those are most profitable and least profitable.
- Whether to continue or discontinue the sales of product or operation of plan.

- Effects on operating profit with the increase in fixed costs.
- Decision regarding special offer *(Munankarmi, 2003: 401).*

Thus, CVP analysis is one of the effective tools for making the profit plan and the objective of CVP analysis is to establish what will happen to the financial results if a specified level of activity or volume fluctuates. If you are going to measure the performance of a department or an activity, then the department and individuals should supply the necessary input to assemble a food plan. As a result, management not only has complete financial forecast as possible but also a clear picture or the operational plans and controls that are currently in place.

2.2 Review of Previous Research

Review of literature is an essential part of all studies. It is a way to discover what other research in the area of our problem has uncovered. It is also a way to avoid investigating problems that have already been definitely answered. Review of literature provides the foundation for developing a comprehensive theoretical frame work from which hypothesis can be developed for testing. It also minimizes the risk of pursuing the dead ends in research. But there are very few research paper concerning comparative cost-volume-profit analysis has been conducted. Few dissertations have been submitted relating to cost volume profit analysis and the study is limited of various constraints. So, this study is attempted to review the previous research work on profit planning and control as well as management accounting. As CVP analysis is one of the major tools of PPC, the previous studies related to PPC are reviewed which will helpful to further study. There has been a lot of research work in the past on public enterprises of Nepal and the application of PPC in both manufacturing and non-manufacturing companies. These past studies have helped this study to be more effective and logistic in its sense. To solve the task presented in this study several concepts and theories of past have been taken. Many researchers have shown interest in doing research in PPC and have carried numerous research and field observations to illuminate pertinent issues. Very few researchers have carried research in CVP analysis by choosing broad areas in multinational company. Whatever the research in this area of profit planning and control made, are also not

in depth and in detail. An attempt is made here to review some of the researches, which have been submitted in the related topics, which are as follows:-

Ojha (1995) has done a research on *"Profit Planning and Control in Manufacturing Public Enterprises in Nepal,"* For case study he has selected two public enterprises namely Royal Drugs Limited (RDL) and Herbs Production & Processing Company Limited (HPPCL). His research was in partial fulfillment of MBA, submitted to the central Department of Management, Tribhuvan University. The study has covered five years period from FY 2046/47 to 2050/51.

Objectives:

- To analyze the trend of profit planning.
- To compare between production and sales plan.
- To examine the variation between production plan and actual production.

Major Findings:

- Objectives of Nepalese Public Enterprises are not clear, conflict between social objectives and profit objectives are hindering profit planning program of NPEs.
- Inadequate planning of profit due to lack of skilled planner.
- Inadequate authority and responsibility to planning department.
- Failure due to inadequate forecasting system.
- Cost volume profit (price-cost-volume) relationships are not considered when developing sales and pricing strategy.
- Lack of entrepreneurship and commercial concept in overall operations of the enterprises.
- In adequate planning of profit due to lack of skilled manpower.
- Inadequate evaluation of internal and external variables.

Bhusal (2000) has submitted the thesis on the topic *"A Comparative Study on Profit Planning in Manufacturing & Non-manufacturing Public Enterprise of*

Nepal". He had focused his study to highlight the current practice if profit planning and its effectiveness in Nepalese Public Enterprises. The study covers only five-year-period from 2051/052 to 2054/055. He has used primary as well as secondary data in his research.

Major Findings:

- There is no adequate and clear-cut co-ordination among various units in the organization.
- Objectives of the enterprises are controversial. There is conflict between profit and social goals.
- There is inadequate planning of profit due to lack of planning experts.
- There is lack of entrepreneurship and commercial concept in overall operation of the enterprises.
- There is radicalism and delay in the implementation phase as shown by the achievement to below the targets.
- The plans are based on ad hoc and unrealistic forecast.

Dhakal(2005) has submitted a thesis on the topic of *"Cost-Volume-Profit Analysis as a Tool to Measure the Effectiveness of Profit Planning and Control: A Case Study of Gorkhkali Rubber Industry Limited. "* He has focused his study to examine CVP as a tool to measure the effectiveness of profit planning 'and control by using both primary and secondary data.

Major Findings:

- Sales plan are not properly maintained by GRIL.
- Appropriated cost classification techniques are not practiced in GRIL.
- There is very low contribution margin of GIRL.
- GIRL is in very high interest bracket.
- GIRL does not have a detailed and systematic practice of planning.
- Goals and objectives are not communicated to the lower level of management.

- GIRL produces very high quality and exportable product but the production cost is high.
- The profitability of the industry is very poor and suffering a high degree of losses.
- GIRL is utilizing only 35% capacity.
- The industry is in risk where operating leverage is high.

Rijal (2005) has conducted a research *"Cost-Volume-Profit Analysis as at Tool to Measure Effectiveness of Profit Planning and Control: A Case Study of Nebiko Private Limited. "* He has centered his study to examine CVP analysis as a tool in manufacturing industry and to analyze the CVP and its impact in profit planning.

Major Findings:

- Nebiko's variable cost is high in portion than fixed cost, which contributes for lower contribution margin.
- Lack of effective cost control and program or technique.
- The profit proportion of the company is very low,
- There is no effective inventory policy in the company.
- The company has no detailed of any systematic plan.
- The board of director is the main body of price determination and he interferes directly in the price decision.
- Nebiko has not proper practice in the segregation of costs.
- There is not proper co-ordination among production, administration, distribution, inventory and sales department.

Katwal (2006) has submitted his thesis on the topic *"Cost-Volume-Profit Analysis of Bottlers Nepal Limited"* with some remarkable objectives for measuring the applicability of CVP analysis on budgeting, for finding the profitability of the Bottlers Nepal Pvt. Ltd. as a tool of financial performance analysis, for the examination of the risk position, and then Mr. Katwal concluded some remarkable findings with respect to these objectives.

Major Findings:

- BNL does not practice the scientific and appropriate cost classification technique.
- BNL has not maintained proper sales plan.
- Out of total cost of BNL, variable cost is almost 60% in every year, which causes the low contribution margin.
- The company has moderate risk.
- The actual sales of BNL have crossed the BEP for five years. So, the company is in profitable condition.
- The financial position of the company is profitable.
- The company has not maintained the broad and long-term objectives.
- Only the top executives are involved in planning and decision-making and lower participation is not encouraged.
- The fixed cost of BNL is in fluctuated trend. It means the BNL is unable to manage the fixed cost.
- There is not systematic purchasing of necessary equipment and fixed assets.
- The company does not apply any appropriate and effective sales forecasting technique.

Gautam (2006) has studied on the topic of *"An Analytical and Comparative Study on Cost Volume Profit Analysis of Unilever Nepal Ltd. and Dabur Nepal Private Limited"* is research was in partial fulfillment of MBS, submitted to the Nepal Commerce Campus, TU.

Major Findings:

- Classification of expenses items as variable and fixed or controllable and non controllable must be made within specific framework of responsibility and time.
- Separate cost control department should be established for the effective management of cost.

- UNL and DNPL should consider BEP analysis while preparing sales plan, production plan and selling price of its products.
- Both companies should consider about the product line to improve its profit. Market studies on demand, supply and pricing of product should be carried out and loss oriented cost should be identified and controlled.
- As UNL and DNPL is multi-product company, more emphasis should be provided to the product having high contribution margin for more profit.
- Some portion of profit should be allocated to research and development program so that new technology could be found which provide more competitiveness in the market.
- UNL and DNPL should have proper manpower planning.
- System of periodical performance reports should be strictly followed to be consisted about poor performance and take corrective action immediately and timely.
- New market areas should be identified for the coverage of increased activities of companies.
- A systematic approach should be made towards comprehensive profit. This can considerably contributed to the increase in profitability to UNL and DNPL. Since separation of costs into fixed and variable elements, all decision makers ought to be fully aware of and understand the cost structure of their operation. Otherwise CVP analysis will be meaningless.

Dahal (2006) has studies on the topics of *"Cost Volume Profit Analysis as a Tool to Measure the Effectiveness of Profit Planning with Special Reference to Dabur Nepal Ltd "* this was submitted to Nepal Commerce Campus, TU in partial fulfillment of Master's Degree in the year 2006.

Objectives:

- Examine the variance between targets and actual sales and production.
- To show the capacity utilization of Dabur Nepal Ltd.
- To forecast future production and sales.
- To analyze financial performance.
- To analyze the CVP of company and its impact in profit planning.

- To analyze the trend of profit over the time covered by the study.
- To provide recommendations and suggestions for improving the profit planning systems of Dabur Nepal Pvt. Ltd

Major Findings:

- Dabur Nepal Pvt. Ltd. constitutes lack of adequate inventory policy.
- No control over external factor i.e. it has poor SWOT analysis.
- Dabur Nepal Pvt. Ltd. does not prepare strategic and policies for long term.
- Dabur Nepal Pvt. Ltd. is not able to coordinate among various departments.
- Dabur Nepal Pvt. Ltd. does not prepare raw material requirement budget and raw material purchase budget systematically.

2.3 Research Gap

Research is a continuous process having no ending point. Every researcher gives his/her effort to fulfill the gap, which has not been covered by the previous research works. Most of the researches have analyzed in very limited areas and impacts are rarely explained. Especially very few researches have been made by comparing the two multinational companies. So, the researcher has attempted to fulfill the following matters:

- Most of the studies have been done in respect of comprehensive profit planning and control of manufacturing enterprises but this study examines the current practice of CVP analysis as a tool of PPC in BNL.
- Previous studies have not covered risk measurement, CVP analysis under conditions of uncertainties but this research tries to cover these areas.
- This study gives a high degree of value as the process and the data used in a systematic way of CVP Analysis
- This study has focused on operating position of the organization and clear picture of CVP analysis and its impact on profitability.

So this research remains fruitful to those interested person, scholars, students, teachers, government, businessman, civil society and other stakeholders for academic and policy prospective.

CHAPTER-III

RESEARCH METHODOLOGY

Research is the process of arriving at the solution of a problem through an organized and systematic investigation of facts and figures related to it. This process involves a series of planned activities of gathering, recording, analyzing and interpreting the data.

Research methodology is the way to solve systematically about the research problem. It helps to analyze, examine and interpret various aspects of research works such as sales, production and profit planning. So, this part is concerned with research methodology applied in this study. This chapter deals with the brief conceptual review of research design of this study and the research methodology used to achieve the objectives of study so that the proper recommendations may be given to the concerned enterprises. Thus, this chapter plays vital role to accomplish the study in realistic term with sound empirical analysis.

3.1 Research Design

Research design is the plan, structure and strategy of investigation conceived so as to obtain answers to research questions and control variance. It provides a way to reach to research objectives.

In order to make any kind of research, a research design is necessary, which fulfills the objectives of the study. The research design is the strategy for conducting research. It describes the general framework for collecting, analyzing and evaluating data after identifying: (a) What the researcher wants to know and (b) What has to be dealt with in order to obtain required information. The research design refers to the entire process of planning and carrying out research study *(Wolf and Pant, 1999: 209).*

By research design, we mean an overall framework, outline or plan for conducting the study. It is the plan, structure and strategy for investigation of the facts in order to arrive at conclusion. Research is generally either exploratory or descriptive in

nature. The exploratory or descriptive design can be further classified into three categories:

(I) Small-Scale Surveys (ii) Case Studies & (iii) Feasibility Studies

This study attempts to show the relationship among cost, volume and profit to determine margin of safety, BEP, and effective application within the conceptual framework.

Comparative cost-volume-profit analysis during the five-year period is presented and analyzed by descriptive research design and analytical method. But qualities aspect of the research such as effectiveness of CVP in enterprise, views of various manager and personnel and the theoretical prescription are explained in words wherever necessary. The researcher has gathered pertinent data about the present status, past experiences and the relevant forces that contribute to the unit of study and has attempted to present an integrated picture of the study unit after a complete study and analysis.

3.2 Population and Sample

As per the objectives of the study, the population comprises all the Nepalese business enterprises operating with the objectives of earning profit. There are not any limitations for the selection of the enterprise. Since it is not possible to attempt all the number of research population in this research due to various circumstances, one of the large multinational companies in Nepal is selected randomly for the sake of convenience of the study.

The latest 5 year's data has been taken as a sample for the comparative analysis. So, the study is based on the sample data.

3.3 Nature and Sources of Data

There are vital role of data in research to clear and complete research objectives. Research methodology cannot be utilized to bring the conclusion. For the purpose of CVP analysis of the enterprise, data has been collected from both sources, which are as follows:

a) Primary Data:

Primary data is original in nature. For the purpose of research work, primary data were collected, basically, following techniques are adopted:

- Direct observation.
- Unstructured dialogues and discussions with personnel of the company.
- Personal interview through questionnaires etc.

b) Secondary Data

This data has already been used by others. Only primary data are not sufficient to fulfill the requirement of the research work. Sometimes it is very difficult to collect the primary data. In this situation, it is better to use secondary data to accomplish the objectives of study. Secondary data is used from the following sources:

- Annual Report provided by the company.
- Different publications made by the company.
- Library
- Books. Booklets, Journals, Magazines

3.4 Data Gathering Procedure

Data gathering is the most important phase of the research work. The conclusion of the study depends upon the collected data. The researcher found the data gathering procedure as the most difficult part of the fieldwork. Frequent visits to personnel of different departments of the company as well as the manufacturing unit were made to ensure that the collected data were according to the requirements of study.

3.5 Period Covered

Due to the short span of time and other constraints, this research only covers the last five years i.e. FY 2005/6 to FY 2009/10.

3.6 Research Variables Studies

A variable is symbol to which numerals or values are assigned. In other words, a variable can take on values. The researcher has defined two types of variables: dependent & independent variables. There are three factors i.e. cost, volume and profit, which are interrelated and depended on each other. So, these three factors are dependent variables. But for the sake of convenience to test the relationship between these variables following criteria are assumed:

Table 3.1: Classification of Variables

S.N.	Independent Variables	S.N.	Dependent Variables
1.	Cost	1.	Profit
2.	Volume (Sales)	2.	Profit
3.	Cost and Volume	3.	Profit

3.7 Tools and Techniques Used for Analysis

The collected information is recorded in the appropriate categories on the basis of their similarity and homogeneous nature. The data are presented in proper formats and interpreted and explained whenever necessary. The following tools are used for analyzing the data.

3.7.1 Accounting and Financial Tools

Generally, the accounting and financial tools are used for the purpose of the assessment of the financial position to a particular organization. The following tools are used for analyzing the data:

Contribution Margin (CM) = Sales Revenue (SR)-Variable Cost (VC)

Contribution Margin (CM) = Fixed Cost (FC) ± Profit/Loss

Contribution Margin per Unit (CMPU) = SPPU - VCPU

Contribution Margin Ratio (C/M Ratio) = CM/SR or CMPU/SPPU

BEP (Units) = FC/CMPU

$$\text{BEP (Rs)} = \frac{FC}{C/M\ Ratio}$$

$$\text{Required Sales (Units)} = \frac{FC\ \Gamma\ DPBT}{CMPU}$$

$$\text{Required Sales (Rs)} = \frac{FC\ \Gamma\ DPBT}{C/M\ Ratio}$$

$$\text{Required Sales (Units)} = \frac{FC\ \Gamma\ \frac{DPAT}{1\ Z\ Tax}}{CMPU}$$

$$\text{Required Sales (Rs)} = \frac{FC\ \Gamma\ \frac{DPAT}{1\ Z\ Tax}}{C/M\ \ ratio}$$

$$\text{Required Sales (Units)} = \frac{FC}{CMPU\ Z\ PPU}$$

$$\text{Required Sales (Rs)} = \frac{FC}{C/M\ Ratio\ Z\ \text{Pr}ofit\ Ratio}$$

$$\text{Required Sales (Units)} = \frac{FC}{CMPU\ Z\ \frac{PPU}{1\ Z\ Tax}}$$

$$\text{Required Sales (Rs)} = \frac{FC}{C/M\ Ratio\ Z\ \frac{\text{Pr}ofit}{1\ Z\ Tax}}$$

Margin of Safety (MOS) = Total Sales - BE Sales

$$\text{Margin of Safety Ratio} = \frac{Total\ Sales\ Z\ BE\ Sales}{Total\ Sales}\ X\ \frac{M\ \text{arg}in\ of\ Safety\ (MOS)}{Total\ Sales}$$

DOL = CM/EBIT

3.7.2 Mathematical and Statistical Tools

Generally, the mathematical and statistical tools are used for attaining accuracy on analysis as well as on study. The following tools are used for analyzing the data:

1) Mean, Standard Deviation and Coefficient of Variation:

a) Mean = $\bar{X} = \frac{X}{n}$

b) Standard Deviation $(\pm) = \sqrt{\frac{1}{n} \sum X^2 - \frac{X^2}{n}}$

c) Coefficient of Variation (C.V.) = $\frac{S.D.(\pm)}{Mean(\bar{X})}$

2) Time Series Analysis (Trend Analysis):

Trend analysis is also one of the moat useful statistical tools. It is used for forecasting. A widely and most commonly used method to describe the trend is the least square method.

a) Simple Regression Analysis:

Let, the demand forecasting regression equation of Y on X is, $Y = a + bX$

Where, Y= Dependent Variable

a= Intercept of Regression Line

b= Slope of Regression Line

X= Independent Variable &

$b = \frac{n \sum XY - \sum X \sum Y}{n \sum X^2 - (\sum X)^2}$ & $a = \bar{Y} - b\bar{X} = \frac{\sum Y}{n} - b\frac{\sum X}{n}$

b. Multiple Regression Analysis:

Let, the demand forecasting multiple regression equation of X_1 X_2 & X_3 is,

$X_1=a_1+b_1X_2+b_2X_2$

Where, X_1= Dependent Variable

X_2= Independent Variable

X_3= Independent Variable

a_1 = Point of Intercept on Y-axis

b_1 = Slope of Xi with variable X_2

b_2 = Slope of Xi with variable X_3

3) Karl Pearson's Correlation Coefficient & Probable Error:

Simple Correlation Coef. (r) = $\frac{n \mid XY \mathrm{Z} X \mid Y}{\sqrt{\mathrm{n} \mid X^2 \mathrm{Z}(X)^2 \mathrm{n} \mid Y^2 \mathrm{Z} f Y \AA}}$

Coefficient of Determination (C.D.) = r^2

Probable Error (P.E.) = $0.6745\frac{1 \mathrm{Z} r^2}{\sqrt{n}}$

Multiple Correlation Coef. ($R_{1.23}$) =

$$\sqrt{\frac{a_1 \quad X_1 \Gamma b_1 \quad X_1X_2 \Gamma b_2 \quad X_1X_3 \mathrm{Z} n(X_1)^2}{X_1^{\,2} \mathrm{Z} n(X_1)^2}}$$

Multiple Determination = $R^2_{1.23}$

$$\text{Standard Error of Estimate } |(\exists_{1.23}) = \sqrt{\frac{X_1^{\,2} \mathrm{Z} a_1 \quad X_1 \mathrm{Z} b_1 \quad X_1X_2 \mathrm{Z} b_2 \quad X_1X_3}{n \mathrm{Z} 3}}$$

4) Hypothesis Test (t -Test):

Null Hypothesis

$\ldots H_0 : \alpha_1 \mathrm{X} \alpha_2$, i.e. there is no significant difference between budgeted & actual sales.

Alternative Hypothesis

$\ldots H_0 : \alpha_1 \mid \alpha_2$, i.e. there is significant difference between budgeted & actual sales.

Test Statistics

$$\ldots t \mathrm{X} \frac{\overline{X}1 \mathrm{Z} \overline{X}2}{\sqrt{S^2 \frac{1}{n_1} \mathrm{Z} \frac{1}{n_2}}}$$

Level of Significance

$\ldots \Im = 5\% = 0.05$

Degree of Freedom

$\ldots n_1 + n_2 - 2$

Critical Value:

$\ldots$0.05 For $(n_1 + n_2 - 2)$ for two tailed test

Decision

a) If the calculated value of 't' is less than the critical value, then H_0, is accepted.

b) If the calculated value of 't' is greater than the critical value then H_0 is rejected.

CHAPTER IV

DATA PRESENTATION AND ANALYSIS

Profit planning is called the pre-plan of revenue and Expenditure regarding how much income will he generated and how it should be spent in order to meet investment and profit requirement. Profit planning involves streaming activities in order to get employees profit minded and secure maximum benefit from minimum effort and Expenditure. A best result seems to be obtained from a single product. The planner is given the right to prove economic, the organization, the mode of operation, the pricing in the marketing or any other fact of making and selling the product that, in one's judgment, affects profit acquiring from that products. The concentration of profit efforts upon the gross traditional boundaries of the enterprise to translate needs from one group to another and obtain consumed profit building efforts among these who can affect profits, are the fundamental factors that contribute to the success of profit planning (Chamberlain). Profit planning is a comprehensive plan expressed in financial terms by which an operating program is effective for a given period.

Generally, two types of range; long range of profit plans and short range profit plan are prepared and which are referred to as budget.

4.1 Current and Future Activities of BNL

BNL is one of the top ten companies listed in the NEPSE in terms of market capitalization. It is manufacturing and processing co, which was established in 1979 under the company act 1964. The objective of BNL is to produce and bottle soft drinks and distribute to the people. It is most of the materials are imported from the foreign country and its inputs are exported to Nepalese as well as foreign market.

The company has invested Rs.90 mm in building capabilities to produce PET packages. The PET package lunched these fiscal years, has been extremely successful and has contributed significantly to comply with the co Canola Co, environmental policy and to help the local environment they have initiated to Install the waste water treatment facilities inside the factory premises.

The company is also planning to launch various new products to market to fulfill the consumer demand. In addition, the co. continues to. Invest in cold drink equipment and containers to improve the availability and quality of their product in market. The performance of BN (Terai) Ltd, a subsidiary volume growth, has helped to offset most of loss incuse.

There are pleasant relations between the management and employees through out the year. The company had entered at 2 yearly collectively bargaining agreements with the union effective October 2004; Overall Industrial relations continue to remain harmonious. The communication, system has been upgraded by installing a direct leased line to Singapore.

BNL produces its products within whole year. But its working hour is not same for whole year. It depends on demand and weather. The company divided its production into three groups in the period of 12 months. The first group has January, February, November and December. The second group has March, April and September and October. Similarly, the third group has May, June, July and August. The first group works for 8 hours, Second group works for 16 hours and third group works for 24 hours in a day. But each group stops its work for 2 hours in a day for rest of all equipment, machines and Manpower.

No ways, the co. has to easy for producing because it has recently installed an electric bottle inspector in its 430 BPM line. The management is working hard to graduate to current 220 BPM line to manufacture PET and new returnable bottlers.

4.2 General Concept of Sales Plan

Sales plan is the first plan of budget to be prepared. It is an estimation of the goods that will be sold. All plans are dependent upon sales plan so it is the corner stone of profit plan. A sales budget is a forecast of total sales expressed and incorporated in qualities and money. All operational activities are directly related with the sales plan. So it is known as backbone of the enterprises.

Sales plan provides basic managerial decision about marketing based on those decisions. It is an organized approach for developing comprehensive sales plan. So

the company is also planning to lunch various new products to its market to fulfill the consumer demand. In addition, the Co. continues to invest in cold drink equipment and containers to improve the availability and quality of their product in the market. The performance of BN (Terai) Ltd, a subsidiary co. has also been encouraging. Though profit has declined, the increased volume growth has helped to offset most of the loss incurred.

To analyze the profit plan of BNL there are not more available data, so the present research tries to present the available data to use the financial tools.

4.3 Sales Plan/Sales Budget

Bottler's plan provides basic managerial decision about marketing based on that decision. It is an organized approach for developing comprehensive sales plan. So different important decisions such as production, purchases, expenses are made by sales unit, which is budgeted, likely production volume depends upon sales target and labor, material and production cost depends up on the production volume.

The sales plan is the foundation for periodic planning in the first because particularly all others enterprise planning is built on it. The primary source of cash is sales. The capital additions needed the Amount of expenses to be planned, the manpower requirement, the production level, and others important operational aspects depend on the volume of sales. Therefore, the sales plan must be realistic.

A comprehensive sales plan includes both strategic and tactical sales plan. Both sales plans must be prepared in comprehensive profit plan. Strategic sales plan is known as long range sales plan. Usually, it is 5 to 10 years strategic sales plan. It is to be developed as annual amount. It require depth analysis of future market potentials which may built up from a basis foundation such as population changes state of economy, industry projections and company objectives.

The effect long term strategic are also brought to bear on the long term sales plan. They would effect in such area as pricing, development of new product line, innovation of product, expansion of distribution channel, cost patterns. Similarly,

tactical sales plan is to be developed for short-term period in a company for future 12 months detailed by month and quarter. So it is also called, short range sales plan. Tactical sales plan includes detailed plan for each major products and from grouping of minor products. Short-term sales plan are usually developed in term of physical units or jobs and in sales or dollars.

For planning and controlling purposes, short-term sales must be developed by sales responsibility. Because short-term profit plan provides major consideration for planning and controlling purposes, it is also necessary for completing other components of profit plan.

4.3.1 Sales Plan of BNL

It is a fundamental plan of overall profit planning. It provides basic management decision about marketing. It is an organized approach for developing comprehensive sales plan. Different important decision such as production purchase expenses etc are made on the basis of sales Budget.

The company does not have a fixed method of sales forecasting. It uses personal judgment method as well as statistical method like regression method, time series analysis etc. The following factors are considered while forecasting the sales.

- Past Sales Level
- General Economic Trend
- Economic Trend in Industry i.e. Industry of soft drink
- Current Political & legal Situation of Country
- Planned Advertising & Sales Promotion Expenses
- Market Research Studies

The following table shows the target and actual sales of BNL (in Rs.) during the five-year period form 2005/06 to 2009/10.

Table 4.1: Target and Actual Sales

Details / Year	Budgeted		Actual		Variance
	Sales (in Rs.)	Increase/ Decrease	Sales in Rs.	Increase/ Decrease	
2005/06	714739440	-2.37%	621827381	1.15%	13U
2006/07	721827381	0.99%	634189583	1.99%	12.14U
2007/08	734189583	1.71%	746581607	17.72%	1.69F
2008/09	846581607	15.31%	1002720181	34.31%	18.44F
2009/10	1102720181	30.25%	1588149524	58.38%	44.02F
Mean*	824011638		918693655		
S.D*	164801314		404328557		
C.V*	20%		44.01%		
r*	0.9959276025				
P.E*	0.002451838714				

*Appendix II. Source: Annual Report of BNL

The above table shows the Budgeted and actual sales of BNL over five year period form 2005/06 to 2009/10, actual sales is Rs 614739440 in FY 2004/05 which is increased by 1.15% in 2005/06. After then it is increased in increasing rate up to the fiscal year 2009/10. There is a slight increase in sales in 2006/07 but there is significant increase in sales afterward and is increased by 17.72%, 34.31% and 58.38% In 2007/08, 2008/09 and 2009/10 respectively. The lowest sales of Rs.621, 827,381 is made in 2005/06 and the highest sales of Rs.1588, 149,524 is made in 2009/10. So sales of BNL are satisfactory.

If it is assumed that 5% variance is ignorable then performance of BNL is not satisfactory since variance is more than 10%. For this variance sales manager should be responsible. The unrealistic forecasting of regional sales manager may also result this variance, the company is able to meet this forecasted sales in 2007/08, 2008/09 and 2009/10 in which there are favorable variance of 1.69%, 18.44% and 44.02%

respectively. And the company has the poorest performance in 2005/06 in which there is high unfavorable variance of 13%.

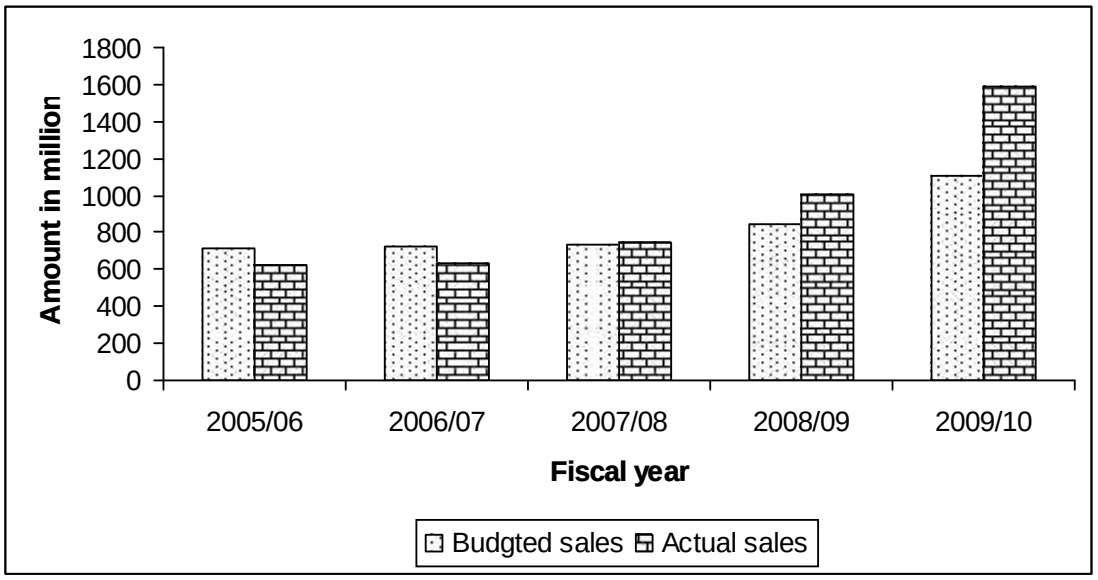
From the above table the average of Budgeted sales is 824011638 with the standard deviation of Rs.164801314 which is less than average of actual sales of Rest.918693655 with the standard deviation of Rs.404328557. The actual sales has the high C.V. than the Budgeted sales that means the actual sales is more fluctuate than the Budgeted sales. It shows that there is not any proper planning for making Budget and for achieving the target sales.

Similarly, the value of correlation coefficient of 0.9959276025 shows the positive relationship between budgeted and the actual sales with very high significant since r = 0.9959276025, then the coefficient of determinant ion r^2=0.992. That means 99.20% of the total variance in actual sales is due to the change in Budgeted sales and remaining 0.80 % (1-0.9920) is unexplained. Since r > 6PE (i.e. 0.9959276025 > 0.002451838714), we can conclude that r is significant.

The above analysis shows that the BNL does not have good planning for preparing the budget. The targets are somehow unrealistic and high and there is no proper planning for achieving the target.

The multiple bar diagram for the budgeted and actual sales is presented below:

Figure No. 4.1: Budgeted and Actual Sales of BNL



The above diagram shows that there is high variance (favorable) in FY 2009/10 and low variance (unfavorable) in FY 2007/08. The company is not able to meet the target in first two years till 2006/07. But the company is able to achieve its target in 2007/08, 2008/09 and 2009/10.

4.4 Production plan of BNL

Production planning is the second step of profit planning and control in a manufacturing company. The past sales & production, inventory level and forecasted sales are the basic foundations of production budget. It is affected by the desired ending inventory of finished goods. To find the budgeted production the following equation should be considered by the management.

Budgeted production = Budgeted Sales + Desired Ending Inventory - Beginning Inventory

Or Budgeted production = Budgeted sales $\pm$ Finished Inventory Changes.

The production plan of BBL is based upon various controllable factors. It adopts seasonal production. The production manager of the company prepares production Budget with the help of sales manager, production supervisors, marketing managers,

administrative manager and financial manager. The industry has sufficient capacity to produce the goods to fulfill the demand of Budgeted sales; nevertheless, it is unable to utilize its full capacity.

The company uses the fluctuating seasonal production policy. While determining inventory levels for finished goods, the management considers fluctuating production & inventory policy for smooth supply. The company keeps inventory of finished goods equal to 2% of next year's sales. The following factors are considered while preparing the production Budget:

- Planned sales for the Budgeted period
- Inventory policies relative to level of finished goods and WIP.
- Plant capacity
- Availability of raw material, labor
- economic lot size of production runs

The following table shows the planned production and actual production of BNL (in Rs.) over five-year period form 2005/06 to 2009/10.

Table 4.2: Budgeted production of BNL

Detail / Year	Cost of goods sold	Desired ending Inventory	Total needed	Actual Beginning Inventory	Budgeted Production
2005/06	415480239	8150789	423631028	7465594	416165434
2006/07	407539444	9012746	416552190	7133110	409419080
2007/08	450637322	10321929	460959251	14401378	446557873
2008/09	516096450	13678286	529774736	18874839	510899897
2009/10	683914300	115102681	685424568	17371311	668053257

Source: Annual report of BNL

Table 4.3: Actual production of BNL

Detail / Year	Cost of goods sold	Desired ending Inventory	Total needed	Beginning Inventory	Actual Production
2005/06	351080039	7133110	358213149	7465594	350747555
2006/07	389258445	14401378	403659823	7133110	396526713
2007/08	455134052	18874839	474008891	14401378	459607513
2008/09	621893624	17371311	639264935	18874839	620390096
2009/10	887111740	11380999	898492739	17371311	881121428
Total	2704477900	11380999	2715858899	7465594	2708393305

Source: Annual report of BNL

Table 4.4: Budgeted and Actual production of BNL

Detail / Year	Budgeted		Actual		Variance
	Production	Increase/ Decrease	Production	Increase/ Decrease	
2005/06	416165434	0.85%	350747555	-0.95%	15.72%U
2006/07	409419080	-1.62%	396526713	13.05%	3.15%U
2007/08	446557873	9.07%	459607513	15.91%	2.96%F
2008/09	510899897	14.41%	620390096	34.98%	21.43%F
2009/10	668053257	30.76%	881121428	42.03%	31.90%F
Mean*	490219108		541678661		
S.D*	107204914		215450882		
C.V*	21.87%		39.78%		
r*	0.9897555125				
P.E*	0.006148750987				

*appendix II Source: Annual Report of BNL

The above table shows the budgeted and actual production of BNL. Budgeted and actual productions are Rs. 412659705 and 354093866 respectively in 2004/05. The budgeted production is increased by 0.85% in FY 2005/06 but actual production is decreased by 0.95%. There is Budgeted production decreased by 1.62%. In FY 2006/07 but actual production is highly increased in that year. Both productions are increased with high rate afterwards.

If 5% variance is assumed to be ignorable, then the performance of BNL is not satisfactory since it has 15.72% & 3.15% unfavorable variance in FY 2005/07 and

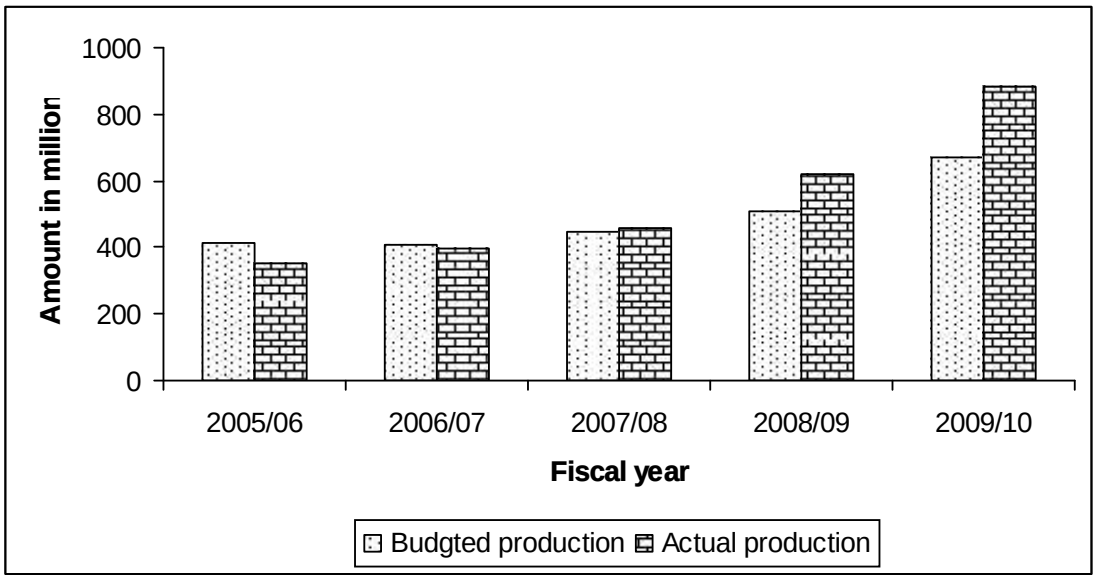
2006/07 respectively, BNL has achieved its target in last three years but there is high variance of 42.03% in 2003/10. The company has the poorest performance in FY 2005/06 in which there is high unfavorable variance of 15.72%. Overall the company has not a good performance since it has the unfavorable variance in past two years. The unrealistic sales forecasting the poorest condition between sales and production manager may happen this result. Production manager as well as sales manager should be responsible for this variance.

The averages of budgeted and actual productions are 490219108 and Rs. 541678661 with the standard deviation of Rs. 107204914 & Rs. 215450882 respectively. The C.V. of budgeted production is 21.87% where as the C.V. of actual production is 39.78%. That means actual production is more fluctuating than the budgeted production.

Similarly the value of correlation coefficient of 0.9897555125 shows the positive relationship between Budgeted and the actual production with the high significance. Since r=0.9897555125 then the coefficient of determination r^2 = 0.9796. That means 97.96% of the total variation in actual Sales is due to the change in Budgeted production and remaining 2.04% (1-0.9796) is unexplained. Since r>6PE (i.e. 0.989755125>0.0368925), we can conclude that r is significant.

The multiple Bar diagram for the budgeted and actual production is presented as below:

Figure No. 4.2: Budgeted and Actual Production



The above diagram shows that there is favorable variance of 31.90% In 2009/10 and high unfavorable variance of 15.72% In 2005/06. The company has low favorable variance of 2.92% In 2007/08 and low unfavorable variance of 3.15% in 2006/07. The company is unable to meet its target. In first two years till 2006/07 but it is able to achieve its target in last three years.

4.5 Cost plan of BNL

The cost is the Amount which is expenses for production of goods and services or used in operation. When we take any goods or service, we have to pay some amount for that. Organization has to bear various types of costs like variable cost, fixed cost or semi variable cost. Variable cost can be controlled. So, it is also called controllable cost. Since fixed cost can not be controlled it is known as uncontrollable cost. For the operation of Business, cost is required but it should be controlled to earn profit. Different organization should bear different types of costs. For the cost volume profit Analysis, production and operation cost should be segregated in- to variable cost and fixed cost. So every organization should segregate their various types of cost into fixed and variable.

Costs incurred by BNL under different headings are presented as below:

Table 4.5: Cost heading &Their Behavior

S.N	Cost Heading	Behavior	Fixed Cost	Variable Cost
1.	Cost Sales:			
	Material cost:			
	Production of Co_2 gas	Variable	-	100%
	Purchase	Variable	-	100%
	Production Expenditures:			
	Salary, wages & allowance	Fixed	100%	
	Utilities	Fixed	100%	
	Traveling	Fixed	100%	
	Repair and maintenances	Fixed	100%	
	Consumables	Fixed	100%	
	Insurance	Fixed	100%	
	Printing and stationery	Fixed	100%	
	Other Expenses	Fixed	100%	
2.	Administrative Expenses:			
	Salary, wages &other employees cost	Fixed	100%	
	Contribution to P.F. gratuity	Fixed	100%	
	Rent	Fixed	100%	
	Repair and maintenance	Fixed	100%	
	Security expenses	Fixed	100%	
	Electricity fuel and water	Fixed	100%	
	Training and traveling expenses	Fixed	100%	
	SAP related expenses	Fixed	100%	
	Audit fee	Fixed	100%	
	Legal professional fee and experience	Fixed	100%	
	Rates and taxes	Fixed	100%	
	Bank Charge	Fixed	100%	
	Trade discount	Variable		100%

	General meeting expenses	Fixed	100%	
	Insurance premium	Fixed	100%	
	Communication	Fixed	100%	
	Information service charge	Fixed	100%	
	Printing and stationary	Fixed	100%	
	Advertisement	Fixed	100%	
	Sales promotion expenses	Fixed	100%	
	Deposit written off	Fixed	100%	
	Charity and donation	Non operating		
	Uniform	Non operating		
	Rejection and breakages	Fixed	100%	
	Vehicle operating expenses	Fixed	100%	
	Royalties and management fees	Fixed	100%	
	Obsolete stock and fixed assets	Fixed	100%	
	Written off	Fixed	100%	
	Product transfer fees	Fixed	100%	
	Management fees	Fixed	100%	
	Miscellaneous expenses	Fixed	100%	
	Bad debt expenses	Fixed	100%	
3.	Distribution Expenses	Semi-Variable	30%	70%
4.	Interest	Fixed	100%	
5.	Depreciation	Fixed	100%	
6.	Impairment	Fixed	100%	
7.	Amortization	Fixed	100%	
8.	Provision for staff Quarter	Non operating		
9.	Provision for bonus	Non operating		

4.5.1 Analysis of semi-variable costs

Semi variable cost is combined cost of both fixed and variable. Fixed cost should bear for certain level and if the level of output or services increased, excess amount should

be spent which is known as variable cost. To segregate the mixed cost into fixed and variable costs, the company has provided the information about the degree of variability of the cost. All semi-variable costs have been segregated on the basis of given information.

Table 4.6: Segregation of semi-variable cost of BNL

Particulars	2005/06	2006/07	2007/08	2008/09	2009/10
1)Distribution Expenses:					
Fixed cost (30%)	5086429	6353684	7791626	10446856	14917993
Variable cost (70%)	11868334	14825263	18180461	24375998	34808651
Total	16954763	21178947	25972087	34822854	49726644
Increase/Decrease	-14.09%	24.91%	22.63%	34.08%	42.80%

Source: Annual Report of BNL.

The above table shows the detailed segregation of semi-variable cost. The company treats the distribution cost as a semi-variable cost. BNL is able to control its distribution cost in FY 2005/06. But it is increased by 24.91%, 22.63%, 34.08% and 42.80% in FY 2006/07, 2007/08, 2008/09 & 2009/10 respectively.

4.5.2 Analysis of Fixed cost

Fixed cost remains constant up to the certain level or the maximum level. It does not vary with level of output. Per unit fixed cost may vary with the level of output (i.e. increase with decrease in level of output & decrease with increase in level of output). Fixed cost in total may vary in different fiscal year due to the other level of output like inflation, tax rate increase in price of different factors used etc. Fixed costs incurred by BNL under different headings are presented in detail as below:

Table 4.7: Computation of Fixed Cost of BNL

S.N	Particular	2005/06	2006/07	2007/08	2008/09	2009/10
1.	Cost of sales: Production expenditure	70512428	91752580	96140535	136427709	179438452
2.	Adm. Expenses	98237991	136209815	185275640	211708914	240654091
3.	Distribution expenses	5086429	6353684	7791626	10446856	14917993
4.	Interest	1328931	8875422	20789989	26193016	20392656
5.	Depreciation	64165899	60227418	65414572	67871841	71740948
6.	Impairment		37672142			
7.	Amortization	503470	531622	1030864	2570691	6889327
Total		239835148	341622683	376443226	458033645	534033467
Increase/decrease		9.50%	42.44%	10.19%	21.67%	16.59%

The above table shows the fixed cost incurred by BNL. Fixed cost is increased by 9.50%, 42.44%, 10.19%, 21.67% and 16.59% in FY 2005/06, 2006/07, 2007/08, 2008/09 and 2009/10 respectively. In 2006/07, it is increased by 42.44% due to increase in miscellaneous expenses and impairment. The company should always try to control its miscellaneous expenses and spend in more productive sectors like advertisement expenses, sales promotion expenses, and information services charges etc. It can be concluded that BNL is not using the effective planning to control the fixed costs.

4.5.3 Analysis of variable cost

Variable costs are based on activity. Thus the variable costs should be zero with no activity level. They are changed directly with change in activity level in a responsibility center. Therefore, variable costs will be proportionately changed with the change in output level. Variable costs are controllable costs. So management has to give priority to control variable costs. Variable costs incurred by BNL under different headings are presented in details as below:

Table 4.8: Computation of Variable Cost of BNL

Particular	2005/06	2006/07	2007/08	2008/09	2009/10
1. Cost of Sales:					
Opening stock:					
Raw materials	142772596	81600664	87259400	47762161	58718366
Work in progress	1379482	1074612	863340	1219212	2466301
Finished goods	7465594	7133110	14401378	18874839	16822875
Total	151617672	89808386	102524118	67856212	78007542
Add: production of CO_2 Gas	5877892	425936	0	0	0
Add: Purchase during the year (Net rebate on concentrate)	224047225	369282382	351268529	541140109	806638257
Less: Transfer to Bottlers Nepal (Terai) Ltd.	(11166792)	(59486721)	(26942919)	(47789047)	(10278353)
Total Available	370375997	400029983	426849728	561207274	874367446
Less: Closing Stock					
Raw material	81600664	87259400	47762161	58718366	153049334
Work in process	1074612	863340	1219212	2466301	2263528
Finished goods	7133110	14401378	18874839	17371311	11381288
Total	89808386	102524118	67856212	78555978	166694150
Material cost	280567611	297505865	358993516	482651296	707673296
2. Administrative expense trade discount	56673446	49126411	30979640	32256140	50883252
3. Distribution expenses	11868334	14825263	18180461	24375998	34808651
Total variable costs	349109391	361457539	408153617	539283434	793365199
Increase/decrease	-0.53%	3.54%	12.92%	32.13%	47.11%

The above table shows the variable cost of BNL. Variable cost varies with the level of output. In 2005/06 variable cost is decreased by 0.53% with 1.15% increase in sales revenue. Again in 2006/07 variable cost is increased by 3.54% with 1.99% increase in sales revenue. Again in 2007/08 variable cost is increased by 12.92% with 17.72% Increase in sales revenue. Again variable cost is increased by 32.13% with 34.31%

increase in sales in 2008/09 and again variable cost is increased by 47.11% with 58.38% increase in sales in 2009/10. That means the company is able to control its costs in 2005/06, 2007/08, 2008/09 & 2009/10 but it is not able to control in 2006/07 in which variable cost is increased more than sales revenue.

4.5.4 Non-operating Income and Expenses

These are the costs which are not related to production and operation of the organization. That means, these are the expenses or losses from non-operating sectors. Non-operating income includes the income other than the sales revenue. Thus, these are the extra income for the company. So, these income and expenses are not related with output level. Non-operating income of BNL under different headings is presented in details as below:

Table 4.9: Computation of Non-operating Income of BNL

Particular	2005/06	2006/07	2007/08	2008/09	2009/10
Dividend from Bottlers Nepal (Terai) ltd, a subsidiary Co.	0	0	83483872	0	31306452
profit on sale of fixed assets	2860982	385302	0	9972	0
Other income	859031	1092417	1317254	30701457	1983895
Total	3720013	1477719	84801126	30711429	33290347
Increase/ Decrease	-44.09%	-60.28%	5638.65%	-63.78%	8.39%

Source: Annual Report of BNL.

The above table shows the non-operating income of BNL from 2005/06 to 2009/10. The company has the non operating income of Rs. 6,653,742 in 2004/05. Then it is decrease with increasing rate up to 2006/07. But it is increased with very high rate in 2007/08. But it is increased with very high rate in 2007/08. Then it is decreased by 63.78% in 2008/09. Again it is increased by 8.39% in 2009/10.

Non-operating Expenses of BNL under different headings are presented in details as below:

Table 4.10: Computation of Non-operating Expenses of BNL

Particular	2005/06	2006/07	2007/08	2008/09	2009/10
Administrative expenses:					
Charity and donation	139331	88258	312356	199871	69139
Uniform	613017	1210954	997000	645383	1320720
Total (A)	752348	1299212	1309356	845254	1389859
Others:					
Loss on sale of fixed assets	0	0	10070535	0	28143049
Provision for staff quarter	1792525	0	1770300	1763464	13225415
Provision for Bonus	3096180	0	3363570	3045983	22843898
Total (B)	4888705	0	15204405	4809447	64212362
Grand total (A + B)	5641053	1299212	16513761	5654701	65602221
Increase/ Decrease	-25.06%	-76.97%	1171.06%	-65.76%	1060.13%

Source: Annual Report of BNL.

The above table shows the non operating expenses of BNL incurred from FY 2005/06 to 2009/10. The company has the non operating expenses of Rs 7527706 in 2004/05. Then it is decreased by 25.06% and 76.97% in 2005/06, 2006/07 respectively. Then it is increased with very high increasing rate by 1171.06% in 2007/08 and again it is decreased by 65.76% in 2008/09. But again it is increased with very high increasing rate by 1060.13% in 2009/10. The company should always try to reduce its non operating expenses.

Both non-operating income and expenses are decreased with increasing rate up to 2006/07. Then, both are increased with very high rate in 2007/08 and again both are decreased in 2008/09 and then both are increased with very high rate in 2009/10.

4.6 Income Statement under Variable Costing

Income statement of BNL under variable costing during five-year period form 2005/06 to 2009/10 is presented as below:

Table No.: 4.11

Income statement (under variable costing)

Form FY 2005/06to 2009/10

Particular	2005/06	2006/07	2007/08	2008/09	2009/10
Sales revenue	621827381	634189583	746581607	1002720181	1588149524
Less: variable cost of sales	(349109391)	(361457539)	(408153617)	(539283434)	(793365199)
Contribution margin	272717990	272732044	338427990	463436747	794784325
Less: Fixed cost	(239835148)	(341622683)	(376443226	(458033645)	(534033467)
Net profit before non operating income and expenses	32882842	(68890639)	(38015236)	5403102	260750858
Add: Non operating income	3720013	1477719	84801126	30711429	33290347
Less: Non operating expense	(5641053)	(1299212)	(16513761)	(5654701)	(65602221)
Net profit before tax	30961802	(68712132)	30272129	30459830	228438984
Provision for tax	(5539057)	0	0	0	0
Provision for special fee	(461588)	0	0	0	0
Income tax		(2959078)	(2209062)	(716990)	(55025012)
Differed tax		41363862	39492081	(9212196)	4088177
Net profit after tax	24961157	(30307348)	(11429014)	20530644	177502149
Increase/Decrease	-28.14%	-221.42%	62.29%	279.64%	764.57%
Mean*	36251518				
SD*	82203824				
C.V*	226.76%				

*appendix II Source: Annual Report of BNL

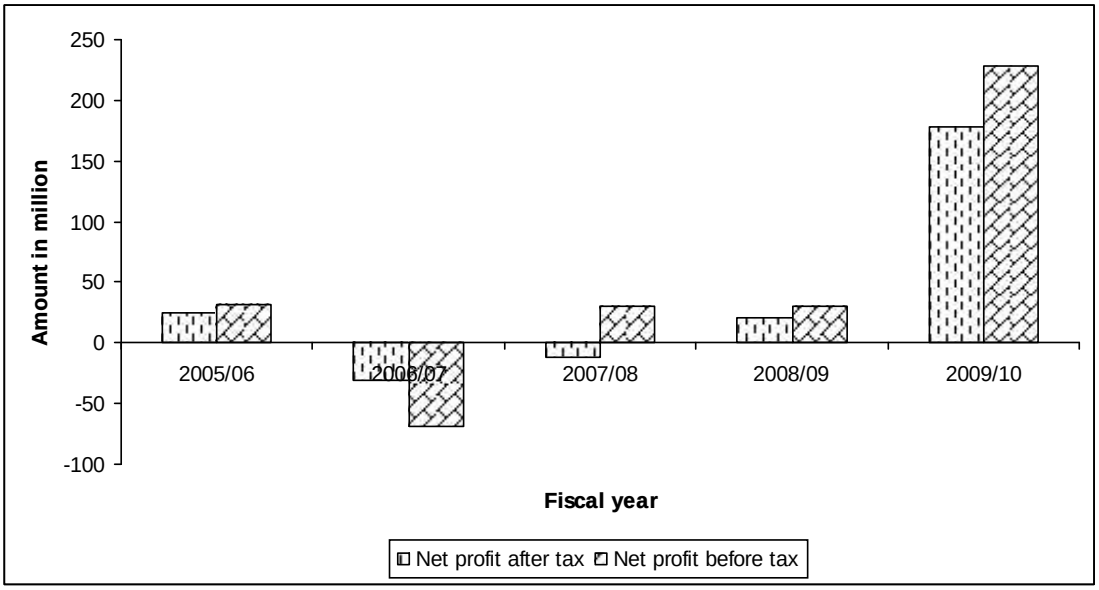
The above table shows the income statement of BNL from FY 2005/06 to 2009/10. The company has net profit of Rs. 34734873 in 2004/05. Then it is decreased 28.14% in 2005/06. Again it is decreased with increasing rate in 2006/07. The company has incurred losses in 2006/07 due to high amount of taxes but it has the satisfactory amount of profit before tax. Again the company is able to make profit of Rs 20530644 and Rs. 177502149 in 2008/09 and 2009/10 respectively. The company is unable to

maintain a stable profit during these periods. This has happened due to the unrealistic and improper planning. The whole management team should be responsible for it.

The average income of BNL is Rs 36251518 with standard deviation 82203824. The coefficient of variation (C.V.) is more than 100% that means the profit is highly fluctuating.

The Bar diagram for the net profit before and after tax earned by BNL is presented as below:

Figure No. 4.3: Net Profit Before and After Tax



The above diagram shows that profit is decreasing every Year up to 2007/08. The company has paid high amount of taxes in 2006/07 and 2007/08. The company has incurred losses in 2006/07 and again it has earned profit in 2008/09. But the company drastically increased profit in 2009/10. Both profits are in highly fluctuating trend which shows the company associates the high risk.

4.7 Contribution Margin Analysis

Contribution margin is the excess of sales revenue over variable cost. Contribution margin is the balance available to recover fixed expenses and after that it contributes

to the profit. If the contribution margin is not sufficient to cover the fixed costs, then the firm suffers from losses. Contribution margin can be expressed by.

… Contribution Margin = Sales Revenue – Variable Costs

C/M Ratio or P/V Ratio = $\frac{Contribution\ M\ \arg in}{Total\ Sales\ \mathrm{Re}venue}$ or

$$\frac{Sales\ \mathrm{Re}veue\ \mathrm{Z}Variable\ Cost}{Sales\ \mathrm{Re}venue}$$

V/C Ratio or C/V Ratio = $\frac{Varibale\ Cost}{Sales\ \mathrm{Re}venue}$

Contribution Margin of BNL during fiver year periods up to 2009/10 is presented as below:

Table 4.12: Calculation of C.M. C/M ratio and V/C Ratio of BNL

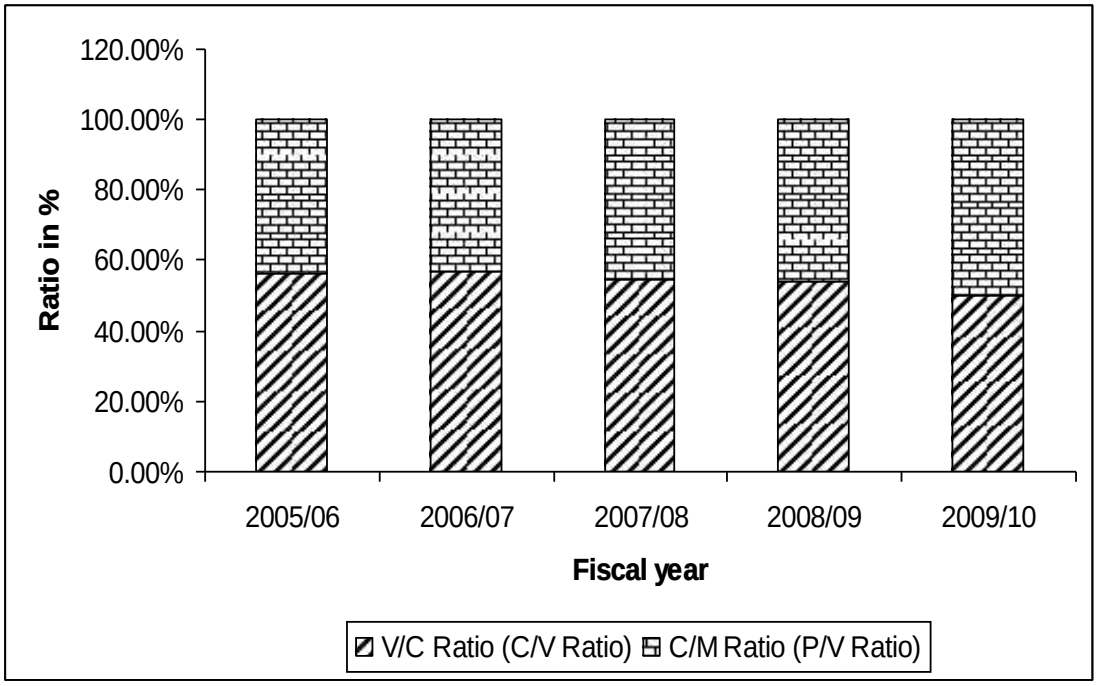
Particular	2005/06	2006/07	2007/08	2008/09	2009/10
Sales Revenue	621827381	634189583	746581607	1002720181	1588149524
Less: Variable cost of sales	(349109391)	(361457539)	(408153617)	(539283434)	(793365199)
Contribution Margin	272717990	272732044	338427990	463436747	794784325
C/M Ratio (P/V Ratio)	43.86%	43.00%	45.33%	46.22%	50.05%
V/C Ratio (C/V Ratio)	56.14%	57.00%	54.67%	53.78%	49.95%

The above table shows the contribution margin of BNL over five year period form FY 2005/06 to 2009/10. The company has the contribution margin 263768747 in 2004/05. Then it has been slightly increased and become Rs 272717990 in 2005/06 and then it is increased to Rs.272732044, Rs.338427990, Rs.463436747 and Rs.794784325 in year 2006/07, 2007/08, 2008/09 and 2009/10 respectively. The company has the almost stable C/M ratio in first two years and then it is slightly increased in 2007/08 and then it is almost same in 2008/09 and it is increased in 2009/10. The company has the C/M ratio of 42.91% in 2004/05. Then it slightly increases and become 43.86% in 2005/06. Then it is decreased to 43% in 2006/07 and

again it is slightly increased to 43.33% in 2007/08. Then it has become 46.22% in 2008/09 and then 50.05% in 2009/10. There is no high variance in V/C ratio during two years up to 2006/07. But V/C ratio is decreased by 2.33% (i.e. 57%-54.67%) in 2007/08 and by 3.83% (i.e. 53.78%-49395%) in 2009/10. In this way the company is able to control its variable cost in 2007/08 and 2009/10 and V/C ratio is almost stable over the years.

The percentile bar diagram for V/C ratio and C/M ratio of BNL during five years period up to 2009/10 is presented as below:

Figure No. 4.4: V/C Ratio and C/M Ratio



The above diagram shows that V/C ratio is almost stable every year up to 2006/07. But it is a bit lower than previous years in 2009/10. Then against it is almost same.

4.8 Break-Even Analysis

Break even analysis is the most widely known form of cost-volume profit analysis. Therefore, cost volume profit analysis is also called break-even analysis. Break even point is the level of activity at which total cost equals to total revenue. In other words Break-even point is a point of "no profit no loss." If the sales is higher than, the BEP

level, there will be profit and if the sales is less than BEP level, there will be loss. BEP can be determined by using these three methods:

- Algebraic or formula approach
- Graphical or chart approach
- Tabulation method

1. Algebraic or formula approach

The most popular, and practiced approach to the break even point and cost volume profit analysis is the formula, also known as the equation. The formula approach uses an algebraic equation. The formula approach uses an algebraic equation to calculate the break even point.

$$\text{BEP (Units)} = \frac{fixed\ Cost}{SPPU\ ZVCPU} \qquad or \qquad \frac{Fixed\ Cost}{CMPU}$$

$$\text{Or, } \frac{Fixed\ Cost\ \Gamma\ Non\ Zoperatig\ Expenses\ Z\ Non\ Zoperating\ income}{CMPU}$$

$$\text{BEP in Rs} = \frac{Fixed\ Cost}{C/M\ or\ P/V\ Ratio}$$

$$= \frac{Fixed\ Cost\ \Gamma\ Non\ Zoperatig\ Expenses\ Z\ Non\ Zoperating\ income}{1ZV/C\ Ratio}$$

BEP of BNL under formula approach during five year period up to 2009/10 is presented as below:

Table 4.13: Calculation of Breakeven sales (in Rs) of BNL

Particular	2005/06	2006/07	2007/08	2008/09	2009/10
Sales Revenue	621827381	634189583	746581607	1002720181	1588149524
Less: Variable cost	(349109391)	(361457519)	(408153617)	(539283434)	(793365199)
Contribution margin	272717990	272732044	338427990	463436747	794784325
C/M (P/V) Ratio	43.86%	43.00%	45.33%	46.22%	50.05
Fixed costs	239835148	341622683	376443226	458033645	534033467
Non-operating Expenses	5641053	1299212	16513761	5654701	65602221
Non-operating Income	3720013	1477719	84801126	30711429	33290347

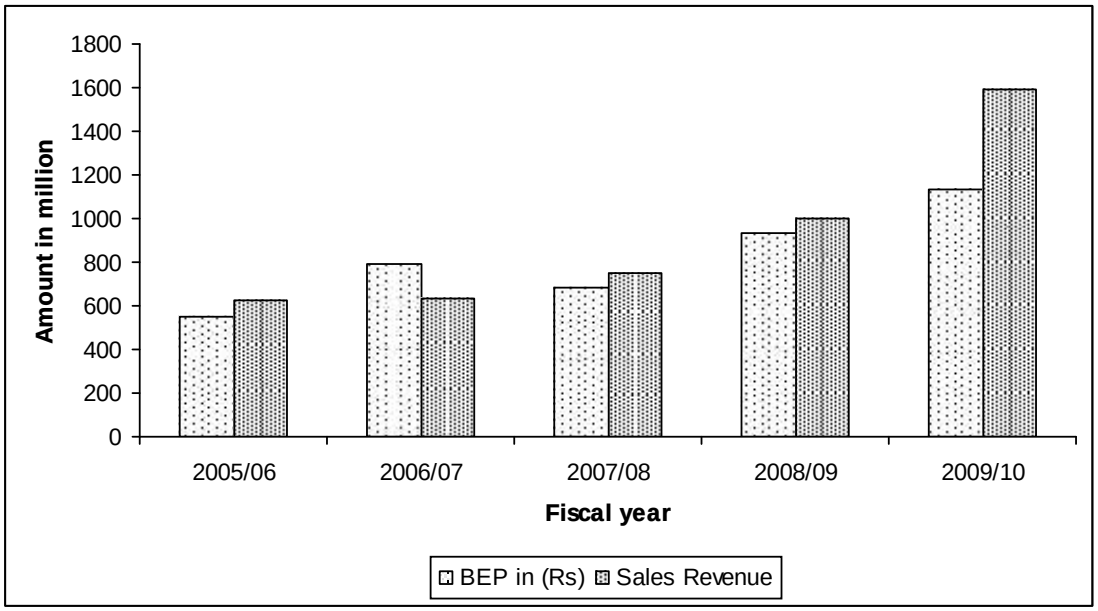
BEP in (Rs)	551231025	793967355	679800444	936815424	1131679445
Increase/Decrease	7.56%	44.04%	-14.38%	37.81%	20.80%
Mean*	818698739				
S.D*	225472742				
C.V*	27.54%				

*appendix II

The above table shows the break even sales of BNL during five years period from FY 2005/06 to 2009/10. The company has BEP of Rs 512482193 in 2004/05. Then due to increase in fixed cost it is increased by 7.56% and become Rs.551231025 in 2005/06. Suddenly, Increase in fixed cost, BEP is increased with high rate and reaches to Rs 793967355 in 2006/07 which is higher than sales revenue so the company is not able to maintain profit and it has incurred losses. BNL is able to decrease its V/C although there is increased in fixed costs in 2007/08. So, BEP is decreased to Rs.679800341 and company is able to make profit. Again BEP is increased to 936815424 due to increase in fixed cost although C/M ratio is little bit increased and then again BEP is increased to Rs.1131679445 due to increased in fixed cost although C/M ratio is increases. The average BEP is Rs.818698739 with the standard deviation of Rs.225472742. The company has CV of 27.54%.

The Bar diagram for BEP is presented as below:

Figure No.4.5: Bar Diagram for BEP of BNL



The above diagram shows that BEP is significantly increased in 2006/07. Then it is decreased in 2007/08 and again it is increased with high rate in 2008/09 and 2009/10.

4.9 Margin of Safety Analysis

It is the differences between the actual sales revenue and the break-even sales revenue. It states the amount by which sales can drop before loss begins to be incurred. Larger margin of safety saves the firm. A high margin of safety is particularly significant in times of depression when the demand for the firm's product is falling. A low margin of safety may result for a firm which has a low contribution ratio. It can be calculated as:

Margin of Safety (MOS) = Total sales – BE Sales

Margin of safety ratio = (Total sales – BE sales)/Total sales

= Margin of safety (MOS)/Total sales

MOS of BNL during five years period up to 2009/10 is presented as below:

Table 4.14: Calculation of MOS, MOS ratio and BEP ratio of BNL

Particular	2005/06	2006/07	2007/08	2008/09	2009/10
Sales Revenue	621827381	634189583	746581607	1002720181	1588149524
Less: Break-even sales	(551231025)	(793967355)	(679800444)	(936815424)	(1131679445)
Margin of safety	70596356	(159777772)	66781063	65904757	456470079
Margin of Safety ratio	11.35%	-25.19%	8.94%	6.57%	28.74%
BEP ratio	88.65%	125.19%	91.06%	93.93%	71.26%

The above table shows the margin of safety of BNL during the five years period up to 2009/10. The company has the margin of safety of Rs.70596356 in 2005/06 which shows the 11.35% of total sales revenue. Then it is decreased to Rs. (159777772). It means the company has the negative MOS ratio of 25.19% in 2006/07. That means the company is in loss position and the sales volume is less than BE sales Volume.

The company is able to make profit and MOS has become 8.94% in 2007/08. Again it is decreased to Rs.65904757 in 2008/09 which shows the only 6.57% of total sales revenue. At the last, it increased to Rs.456470079 in 2009/10 which shows the 28.74% of total sales revenue form the above analysis we can say that the company has high MOS ratio in the initial period and then it is decreased over year. Again it increased in FY 2009/10. It may have happened due to the high competition in the market.

4.10 Risk Measurement Operating Leverage & BEP Analysis

Leverage decision is meant to substitute variable costs by the fixed costs. To create a degree of operating leverage means the employment of higher amount of fixed costs, which eventually increases the break-even point also, so a high degree of operating leverage makes good time better and bad time worse. SO, a risk taker may prefer a high DOL but a risk averter prefers a small DOL.

$$\ldots DOL \; \mathrm{X} \frac{Contribution\, M\, \arg in(CM)}{Net\, Operating\, incoem(EBIT)} \quad \mathrm{X} \frac{Q(SPPU\ \mathrm{Z}VCPU)}{Q(SPPU\ \mathrm{Z}VCPU)\ \mathrm{Z}FC}$$

DOL of BNL during five year period up 2009/10 is presented as below

Table 4.15: Computation of DOL

Particular	2005/06	2006/07	2007/08	2008/09	2009/10
Sales Revenue	621827381	634189583	746581607	1002720181	1588149524
Less: Variable cost	(3499109391)	(361457539)	(408153617)	(539283434)	(793365199)
Contribution margin	272717990	272732044	338427990	463436747	794784325
Less: Fixed cost	(238506217)	(332747261)	(355653237)	(431840629)	(513640811)
EBIT	34211773	(60015217)	(17225247)	31596118	281143514
DOL in times	7.97	4.54	19.65	14.67	2.82

The above table shows the DOL of BNL during five year period. The company has DOL of 7.97 times in FY 2005/06. The company has DOL of 7.97times in FY 2005/06. That means profit is increased by 7.97 more times than sales increased and vice versa. The company has 4.54 times in 2006/07. The company has the highest DOL of 19.65 times in 2007/08 which may very good. In increase in sales and very bad for decreased in sales. Again it is decreased to 2.82 times in 2009/10.

4.11 Time Series Analysis for Sales plan

Let x_1, x_2 and x_3 be the sales revenue no of time periods and Advertisement and promotional expenses of BNL respectively.

Then,

Since sales revenue is a dependent variable so the multiple regression equation of x_1 on x_2 and x_3 is

$x_1=a_1+b_1x_2+b_2x_3$ ……..(i)

The value of a_1, b_1 can be determined by solving the following three normal equations simultaneously.

$\phi x_1= b_1x_2+b2x3$ ……..(ii)

$\phi x_1x_2=a_1\phi x_2+b_1\phi x^2_2+b_2\phi\ x_2\ x_3$……..(iii)

$\phi x_1x_3=a_1\phi x_2+b_1\phi x^2_2+b_2\phi\ x_2\ x^2_3$……..(iv)

Now putting the value of x in the above equation the equation will be

$4593468276 = 5a_1+5b_1 + 105690785b_2$ …….. (v)

$16081579712 = 15a_1+55b_1+360321414b_2$ ……. (vi)

$104127171921135140 = 105690785a_1 + 360321414b_1 + 2506961113480287b_2$…… (vii)

Solving equation (v), (vi) and(vii) then,

$a = 506401438$ $b_1 = 377430939$, $b_2 = -34.06165441$

Now substituting the value of a1, b1 and b2 in equation (i)

$X_1 = a_1+b_1x_2+b_2x_3$

$X_1 = 506401438+377430939x_2-34.06165441x_3$

Interpretation

1. Since, a_1 506401438, which represents the value of dependent variable x_1 (Sales revenue) when others variables x_2 (no of time periods) and x_3 (advertisement and promotional expenses) remain zero i.e. sales revenue = Rs.506401438 when no. of time period = advertisement and promotional expenses = 0

2. Again, since b_1 = 377430939, which represent the corresponding change in sales revenue for each no. of change in time period when advertisements and promotional expenses held constant i.e. each no. of change in time period leads to increase sales revenue by Rs.377430939 at advertisement and promotional expenses held constant.

3. Again since b_2=-34.06165441, which represents the corresponding change in sales revenue for each rupee change in advertisement and promotional expenses when time period is held constant i.e. each rupee change in advertisement and promotional expenses lead to decrease sales revenue by Rs.34.06165441 at time period is held constant.

Table 4.16: Sales Forecasting of BNL

Fiscal year	$X_1 = 506401438 + 377430939x_2 - 34.06165441x_3$	Sales in Rs.
2010/11	$x_6 = 506401438 + 377430939x_6 – 34.061665441$ x 34112871	160946249
2011/12	$x_7 = 506401438 + 377430939x_7 – 34.06165441$ x 38437776	1839163769
2012/13	$x_8 = 506401438 + 377430939x_8 – 34.06165441$ x 42763682	2069281254
2013/14	$x_9 = 506401438 + 377430939x_9 - 34.06165441$ x 47087587	2299398774
2014/15	$x_{10} = 506401438 + 377430939x_{10} – 34.06165441$ x 51412492	2529516293

* Appendix IV

4.12 Correlation Analysis

Let x_1, x_2 and x_3 be the net profit before tax, sales revenue and operating expenses of BNL respectively.

Since profit is a dependent variable, so the multiple regression equation of x_1 on x_2 and x_3 is:

$x_1 = a_1 + b_2x_2 + b_2x_3$ …….. (i)

The value of a, b_1 and b_2 can be determined by solving the following three normal equations simultaneously.

$\phi x_1 = na_1 + b_2\phi x_2 + b_2\phi x_3$ …… (ii)

$\phi x_1x_2 = a_1\phi x_2 + b1\phi x_2^2 + b_2\phi x_2x_3$ … (iii)

$\phi x_1x_3 = a_1\phi x_3 + b_1\phi x_2x_3 + b_2\,\phi x_3^2$ ….. (iv)

Now, putting the value of x in the above equation, the equation will be:

Appendix V.

$251422 = 5a_1 + 4593469b_1 + 4401337b_2$ ……. (v)

$391616911798 = 4593469a_1 + 4873918277653b_1 + 4506012007432b_2$ ….. (vi)

$327285474932 = 4401337a_1 + 4506012007432b_2 + 4213398277635b_2$ …… (vii)

$a_1 = -27040.93735$ $b_1 = 0.700939927$ $b_2 = -0.643689438$

1. Calculation of multiple correlation coefficients:

$$R_{1.23} = \sqrt{\frac{a1 \quad x1\Gamma b1 \quad x1x2\,\Gamma b2 \quad x2x3.n(\bar{x})^2}{x12\ \mathrm{Z}n(\bar{x})^2}}$$

$$R_{1.23} = \sqrt{\frac{\mathrm{Z}\ 27045\ .94 \mid 251422 \quad \Gamma\ 0.700939927 \quad \mid 3916169117 \quad 98\ \Gamma\ (\mathrm{Z}0.643689438 \quad) \mid}{3272854749 \quad 32\ \mathrm{Z}\ 2\ \frac{251422}{5}^{\ 2}}}{5970902357 \quad 2\ \mathrm{Z}\ 5\ \frac{251422}{2}^{\ 2}}$$

$R_{1.23} = \sqrt{0.943075299}$

Or, $R_{1.23} = 0.971120$

Hence required multiple correlation coefficient is,

$R_{1.23} = 0.971120$

Calculation of coefficient of multiple determinations:

$R_{1.23} = 0.971120$

$R^2_{1.23} = 0.943075$

Interpretation:

Since the correlation coefficient $R_{1.23} = 0.9711$, then the coefficient of multiple determination $R^2 1.23 = 0.943075$ which indicates that 94.30% of the total variation in the dependent variable x1 (net profit before tax) is due to the independent variables x2 (Sales revenue) and x3 (operating expenses) remaining 5.70% is due to the other factors.

2. Calculation of standard error of estimate

$$\exists_{1.23} = \sqrt{\frac{x_1^{\,2}\ \mathrm{Z}\, a1 \quad x1\,\mathrm{Z}\, b1 \quad x1x2\,\mathrm{Z}\, b2 \quad x1x3}{n\,\mathrm{Z}\,3}}$$

$$= \sqrt{\frac{59709023572\ \mathrm{Z}\,(\mathrm{Z}27045.93735) \mid 251422\ \mathrm{Z}\, 0.700939927 \mid 391616911798\ \mathrm{Z}\ (\mathrm{Z}0.643689438) \mid 327285474932}{(5\ \mathrm{Z}\,3)}}$$

$$= \sqrt{1339620568}$$

= 36600.82742

Hence, required standard error of estimate is:

$\exists_{1.23}$ = 36600.82742

4.13 Testing of Hypothesis

For budgeted sales: n = 5, $\overline{X}_1$ = 824011638.40, S_1 = 164801314

For actual sales: n = 5, $\overline{X}_2$ = 918693655.2, S_1 = 404328557

$$S^2 = \frac{n1S_1^{\,2}\ \Gamma\, n2S_2^{\,2}}{n1\,\Gamma\, n2\,\mathrm{Z}\,2} = \frac{5 \mid 164801314^2\ \Gamma\, 5 \mid 404328557^2}{5\,\Gamma\, 5\,\mathrm{Z}\,2} = 1191506594$$

Null hypothesis:

H_0: $\Uparrow_1 = \Uparrow_2$, i.e. there is no significant difference between budgeted and actual sales.

Alternative hypothesis:

H_1: $\Uparrow_1 \mid \Uparrow_2$, i.e. there is significant difference between budgeted and actual sales.

Test of statistics:

$$t = \frac{\overline{X}_1 - \overline{X}_2}{\sqrt{S^2 \left(\frac{1}{n1} + \frac{1}{n2}\right)}} = \frac{824011638.4 - 918693655.2}{\sqrt{1.191506594 \left(\frac{1}{5} + \frac{1}{5}\right)}} = -0.43369$$

Level of significance:

$\alpha = 5\% = 0.05$

Degree of freedom:

$n_1 + n_2 - 2 = 5 + 5 - 2 = 8$

Critical value: $t_{0.05}$ for 8 d.f. for two tailed test = 2.306

Decision: Since the calculated value of t is less than the critical value of t, so H_0 is accepted. Hence, we can conclude that there is no significant difference between budgeted and actual sales.

4.14 Major Findings of the Study

After the brief analysis of various elements of BNL, it can be concluded that it has been formulating and implementing respective tools and techniques in controlling cost and making effective and efficient use of its resources. From this research, the major findings of BNL based on the analysis of available data under the constraints of given method of study, are pointed out as below:

- The use of profit planning and control is not practiced by the management.
- The planning is not properly maintained; it is made on ad hoc basis.
- The objective set by the management is very ambiguous which resulted in the fluctuation in the actual and targeted results.
- There is more than 10% unfavorable variance between actual and budgeted sales in most of the periods i.e. research periods. The company is able to meet its target in 2007/08, 2008/09 and 2009/10.
- There is no linearity in the target figure.
- The company has not practiced any appropriate and effective sales forecasting techniques like survey method and statistical method. It uses market studies and

experimentation method for sales forecasting. It also forecast sales on the basis of advertisement expenses made.

- The company has unfavorable variance between budgeted and actual production in first three years. There is high fluctuation in desired ending inventory and actual ending inventory.
- This company has not practiced cost volume profit analysis tools for profit planning and the company does not have any policy for using CVP tools in coming years.
- The company has not applied any special technique for segregation of costs into fixed and variable, controllable and controllable and operating and non-operating.
- The company has used high variable costs as compared to fixed costs.
- The company is not able to control its variable costs. Variable cost is increased more than sales increased and decreased less than sales decreased.
- The company has not applied any effective managerial tools of "profit planning and control" for controlling its activity.
- The company is not considering about margin of safety.
- The top level management, being highly competent is praise worthy. They have given due care on ascertaining their level of operation to have good profitability.
- Coefficient of variation of actual sales is less than BEP sales. So actual sales is less volatile.
- The relationship between sales and profit and loss is not significant. There is no clear relationship. So that it can be concluded that the pattern of fixed costs and variable cost is not consistent.
- The company is enjoying huge profit every year in comparison to other companies of similar category whether public or private.
- MOS ratio is very fluctuating with decreasing trend which shows the risk of loss.
- The company has incurred losses in FY 2006/07 due to the high increase in fixed costs.
- The company is able to maintain almost consistent C/M ratio in every year which shows the good efficiency of BNL not for increasing V/C ratio.

- DOL is not consistent and fluctuating every year which leads BNL to the risk. DOL is high in last two years which is best for increasing sales but worst for decreasing sales.
- BNL has low probability to achieve its forecasted sales but it has high probability to achieve profit i.e. there is high probability to achieve sales more than break even sales.
- 94.30% of the total variation in net profit before tax is due to the sales revenue and operating expenses and remaining 5.70% is due to the other factor which is not good for BNL.
- From the t-test we can conclude that there is no significant difference between budgeted and actual sales.
- BNL has the good strategic policy for promotion of sales, which helps actual sales to stay far above the BEP level.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

A large number of business organizations including multinational companies have emerged in our country since the restoration of democracy in 2046. The threats of competition from multinational companies are forcing Nepalese managers to be more efficient in managing and utilizing their assets. However, inventory constitutes the most significant part of current assets, most of the organizations in Nepal are facing various problems in management of inventories, very little measures have been taken to use the scientific tools and techniques developed for the purpose.

Nepal is the least developed country in the world. The main source of income is agriculture for the socio-economic development of the nation. Industrialization is essential. Scientific and technological advancement plays vital role in industrializing the nation. But it is not enough only the advancement of science and technology for development of the country. Management of all these sectors is very essential. Without good management, organization cannot achieve its goals and objectives, government of Nepal has established so many public enterprises to facilitate the people. Most of the public enterprises are suffering loss;, whereas the government has invested huge amount of resources. There is no any concept of effective and appropriate planning system and procedure. Lack of expert, qualified and skilled manpower in the field of management, available resources, capacity and efficiency are not utilized properly. Some popular and systematic tools and techniques of management are ignored. These tools are not used in public enterprises for measurement of financial statement.

The main objective of the present research is to examine the use of cost-volume-profit analysis to plan the profit. So this study is undertaken to cost-volume profit analysis to plan the profit. It was observed that BNL was successful private enterprise rise in soft drinks and beverages all over the country. As per the nature of the study, the secondary data were used and related other information were collected through

informal interviews for sales analysis, costs analysis, inventory analysis, contribution margin analysis, P/V ratio analysis BEP analysis.

BNL, one of the large multinational companies has glorious history of the field of cold drinks. Its smooth running with profit shows the strong financial position of the company whereas loss shows the weak financial position. Profit is necessary to every organization. Profit is excess amount over cost. Financial position of the company can be analyzed its from various ways like financial performance, cash flow statement, ratio analysis, profit and loss account, balance sheet, and budgeting etc. Cost volume profit analysis is one of the most popular tools of management account. It is a part of profit planning and control. It shows the relationship among the variable like selling price, sales volume, cost-break-even level safety margin etc. when the organization finds its BE sales, it can determine the price, volume and cost for profit earning. The main objectives of the study are to highlight the cost-volume-profit analysis of BNL and comparative study of sales revenue, P/V ratio, BEP sales, safety margin etc. in different years. As per the objective of the study various primary and secondary data are collected for five year period from FY 2005/06 to 2009/10. The collected data are analyzed with descriptive and analytical approach. Sales revenue analysis, sales trend analysis, cost analysis, P/V ratio analysis, BEP analysis, profitability analysis, correlation analysis are done with the help of various financial and statistical tools. Primary data are collected by direct interview with concerned employees and senior staff of the enterprises. Secondary data are drawn from the various document like annual report, journal published by these enterprises and concerned authority. Different results are concluded from the analysis of CVP variables. BNL has almost consistent CM ratio. Its operating income is in fluctuating trend, variable cost of BNL is very less in comparison to fixed cost. So profit volume ratio is high. So it is able to earn profit. Sensitivity analysis of the profit planning is very important and necessary tool for both deficit and surplus units of the growing financial market of our country Nepal. So, profit plan is the lifeblood of every organization, which not only keeps it alive but also assures the future and creates the soundness on it. PPC means the development of objectives which motivates the organization to achieve the objectives effectively and efficiently.

5.2 Conclusion

In Nepal, most of the theoretical knowledge is not applied in practice. There is a vast gap between theory and practice. There are so many tools and techniques to measure the financial performance of the company but BNL has applied very few tools to analyze its performance. BNL has neither applied cost-volume-profit analysis nor segregated costs into fixed and variable. Increasing in operating and maintenance cost in each years is another remarkable problem for BNL. The company has not adopted the cost control programme. Company had no practice of segregating semi-variable cost into fixed and variable components. The classification of cost is not scientific and systematic. Therefore, BNL is unable to apply CVP analysis as a tool of profit planning and control.

After performing the study, we are able to arrive at some results. Thus this study helps us to conclude that:

- The objective of company is not clearly defined. There is not a long-term strategic plan to achieve the objectives. There is not complete and comprehensive budgeting system. BNL has not prepared long-term strategic profit plan but has prepared only short-term profit plan in term of budget for each year.
- There is not a scientific budget system. Budgets are prepared on traditional basis. There is no proper planning for purchasing materials and sales of goods. It has not applied any inventory policy. All overhead expenses or shown in general expenditure budget.
- Different types of profit planning tools, which are used in the academic field, are not found applied by the company as no segregation of cost into fixed cost and variable cost which is hardcore of CVP.
- There is no plan and policies like production plan sales plan and other operating plan. The company has not utilized its full capacity because of the lack of raw material, in efficiency of management and lack of skilled production specialist.

- BNL has not used CVP tools for planning so, the company is not able to earn a large. There is no perfect sales policy or sales planner; as a result the company is not able to meet the target sales.
- The top-level management makes the decisions and policies, target sales are always greater than actual sales. So there is high fluctuation in target and actual sales.
- The major problem faced by the company is increasing in the variable operating cost because it has adopted neither cost control system nor the systematic and scientific plan for classification of cost.
- The company has incurred heavy losses in 2006/07 which has happened due to the improper cost planning, fixed cost is increased by 42.44%.
- The company is able to maintain almost consistent CM ratio in every year but it is not able to increase CM ratio.
- Margin of safety ratio is decreased every year which leads BNL to the risk. BEP ratio is more than 80% every year.
- Degree of operating leverage is fluctuating more which leads BNL to the risk. More DOL is only good for the favorable condition.
- There is high probability not to achieve the expected sales in coming year which shows the improper planning of sales but there is high probability to make profit.
- From the t-test, we can conclude there is no significant difference between budgeted and actual sales which is good for company.

5.3 Recommendations

Nepal is moving towards globalization with membership of WTO. Therefore, Nepalese companies now have to prepare themselves to compete in international market through effective use of limited resources, profit planning and control is a means for every organization to achieve goals in a cut throat competition without much difficulty. Nepalese organizations lack effective tools for their improvement. On the basis of the study of use of CVP analysis, it seems necessary to develop, implement and improve the process of CVP analysis, to plan the profit. Thus, the recommendations based on the findings of the research study are as follows:

Analyze the SWOT:

For long-life of the company, it should analyze its strengths and weakness in internal environment of company and its opportunities and threats. In external environment of the company, regular inspection, evaluation, monitoring activities should be undertaken by the central level to different department

Apply participatory management system:

The participative management can play the vital role in the implementation of decisions. Therefore the company should try to involve more personnel in decision making process as far as possible. The CVP and PPC manuals should be communicated from top to lower levels of the company.

Apply budgetary control system:

The company should use the different tools of PPC to strengthen the competitiveness of BNL and carry out planning and controlling activities. For this purpose, the company can use CVP analysis tool for planning in budgetary activities.

Production and Sales Plan

There is unfavourable variance between budgeted and actual due to the unrealistic planning. The planning should be made on the basis of systematic and the realistic way. The achievable target should be made instead of higher target.

Classify the cost as fixed and variable

Classification of expenses and cost according to their nature of variability is very essential the preparation of flexible budget becomes exact and easier after classification of costs. So, it is recommended to follow the segregation method either high low method or least square method for segregating semi-variable cost into variable cost and fixed cost.

Make optimum utilization of fixed cost

BNL has invested huge amount of capital in fixed cost. Therefore, the company should try to maximize the effective utilization of fixed costs to generate profit.

Use effective inventory policy

The ending inventory of the company does not show any inventory policy. Therefore the company should apply the effective management policy, raw material handling and controlling system for continuous production and selling of the product.

Use systematic and complete profit planning programme

A systematic and complete profit planning programme should be followed to generate more profit. The efficiency and profitability of the company may be improved through different planning programs.

Profitability

BNL is running smoothly by earning profit. But it has incurred heavy losses in 2006/07 due to the high increase in fixed cost. The company should consider cost controlling program.

Contribution Margin

Contribution margin ratio is less than 47% and variable cost ratio is more than 53%. The company should control variable cost to minimize the risk. It is suggested to utilize maximum fixed cost.

Break-even sales and margin of safety

Break-even level of BNL is more than 71.26% and margin of safety is only less than 28.74%. It is suggested to increase margin of safety to minimize the risk by applying cost control progrmame.

Degree of operating leverage

High degree of operating leverage makes good time better and bad time worse. So it is suggested to increase DOL if the company will have a favourable condition in future, otherwise it is suggested to use average level of DOL.

Application of new management theory

There are many new and popular management theories like management by objective, participation management etc. These principles can be more effective to BNL.

Use performance report

Finally, a system of periodical performance report should be prepared and analyzed after a budget is implemented. Actual results should be compared with the outcome that ought to be. Then necessary corrective action should be strictly implemented for any variances occurred.

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Appendix-I

Income Statement (From 2005/06 to 2009/10)

Particular	2005/06	2006/07	2007/08	2008/09	2009/10
Sales	621827381	634189583	746581607	1002720181	1588149524
Cost of sales	(351080038)	(389258445)	(455134052)	(621893624)	(887111747)
Gross profit	270747343	244931138	291447555	380826557	701037777
Other income	859030	1092417	1317254	30701457	1983895
Business expenses					
Distribution expenses	(16954763)	(21178947)	(25972087)	(34822854)	(49726644)
Administrative expenses	(155663785)	(186635438)	(217564636)	(244810306)	(292927203)
Profit form operation	98987825	38209170	49228086	131894854	360367826
interest	(1328931)	(8875422)	(20789989)	(26193016)	(20392656)
Depreciation	(64165899)	(60227418)	(65414572)	(67871841)	(71740948
Impairment	0	(37678142)	0	0	0
Amortization	(503470)	(531622)	(1030862)	(2570691)	(6889327)
Dividend from bottlers Nepal (Terai)	0	0	83483872	0	31306452
Profit/loss on sales of fixed	2860982	385302	(10070535)	9972	(28143049)

assets					
Provision for staff quarter	(1792525)	0	(17770300)	(1763464)	(13225415)
Provision for bonus	(3096180)	0	(3363570)	(3045983)	(22843898)
Profit before tax	30961802	(68712132)	30272128	30459831	228438985
Provision for tax	(5539057)	0	0	0	0
Provision for special fees	(461588)	0	0	0	0
Income tax	0	(2959078)	(2209062)	(716990)	(55025012)
Deferred tax	0	41363862	(39492081)	(9212196)	4088177
Net profit after tax	24961157	(30307348)	178483161	20530646	177502150
Balance brought forward	399912950	342592657	0	167054146	177840357
Provision fro tax in respect of earlier year	(24332000)	0	0	0	0
Depreciation exp. for earlier years	(57949450)	0	0	0	0
Dividend tax in respect of dividend from earlier years		(1376840)	0	0	0
Profit available	342592657	310908469	167054146	187584791	355342507

for appropriation					
Proposed dividend for the year		(224122005)		(9744435)	(7795480)
Previous years tax expenses					(10555734)
Capital reserve transfer					200000
Balance of profit transfer to B/S	342592657	86786464	167054146	177840357	268831293

Administrative Expenses

Particular	2005/06	2006/07	2007/08	2008/09	2009/10
Salaries, wages and other employee cost	35286009	46051701	66029922	72107937	80558757
Contribution to PF, gratuity	0	0	0	0	0
Rent	1381389	4485245	5397472	3632008	1828487
Repair and maintenance	4446570	3874630	3757276	5296273	7330245
Security expenses	0	0	0	0	0
Electricity, fuel and water	155645	212230	163108	178147	2191329
Training and traveling expenses	14899616	8900706	8608982	9492818	9111440
SAP related expenses	6291308	0	0	0	0
Audit fees	219615	220000	220000	220000	220000
Legal and professional fees and expenses	1131161	1251851	1640001	3232729	595636
Rates and taxes	352071	308578	280645	223526	134200
Bank charges	287786	334678	346337	225145	334538
Trade discount	56673446	49126411	30979640	32256140	50883252
General meeting expenses	52096	24822	242632	387166	558652
Insurance premium	180293	71575	102184	66439	97699
Communication	5492827	2711339	5776770	5863637	2782096

Information service charges	0	10882367	12209111	0	0
Printing and stationery	1312883	1616886	1381211	996071	1049991
Advertisement	2789767	3224720	488387	852800	428778
Sales promotion expenses	4628452	17966080	22285256	28487149	24539396
Training	0	0	0	0	0
Deposit written off	0	0	2190175	2797354	0
Charity and donation	139331	88258	312356	199871	69139
Uniform	613017	1210953	997000	645383	1320720
Rejection and breakages	1902187	2511779	1219546	1061836	2761849
Vehicle operating expenses	2316701	2044689	1626485	1257336	2789561
Obsolete stock and fixed assets written off	717221	0	16228486	1626320	21895724
Product transfer fees	6779918	179873671	25677800	38537009	73127109
Management fees	6643214	6879300	7725931	4323839	2273554
Special fees	0	0	0	0	0
Miscellaneous expenses	971262	890308	1677923	2012295	5085391
Bad dent expenses	0	0	0	28831080	959659
Total	15663785	182872777	217564636	244810308	292927203

Cost of Sales

Particular	2005/06	2006/07	2007/08	2008/09	2009/10
Opening stocks:					
Raw materials	142772596	81600664	87259400	47762161	58718366
Work-in-progress	1379482	1074612	863340	1219212	2466301
Finished goods	7465594	7133110	14401378	18874839	16822875
Production of CO_2 gas	5877892	425936	0	0	0
Purchase during the year (net of rebate on concentrate)	224047225	369282382	351268529	541140109	806638257
Add: Transfer from Bottlers Nepal (Terai) Ltd.	0	0	0	0	0
Less: Transfer to Bottlers Nepal (Terai) Ltd.	(11166792)	(59486721)	(26942919)	(47789047)	(10278353)
Total available	370375997	400029983	426849728	561207274	874367446
Less: Closing stock:					
Raw materials	81600664	87259400	47762161	58718366	153049334
Work-in-progress	1074612	863340	1219212	2466301	2263528
Finished goods	7133110	14401378	18874839	17371311	1138288
Stock write off	0	0	0	0	0
Total	89808386	102524118	67856212	78555978	166694150
Material cost	280567611	297505865	358993516	482651296	707673296
Production expenditure	70512428	91752000	96140535	139242327	179438452
Total	351080039	389257865	455134051	621893623	887111748

Appendix-II

1. Actual and Budgeted Sales

Year	Budgeted sales (x)	Actual sales (y)	x^2	y^2	xy
2005/06	714739440	621827381	510852467091514000	386669291761319000	444444554072607000
2006/07	721827381	634189583	521034767961319000	402196427185714000	457775405754372000
2007/08	734189583	746581607	539034343785714000	557384095910702000	548132438718800000
2008/09	846581607	1002720181	716700417310702000	1005447761384670000	848884462202311000
2009/10	1102720181	1588149524	1215991797584673000	2522218910581427000	1751284530560344000
n = 5	ϕx = 4120058192	ϕy = 4593468276	ϕx^2 = 3503613793733922000	ϕy = 4873916486823832000	ϕxy = 4050521391308434000

1) Mean ($\overline{X}$) = $\frac{x}{N}$

Budgeted sales ($\overline{X}$) = $\frac{4120058192}{5}$ = Rs. 824011638.4

Actual sales ($\overline{Y}$) = $\frac{4593468276}{5}$ = Rs. 918693655.2

2) Standard deviation (∃) = $\sqrt{\frac{1}{n\,Z1} \quad x^2\ Z\frac{(\quad x)^2}{n}}$

Budgeted sales = $\sqrt{\frac{1}{5\,Z1}\ 3503613793733922000\,Z\frac{(4120058192)^2}{5}}$ = 164801314

Actual sales = $\sqrt{\frac{1}{5\,Z1}\ 4873916486823832000\,Z\frac{(4593468276)^2}{5}}$ = 404328556.5

3) Coefficient of variation = $\frac{\pm}{X}$ x 100%

Budgeted sales = $\frac{164801314}{824011638}$ x 100% = 20%

Actual sales = $\frac{404328557}{918693655.2}$ x 100% = 44.01%

4) Correlation coefficient (r) = $\frac{n \quad xy \,\mathrm{Z}\quad x. \quad y}{\sqrt{[n \quad x^2 \,\mathrm{Z}(\quad x)^2]}\sqrt{[n \quad y^2 \,\mathrm{Z}(\quad y)^2}}$

$$\frac{5 \mid 4050521391308434000 \,\mathrm{Z} 4120058192 \mid 4593468276}{\sqrt{[5 \mid 3503613793733922000 \,\mathrm{Z}(4120058192)^2}\sqrt{[5 \mid 4873916486823832000 \,\mathrm{Z}(4593468276)^2}}$$

= 0.9959276025

5) Probable error (PE) = 0.6745 x $\frac{1 \mathrm{Z} r^2}{\sqrt{n}}$

= 0.6745 x $\frac{1 \mathrm{Z}(0.9959276025)^2}{\sqrt{n}}$ = 0.002451838714

2. Actual and Budgeted Production

Year	Budgeted production (x)	Actual production (y)	x^2	y^2	xy
2005/06	416165434	350747555	173193668456408000	123023847338478000	145969008451014000
2006/07	409419080	396526713	167623983068046000	157233434122584000	162345602031884000
2007/08	446557873	459607513	199413933938284000	211239066006045000	205241353420100000
2008/09	510899897	620390096	261018704754611000	384883871214889000	316957236146220000
2009/10	668053257	881121428	446295154188308000	776374970880759000	588636039787891000
n = 5	ϕx = 2451095541	ϕy = 2708393305	ϕx^2 = 1247545444056570000	ϕy = 1652755189562755000	ϕxy = 1419149239837109000

1) Mean ($\overline{X}$) = $\frac{x}{N}$

Budgeted production ($\overline{X}$) = $\frac{2451095541}{5}$ = Rs. 490219108

Actual production ($\overline{Y}$) = $\frac{2708393305}{5}$ = Rs. 541678661

2) Standard deviation (∃) = $\sqrt{\frac{1}{n\,\mathrm{Z}1} \quad x^2\,\mathrm{Z}\frac{(\quad x)^2}{n}}$

Budgeted production = $\sqrt{\frac{1}{5\,\mathrm{Z}1}\ 1247545444405657000\,\mathrm{Z}\frac{(2451095541)^2}{5}}$ =

107204914

Actual production = $\sqrt{\frac{1}{5\,\mathrm{Z}1}\ 1652755189562755000\,\mathrm{Z}\frac{(2708393305)^2}{5}}$ = 215450882

3) Coefficient of variation = $\frac{\pm}{\overline{X}}$ x 100%

Budgeted sales = $\frac{107204914}{490219108}$ x 100% = 21.87%

Actual sales = $\frac{215450882}{541678661}$ x 100% = 39.78%

4) Correlation coefficient (r) = $\frac{n \quad xy\,\mathrm{Z} \quad x. \quad y}{\sqrt{[n \quad x^2\,\mathrm{Z}(\quad x)^2]}\sqrt{[n \quad y^2\,\mathrm{Z}(\quad y)^2}}$

$$\frac{5\,|\,14191492398371009000\,\mathrm{Z}2451095541\,|\,2708393305}{\sqrt{[5\,|\,1247545444405657000\,\mathrm{Z}(2451095541)^2}\sqrt{[5\,|\,1652755189562755000\,\mathrm{Z}(2708393305)^2}}$$

= 0.9897555125

5) Probable error (PE) = 0.6745 x $\frac{1\,\mathrm{Z}r^2}{\sqrt{n}}$

= 0.6745 x $\frac{1\,\mathrm{Z}(0.989755125)^2}{\sqrt{n}}$ = 0.006148750987

3. Net Income of Break Even Sales

Year	Net profit after tax (x)	BEP sales (y)	x^2	y^2
2005/06	24961157	551231025	623059358778649	303855642922551000
2006/07	(30307348)	793967355	918535342793104	630384160805696000
2007/08	(11429014)	679800444	130622361012196	462128643662597000
2008/09	20530644	936815424	421507343054736	877623138644300000
2009/10	177502149	1131679445	31507012899618201	1280698366235508000
n = 5	ϕx = 181257588	ϕy = 4093493693	ϕx^2 = 33600737305256886	ϕy^2 = 3554689952270652000

1) Mean ($\overline{X}$) = $\frac{x}{N}$

Net profit ($\overline{X}$) = $\frac{181257588}{5}$ = Rs. 36251517.60

BEP sales ($\overline{Y}$) = $\frac{4093493693}{5}$ = Rs. 818698738.60

2) Standard deviation (∃) = $\sqrt{\frac{1}{n\,\mathrm{Z}1} \quad x^2\ \mathrm{Z}\frac{(\ x)^2}{n}}$

Net profit = $\sqrt{\frac{1}{5\,\mathrm{Z}1}\ \ 3360073735256886\,\mathrm{Z}\frac{(181257588)^2}{5}}$ = 82203824

BEP sales = $\sqrt{\frac{1}{5\,\mathrm{Z}1}\ \ 3554689952270652000\,\mathrm{Z}\frac{(4093493693)^2}{5}}$ = 225472742

3) Coefficient of variation = $\frac{\pm}{\overline{X}}$ x 100%

Net profit ($\overline{X}$) = $\frac{82203824}{36251517.60}$ x 100% = 226.76%

BEP Sales ($\overline{Y}$) = $\frac{225472742}{818698738.60}$ x 100% = 27.54%

Appendix-III

Calculation p**x,** p**x2,** p**x3,** p**x1x2,** p**x2x3,** p**x3x1,** p**x3x1,** px_1^2**,** px_2^2 **and** px_3^2.

x_1	x_2	x_3	x_1x_2	x_2x_3	x_3x_1	x_1^2	x_2^2	x_3^2
621827381	1	7418219	621827381	7418219	4612851692454440	386669291761319000	1	55029973131961
6341895883	2	21190800	1268379166	42381600	13438984615436400	402196427185714000	4	449050004640000
746581607	3	22773643	2239744821	68320929	17002382988184300	557384095910702000	9	518638815491449
1002720181	4	29339949	4010880724	117359796	29419758971810800	1005447761384670000	16	860832607322601
1588149524	5	24968174	7940747620	124840870	39653193653249200	2522218910581427000	25	623409712894276
ϕx_1 = 4593468276	ϕx_2 = 15	ϕx_3 = 105690785	ϕ x_1x_2 = 16081579712	ϕx_2x_3= 360321414	ϕx_3 x_1= 104127171921135140	ϕx_1^2= 4873 916486823832000	ϕx_2^2= 55	ϕx_3^2= 2506961113480287

Appendix-IV

Trend Analysis of Advertisement and Promotional Expenses

Let x and y be the no. of time periods of advertisement and promotional expenses of BNL respectively. Then the forecasted regression equation of y on x is,

Y= a+bX

Years	No. of given period (x)	Advertisement and promotional exp. (y)	x^2	y^2	xy
2005/06	1	7418219	1	55029973131961	7418219
2006/07	2	21190800	4	449050004640000	42381600
2007/08	3	22773643	9	518638815491449	68320929
2008/09	4	29339949	16	860832607322601	117359796
2009/10	5	24968174	25	623409712894276	124840870
n = 5	ϕx = 15	ϕy = 105690785	ϕx^2 = 55	ϕy^2 = 2506961113480287	ϕxy = 360321414

$$b = \frac{n \quad xy \,\mathrm{Z}\quad x. \quad y}{n \quad x^2 \,\mathrm{Z}(\quad x)^2} = \frac{5 \mid 360321414 \,\mathrm{Z}15 \mid 105690785}{5 \mid 55 \,\mathrm{Z}(15)^2} = \frac{216245295}{275 \,\mathrm{Z}225} = 4324905.90$$

$$a = \frac{y}{n} \mathrm{Z} b \frac{x}{n} = \frac{105690785}{5} - (4324905.90 \times 15/5) = 8153439.30$$

Forecasting of advertisement and promotional expenses:

Fiscal year	y = 8163439.30 + 4324905.3x	Advertisement and promotional expenses
2010/11	Y_6 = 8163439.30 + 4324905.3 X 6	34112871.1
2011/12	Y_7= 8163439.30 + 4324905.3 X 7	38437776.40
2012/13	Y_8= 8163439.30 + 4324905.3 X 8	42762681.70
2013/14	Y_9 = 8163439.30 + 4324905.3 X 9	47087587
2014/15	y_{10} = 8163439.30 + 4324905.3 X 10	51412492.30

Appendix-V

Calculation of px_1, px_2, px_3, px_1x_2, px_2x_3, px_2x_1, px_{12}, px_1^2, px_2^2, px_3^2

x1 (in 000)	x1 (000)	x3 (000)	x1x2	x2x3	x3x1	x_1^2	x_2^2	x_3^2
30962	621827	588944	19253007574	366221280688	18234884128	958645444	386668817929	346855035136
(68712)	634190	703080	(43576463280)	445886305200	(48310032960)	4721338944	402196956100	494321486400
30272	746582	784597	22600530304	585765997454	23751320384	916393984	557384682724	615592452409
30460	1002720	997317	30542851200	1000029702240	303782575820	927811600	1005447398400	994641198489
228440	1588150	1327399	362796986000	2107108721850	303231027560	52184833600	2522220422500	1761988105201
ϕx_1 = 251422	ϕx_2 = 4593469	ϕx_3 = 4401337	ϕx_1x_2 = 391616911798	ϕx_2x_3 = 4506012007432	ϕx_3x_1 = 327285474932	ϕx_{12} = 59709023572	ϕx_2^2 = 4873918277653	ϕx_3^2 = 4213398277635