

**COST-VOLUME-PROFIT ANALYSIS
OF BOTTLERS NEPAL LIMITED**

**Submitted to:
Office of the Dean
Faculty of Management
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**In partial fulfillment of the requirements for the degree of
Master of Business Studies (M.B.S)**

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RECOMMENDATION

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

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DECLARATION

I hereby declare that the present study entitled “Cost-Volume-Profit analysis of Bottlers Nepal Limited” submitted to Office of the Dean, Tribhuvan University, is based on my original research work. It has prepared in the form of Partial fulfillment of the requirements for the Master of Business Studies (MBS) under the supervision and guidance of Prof. Dr. Bal Krishna Shreshtha, Central Department of Management, University Campus, Tribhuvan University, Kirtipur, Kathmandu.

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LIST OF ABBREVIATIONS

BE	:	Break-Even
BEP	:	Break-Even Point
BNL	:	Bottlers Nepal Limited
CBEP	:	Cash Break-even Point
CM	:	Contribution Margin
Co.	:	Company
CVP	:	Cost-Volume-Profit
FC	:	Fixed Cost
Ltd.	:	Limited
PV Ratio	:	Profit-Volume Ratio
PPC	:	Profit Planning and Control
Rs.	:	Rupees
SPPU	:	Selling Price per Unit
SWOT	:	Strength, Weakness, Opportunities and Threat
TC	:	Total Cost
TCM	:	Total Contribution Margin
TS	:	Total Sales
VC	:	Variable Cost
VCPU	:	Variable cost per unit

CHAPTER-I

INTRODUCTION

1.1 Background of the study:

Industrialization is the measure instrument of progress, modernization and social development in the context of Nepal. Industries have not developed to the extent of expectation in Nepal. The industrial development process started after establishment of Biratnagar jute mill and Udyog parishad in 1936. People hesitated to invest due to the lack of appropriate knowledge and lack of sufficient investing capital. Unstable political environment is another reason for it. A state should effort to encourage people for investment and create new investment opportunities with the minimum required facilities. For a successful investment, first one should know his/her own financial condition. It is necessary to look in to the factors, which influence the development of industries and to assess those factors.

After re-instate of democracy in 2046 B.S. some important changes took place in the field of industry. Some industries were established from the private sector thereafter. The role which manufacturing industry has been playing in the national economy is marginal but gradually, it is in increasing trend and market is also being large due to the increment of consumer needs and desires.

Establishing and running of enterprises are a risky task and it is needs huge knowledge of management and profit planning. Profit planning plays a vital role in the development of an industry. Therefore, understanding of profit planning is very essential to conduct a business. Profit planning involves two aspects; Profit and Planning. Profit is the primary objective of business entity. Profit does not just happen, they are managed. Profit is the primary measurement of business success in any economy, if firm is not able to earn profit than it fails to hold the capital, it can't secure and retain other sources, such as manpower, materials, and machine etc. In others words the more profitable firm/enterprises are more attractive to the holders of the available capital.

There are several different interpretations of the term profit. According to an economist, Profit is the reward for entrepreneurship for risk taking. Leader of labor might say that profit is a measure of how efficiently labour has produced and that it provides a base for negotiation

a wage increase. An investor will view it as a gauge of the return on his/her money. An accountant will explain it simply as the excess of firm's revenue over expenditure of producing revenue in a given fiscal year.

Similarly planning is the first essence of management and all other functions are performed within the framework of planning. Planning means deciding in advance what is to be done in future? Planning starts from forecasting and predetermination of future event. Planning is the whole concept of the any business organization. No firm can achieve its predetermined goal and objective in the absence of proper plan. Hence, it is life blood of any organization which makes efficiently run toward competitive environment. It is a method of thinking out acts beforehand. Planning is the function of profit realization and a plan is a projected course of action. Management is the process of planning, organizing, directing, decision making and controlling. In modern days profit planning is taken as an important managerial technique of decision making. It is also regarded as a way of management and is given the name profit planning programmers of an organization. Cost volume profit analysis serves as a powerful tool in the hands of management for profit planning.

The systematic relationship between cost volume and profit is shown by cost volume and profit analysis. It is analytical tools for analyzing the relationship among sales, costs and profit or production volume.

CVP analysis can be used in profit planning because it provides the information about the behavior and relation of cost-volume-profit. It also provides the information about sensitivity of profit due to variation in projected amount of outputs or sales. CVP analysis is an important tool to look into effect on profit on profit from variation in costs and sales and to take appropriation decisions. CVP analysis is great helpful in managerial decision making especially in cost control and profit planning. Profit planning is the fundamental aspect of the overall management functions. Therefore CVP is also known as complementary to profit planning and control.

Profit planning can be done only when the management has the information about the cost and selling price of the product. Profit planning and control have wide application. It can be applied in both profit making and nonprofit making organizations, and also in both manufacturing and non manufacturing business.

In Nepalese context, manufacturing organizations are facing so many problems. There are need for a large number of good managers and managerial decision in developing countries like Nepal. Most of organizations are in losses, profit earning is necessary to serve organization. For this application, profit planning tools are necessary.

Cost-volume-profit is a systematic method of examining the relationship between change in activities (i.e. output) and changes in total sales revenue, expenses and net profit. As a model of this relationship CVP analysis simplifies the real world condition that a firm will face. CVP 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, demands, variable costs, fixed costs taxes etc. The whole picture of profit planning is associated with cost-volume-profit interrelationship. A popular technique to study cost-volume—profit relation is break even analysis. Break-even analysis is concerned with the study of revenue and costs in relation to sales at which the firm's revenues and cost will be exactly equal or the net income will be zero. It is a “no profit no loss” situation. This point is a corner-stone of profit planning.

1.2 Company Profile:

1.2.1 An Over View of Bottlers Nepal Ltd(BNL):

Bottlers Nepal Balaju, Kathmandu is one of the manufacturing and processing companies. It is established in 1979 under this company act 1964. It was initially started as a private enterprise and converted into public enterprises in 1985 issuing to public. It was established with the objective of producing and bottling soft drinks under the brand name of coca-cola. The company also makes the sales of the soft drinks under the registered trademarks of the coca-cola managed by Dubai based coca-cola syabco Asia Limited. The company is located as Balaju, in an area of the 10648 square meters of the land and the building of the company covers 5.823 square meters. The company has been lunching various types of promotional activities with financial and technical support from the coca-cola syabco Asia Ltd. Dubai. (BNL Annual Report 2009/2010)

1.2.2 Share Capital of BNL:

The BNL was started with an authorized capital of Rs30, 250,000. In the initial period it's paid of capital was Rs10, 500,000 of Rs100 per share. Now, the company has an Authorized capital of Rs4,30,000,000, issued capital of Rs3,70,000,000 and paid of capital of Rs1,94,889,000. (BNL Audit Report 2009/2010)

1.2.3 Product Line :

BNL produce coke, Fanta and Sprite in returnable glass bottles 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 package in non returnable bottles. The line has commenced production and they have start sales of locally manufactured per since the previous year. So, the company has been able to increase the production efficiency of the plant giving better outputs compared to the previous year. The company is able to fulfill the market demand without any production constraints after the installation of new plant.

1.2.4 Profit Position:

BNL is one of the top ten companies listed on the NEPSE in term of market capitalization. The company produces soft drink name coca-cola, Fanta orange, Fanta lemon and sprite.

Despite several market competition and disturbance in the market due to the external factors, the company made a remarkable growth of 58% in the net sales revenue this year which contributed to the growth of 6.5 times growth in the profit before tax versus last year. On other side major cost i.e. cost of goods sold and distribution expenses rose by 43% and administrative cost increased by 20% versus last year. The company has earned for the FY 2009/2010 is Rs.197.13 million net profits before tax excluding dividend income of Rs.31.31 million during the year, against the profit before tax of Rs.30.56 million last year. (BNL Annual Report 2009/2010)

1.2.5 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 companies use two type of distribution channel i.e. through the dealer and retailer to consumer. Since the company doesn't sales the product by its self 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 sales 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 company. The objectives of those programs are to increase the per capital consumption of its beverage in the market. This company will continue to promote all its products as before.

1.3 Statement of problem :

Every commercial organization's mission is to earn profit. Hence the said entity should be clear from the very beginning regarding their way of operation. They should be clear about their production capacity, cost of raw materials, direct labour, indirect labour, production overhead, others cost aspect etc, the level of production at which they will be paid off, when they will enjoy profit, measure of deduction of cost of production etc. segregation between the cost of fixed nature and various nature is must for the study of cost, volume, and profit of any organization. So, primarily the BNL should be able to allocate its cost components into different categories based on their categories.

The problem situation in this case is the separation of various cost component and analysis of outcomes. This study deals with:-

- The study of existing information of sales cost and profit.
- Whether or not the principle of CVP analysis comply.

Therefore the present study has made effort to highlight the problems, role of profit plan to improve the financial performance using break-even analysis and cost-volume-profit approach and recommend possible suggestion to them.

1.4 Objectives of the study:

The main objective of the study is to examine the use of CVP analysis to plan the profit in Bottlers Nepal Limited (BNL). The others specific objectives of this study are:

- To study the profitability and financial position of BNL.
- To analyze CVP of the company and its impact in planning profit.
- To provide suggestion and recommendation of operation of BNL.

1.5 Significance of the study:

The present research work is the study of cost-volume-profit analysis in BNL. This study is significance in the following ways:-

- It examines the application of CVP analysis in the company.
- This study provides necessary recommendation to the related department of the company.
- It provides information of the application of the tools under profit planning in different circumstances.
- This study will be useful for potential manager, Accountant, policy maker and planners.
- It will also provide the literature to the researcher who wants to carry on future research in this field.

1.6 Limitation of the Study:

Basically, this research is done for the partial fulfillment of master of business studies (MBS). So, it is limited only to academic purpose. Time limitation, financial problem, lack of research materials and experience are main elements which put constraint on study. This study is only limited to CVP analysis and Financial analysis. The others specific limitations are as follows:

- The study is focused on cost-volume-profit analysis and financial analysis of BNL.
- The study is based on secondary data.
- The analysis is based on short period of time i.e. from 2005/2006 to 2009/2010.

1.7 Design of the study:

This study has been divided into five major chapters, which are as follows:

1.7.1 Introduction:

This chapter deals with background, evaluation of industrial development in Nepal, a brief overview of Bottlers Nepal Limited company, the focus on the study, statement of problem , objective of the studies, significance of the study and limitation of the study.

1.7.2 Literature Review:

The second chapter “Literature Review” deals with the review of related literature and available studies written and conducted by different export and researchers in the field of working capital.

1.7.3 Research Methodology:

The third chapter “Research methodology” presents the methodology used in this study. It deals with research design, source of data, procedure employed and financial and statistical tool used for the study.

1.7.4 Presentation and analysis of data:

The fourth chapter fulfills the objectives of the study by presenting the data and analyzing them with the help of various statistical tools followed by methodology.

1.7.5 Summary, Conclusion and Recommendation:

The fifth chapter summarizes the whole study. Moreover, it draws the conclusion and forwards the recommendation better utilization of cost volume profit analysis.

CHAPTER-II

REVIEW OF LITERATURE

Conceptual frame work and review of literature is supported to review the eminent literature relating to study. Various books, articles, journals, bulletins, reports, news, statements, and thesis etc. are the basis for preparing it. Some philosophers, Writers or Researcher have given the contribution on it since many years.

Planning and controlling are the primary function of business. A business can't success or live a minute in competitive or global environment without it. In most cases, cost volume profit analysis provides the management decision about effective budgeting of a company and best on those decisions. It is an organize approach for planning an appraisal or coordination and control.

2.1 Fundamental concept of profit planning and control

A profit planning and control programmed helps the management perform its planning function by developing a strategy (long run) and tactical (short run) Profit plan. Both of these plan include monitory expectation for assets, liabilities, profit and return on investment, The Foundation for the strategic profit plan include the objectives, goals, planning premises and strategies of the enterprise as develop by top management. The tactical profit plan can actually be viewed as the first years of the strategic plan. If it is details plans for the enterprise and for each of its responsibilities centers. PPC programmed also help management perform if control function by providing realistic goal and standard that are then compared with actual result to measure performance. Under PPC this performance measurement extends from the top to the lower organizational level in the enterprise. As outline fundamental concept of profit planning and control are:

1. A managerial process that include planning, organizing, staffing, leading and controlling.
2. An organizational structure that clearly specifies assignment management authority and responsibility levels.
3. A managerial commitment to effective management participation by all levels in the entity.

4. A management planning process.
5. A management control process.
6. Continuous and consist test coordination of all the management functions.
7. Continues feed forward, Feedback, follow up and re-planning through defined communication channels.
8. A strategic profit plan.
9. A tactical profit plan.
10. A responsibility account system.
11. A behavioral management programmed (Welsh,Hilton and Gorder, 2000:32)

Usually, profits do not just happen. Profits are managed before we can make an intelligent approach to the managerial process of profit planning, it is important that we understand the management concept of profit. There are, after all, several different interpretations of the term “Profit”. An economist will say that profit is the reward for entrepreneurship for risk taking. A labour leader might say that it is a measure of how efficiently labour has produced and that is provides a base for negotiating a wage increase. An investor will view it as a gauge of the return on his or her money. An internal revenue agent might regard it as the base for determining taxes. The accountant will define it simply as the excess of a firm’s revenue over the expense of producing revenue in a given fiscal period. (Lynch and Williamson, 1984:99)

2.2 Cost-Volume-Profit Analysis as Tools of Profit Planning and Budgeting:

The analysis of relation between cost volume and profit is knows as cost volume profit analysis. It is an analytical tool for studying relationship between volume cost price and profit analysis is great helpful in managerial decision making. Specially Profit planning and control is possible with the help of cost volume profit analysis.

Cost volume profit analysis is an important tool of profit planning because it provide the information about the behavior of cost interrelation to volume, production or sales where the

business will between sensitivity of profit due to variation of outputs amount of profit for a projected sales volume and quality of production and sales for a target profit level etc. CVP analysis may therefore be defined as managerial tools showing the relationship between various ingredients of profit planning. CVP analysis is an important media through which the management can have an insight into effect on profit on account of variation in cost and sales to take an appropriate decision. Cost volume profit analysis is great helpful in managerial decision making.

Especially profit planning and control is possible with the help of cost volume profit analysis. Profit planning can be done only when the management has the information about the cost of the product and selling price of the product.

2.3 Concept of Cost-Volume-Profit Analysis:

The cost volume profit analysis is the process of studying the relationship between cost volume and profit, with the given changes in cost or volume. What is the expected change in profit? While volume is a function of price, cost is a function of volume. That is CVP technique analysis the behavior of the three key parameters of cost, volume and profit. It is thus best on cost behavior patterns how cost respond to change in the output levels.

It is an analytical technique for studying the relationship between volume, cost, prices, and profits. It is used to determine the profit planning process of the firm. It is a simple but powerful tool for planning of profit and therefore of operation. It provides an answer to “What if” those – telling the volume require producing a target amount of profit. For a coordinate approach to what achieving production and profit goals, it has grown into a basic technique. With a focus on future, it has gained greater utility and respectability. According to Blocher, Chen and Lin “CVP analysis is best on an explicit model of the relationship between three factors- cost, revenue and profit and how they change in a predictable way as the volume of activities changes”

The objective of CVP analysis is to establish what will happen to the financial results if a specified level of activity or volume fluctuates. It helps to determine the minimum sales to avoid losses and sales volume at which the profit goals of the firm will be achieved, and it also helps the management to find out the most profitable combination of cost and volume. The management of organization therefore uses cost volume profit analysis to product and

calculate the implications of its short run decision and fixed cost ,variable cost, volume and selling price for it profit plan on a continues basis. There are three factors of cost volume profit analysis which are inter-relationship and dependent on each other.i.e. Profit depends on sales, selling price to greater extent will depend upon the costs and cost depends upon the volume of production. It assumed that under the constant underlying condition, CVP analysis deals with how profit and cost change with the change in volume. Last but not least cost-volume-profit analysis is a great helpful in managerial decision making. Specially cost control. Cost reduction and profit planning. In fact cost- volume-profit analysis provides answers to question. Such as:

1. What level of sales is needed to avoid the losses?
2. What sales volume is needed on the target profit?
3. What should be the effect on profit if we reduce our selling price and sale more units?
4. What sales volume is required meet the additional fixed charges arising from an advertising campaign?
5. What will be the effect on the profit where sale mix is changed?
6. What will be the new break-even point when there is changing prices, cost, volume and sales mix?
7. Which product or product mix is most profitable?
8. Which product mix should be discontinued or not?

Cost-volume-profit analysis provides attention-direction and problem solving background for important planning decisions such as selecting distribution channel, pricing, special promotions and personnel hiring. “Know your cost” is an essential theme for any manager. And cost-volume-profit analysis helps to direct managerial attention to important problems and paves the way to their solution. (Charles T. Hongren)

Managers often classify costs as fixed or variables when making decision about how many units of a product to produce in the coming year. Managers realize that many factors in addition to the volume of output will affect costs. Yet, a useful starting point in their decision process is to predict how the choice of production level will affect costs.

The managers of profit-seeking organizations usually study the effect of output volume on revenue, expenses and net income. We call this study cost-volume-profit analysis. The

manager of none profit organizations also benefit from the study of CVP relationships. Why? No organization has unlimited resources, and knowledge of how costs fluctuate with change in volume helps managers to understand how to control costs. For example, administrators of none profit hospitals are concerned about the behavior of cost as the volume of patients fluctuate. (Horgren,sundem,Stratton,Burgstahler and Schatzberg, 2008:53)

CVP analysis is based on the relationship between volume and sales revenue, cost and profit in the short-run, the short run normally being a period of one year, or less, in which the output of a firm is restricted to that available from the current operating capacity. In the short-run, some input can be increased, but others cannot. (Colin Drury, 2009:264)

2.3.1 Purpose of Cost-Volume-Profit Analysis:

Cost-volume-profit analysis helps management in a number of ways. The following purposes are served it;

- a) Evaluation of profit resulting from a budgeted sales volume.
- b) Calculation of sales volume to break-even.
- c) Calculation of sales volume to produce desired profit.
- d) Effect of changes on price, costs and profits.
- e) Determination of new break-even point for change in cost and selling price.
- f) Measurement of effect of change in profit factors.
- g) Choosing the most profitable alternatives.
- h) Determining the optimum sales mix.
- i) Determination of capacity and equipment selection.
- j) Long term decision on continuance or discontinuance of products.
- k) Make or buy decision on sub-assemble or part.
- l) To contemplate the increase or decrease in profit due to the change in method of production, etc.

2.3.2 Important of Cost-Volume-profit analysis:

CVP analysis is an important powerful tool for management to take crucial and vital managerial decision which effects the profit planning. It also helps to analyze the inter relationship between cost-volume-profit and to attain the objectives of profit maximization and cost control programs. It is also helpful to make plan for profit and obtained important information which are required to take managerial decisions. Others important points are;

- a) It helps on determining the break-even point in term of units and in Rs to avoided losses.
- b) It helps in determining reasonable price of the products.
- c) It helps in identifying the effect of change in price, cost, and volume on profit.
- d) It helps in selection of most profitable alternative.
- e) It helps in determining the volume of sales required to achieve the target profit.
- f) It helps in determining the margin of safety and profit at different level of sales.
- g) It helps on developing the optimum combination of product mix to attain the desire level of profit.

2.3.3 Assumption of Cost-Volume-Profit Analysis:

It is essential that any one preparing and interpreting CVP information is aware of the underlying assumption on which the information has been prepared. If this assumptions are not recognize serious errors may result and incorrect conclusion any be drawn from the analysis. The CVP analysis is based on the following assumptions;

- 1) Cost can be accurately divided into fixed and variables elements.
- 2) Fixed cost will remain constant and variable costs change proportionately with level of activity.
- 3) A single product or constant sales mix.
- 4) Production equal to sales. In other words, there is no change in inventory.
- 5) Selling price per unit remains constant at different level of activity.
- 6) The analysis applies only to a short-term time horizon.
- 7) No change in capacity and productivity.
- 8) Profits are calculated on a variable costing basis.
- 9) It assumes that all units produced are sold.

- 10) There are no changes in materials prices or wage rates, no design change in the product and no methods change in manufacture.

2.4 Break-Even Analysis:

Break-even analysis and the construction of break-even chart constitute another area of cost accounting which provides management with cost and profit data required for profit planning, policy formulating, and decision making. The chief advantage of a break-even chart lies in its efficiency as a compact, readable reporting device.

The term “break-even” implies that point at which the company neither makes a profit nor suffers a loss. Break-even analysis transmits to management information that would normally require voluminous reports and tables. Justification for the break-even chart is found in the need for an efficient reporting device. Based primarily on accounting data, there are limitations to the use of the break-even chart. The data involved, the assumptions made, the manner in which the information is obtained, and the way the data are expressed must be considered in connection with results indicated in the analysis and on the chart. Although a break-even analysis is not a sure way to profit, it is a very valuable aid in uncovering profit potential.

A break-even analysis indicates at what level cost and revenue are in equilibrium. The break-even point, obtained directly by mathematical computation, is usually presented in graphic form because it is not only shows management the point at which neither a profit nor a loss occurs, but also indicates more forcefully the possibilities associated with changes in costs or sales. A break-even chart can be defined as a graphic analysis of the relationship of cost and sales to profit. (Matz/Curry, fifth edition)

The margin of sales over variable costs, as in the preceding profit summaries, will henceforth be called the contribution margin. Conceptually, this is the contribution made by the sales of any period, after coverage of all applicable variable costs, toward the recovery of the fixed costs of the period and the realization of profit. (Lynch and William, 1984:102)

The purpose of break-even analysis is to determine the effect of alternative decisions that are usually included in short-run planning. Under certain circumstances break-even analysis is also used for long-run planning. This type of analysis involves the interrelationship of costs,

volume, and profit. The break-even point is that volume level at which sales revenue is exactly equal to all cost. (Holmes, Meler and Pabst, Page 705)

The most basis CVP analysis computes the monthly break-even point in number of units and in dollar sales. The break-even point is the level of sales at which revenue equals expenses and net income is zero. Some people call the study cost-volume-profit relationships break-even analysis. However, this term is misleading. Why? Because CVP analysis does much more than compute the break-even point. It is often an important part of a company's planning process. It helps managers to predict how their decisions will affect sales, cost, and net income. Nevertheless, computing a break-even point is one application of CVP analysis. (Horngren, Sudeh, Stratton, Burgstahler and Schatzberg, 2008:54)

2.4.1 Approaches to CVP and Break-Even Analysis:

The cost-volume-profit relationship and the break-even point can be analyzed through different approaches. Mainly the break-even point and other required cost volume profit relationship can be explained through contribution margin statement approach. A contribution margin statement is all fixed cost period costs which should be deducted from the contribution margin of the same period. Most often, we use the equations approach graph or the income statement.

(a) Contribution Margin Income Statement Approach:

The contribution margin income statement approach to CVP approach allows the preparation of performance statement from the available information BEP and others required CVP relationship can be explained through a contribution margin statement. A contribution margin statement is the variable costing income statement whose philosophy is fixed cost is period costs that should be deducted from the contribution margin of the same period. Only the variable costs vary proportionately to the level of output or sales.

(b) Formula Approach:

The most popular practiced approach to the break-even point and cost volume profit analysis is the formula also known as the calculate break-even point. The answer provided by solving the equation may sometimes to be rounded to whole number of units or lot sizes.

The calculation is the equation approach is similar to that of the contribution margin statement approach. The equation is mainly a restatement of the others. To developed the cost-volume-profit equation.

Table No. 2.1

Formula Approach in Table

Contribution margin approach	Symbol of Equation
Sales volume (Units)	Q
Selling price per units	SPPU
Sales revenue(Rs)	Q×SPPU
Less: Variable cost	Q×VCPU
Contribution margin	Q×SPPU-Q×VCPU
Less: Fixed cost	FC
Net profit	Q×SPPU-Q×VCPU-FC

Sales –variable expenses-Fixed expenses = Net profit

Or Sales = Variable expenses + Fixed cost + Net profit

Or $Q \times SPPU = Q \times VCPU + FC + \text{Profit}$

$$\text{Therefore, } Q = \frac{\text{Fixed cost} + \text{Profit}}{\text{CMPU}}$$

Where, $\text{CMPU} = \text{SPPU} - \text{VCPU}$

$$\text{Break-even (BEP units)} = \frac{\text{Fixed Cost}}{\text{CMPU}}$$

$$\text{Break-even (BEP Rs)} = \frac{\text{Fixed Cost}}{\text{CM Ratio}}$$

$$\text{Required Sales in units} = \frac{\text{Fixed Cost} + \text{Target Profit}}{\text{CMPU}}$$

$$\text{Required Sales in Rs} = \frac{\text{Fixed Cost} + \text{Target Profit}}{\text{CM Ratio}}$$

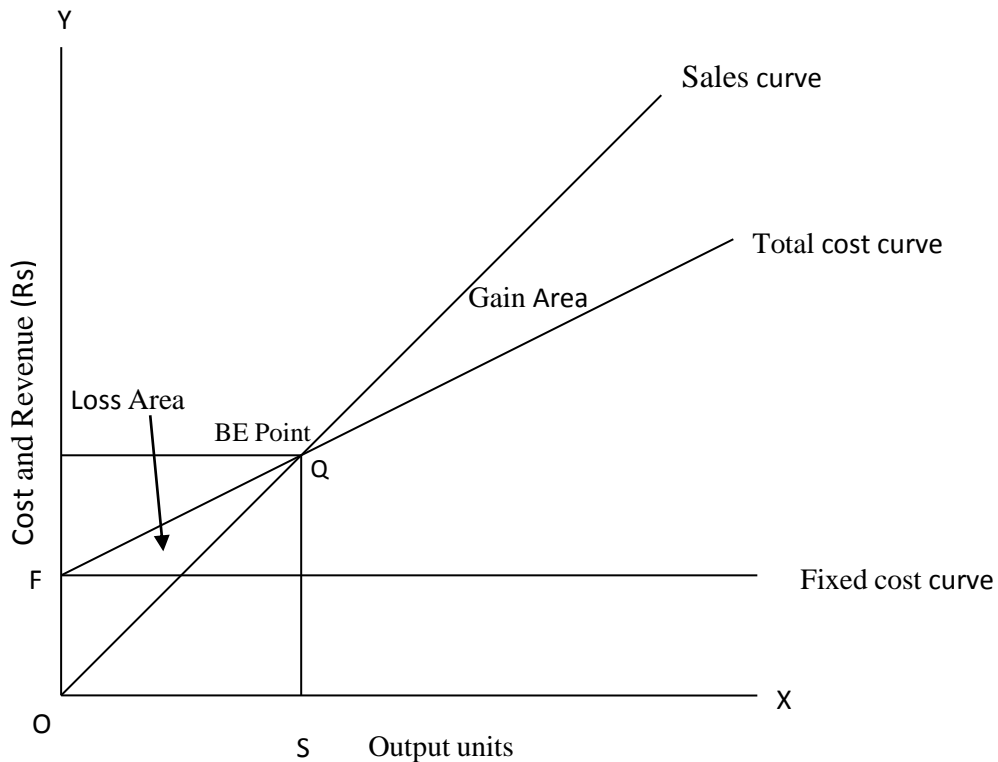
$$\text{Required sales after tax in Rs} = \frac{\text{Fixed cost} + \frac{\text{DPAT}}{1 - \text{Tax rate}}}{\text{Contribution margin ratio}}$$

The contribution margin and equation approaches are two equivalent techniques for finding the BEP. Both methods reach the same conclusion. So, personal preference dictates which approach should be used. It is especially used in which units' price and unit variable costs are clearly identifiable.

(c) Graphic Method:

Break-even point can also be determined by using graph. The relation shown among cost volume and profit with the help of diagram is described as break-even chart. There can be neither profit nor loss at the break-even sales. However, if the sales exceed the break-even point, there will be profit and if the sales are less than break-even sales, there will be loss. Below is a simple illustration of break-even chart;

Figure-2.1



OX represents output or sales units and OY represents Rs. i.e. total cost as well as revenue. OF denotes the amount of fixed cost. As the increase or decrease in sales does not have any effect on the amount of fixed cost, the fixed cost curve is parallel to x-axis.

Total cost increase if output or activity increases. It includes fixed cost as well as variable cost. Hence, it is started from the point of intersection of fixed cost curve and x-axis and sloping upward to right side.

The sales curve is organized from the origin "o". It is because the revenue will be zero, if sales are zero. As the unit increase, sales revenue also increases. Hence, sales curve is also sloping upward to right side.

An equilibrium point between revenue curve and total curve is known as break-even point. OS is the break-even sales volume and Q is the break-even point. If the actual sales volume is more than break-even sales, the business will earn profit and if it is less than break-even sales, the business will incur losses.

In the figure, OQF part is regarded as loss area. Loss is the result when the sales trend to be less than break-even point. When sales are made less than the equilibrium point, total cost curve is above to the sales curve, which is followed by loss. In case of sales being higher than break-even sales, sales curve is above to total cost curve. Hence, there is gain, in this condition.

2.4.2 Application of Break-Even Analysis:

Break-even concept can be used to formulate different policies in business enterprises. Some of these applications are:

- 1) Determination of it at different level of sales and margin of safety.
- 2) Effect of price reduction on sales volume and changes on sales volume.
- 3) To find the level, output to get desired profit.
- 4) Effect on fixed cost or variables cost changes on sales volume.
- 5) Selection of most profitable alternative, make or buy decisions and drop or add decision.

2.4.3 Assumption of Break-Even Analysis:

Contribution analysis and break-even analysis are based on a specific set of assumption that should be clearly understood. These underlying assumptions are as follows:

- 1) All cost can classify into two parts, fixed cost and variable cost. There is not cost other than fixed and variable.
- 2) There is the relevant range of validity for using the results of the analysis and sales price does not change as units of sales change.
- 3) There is only one product or in case of multiple products, the sales mix among the product remains constant.
- 4) Basis management policy about operation will not change materially in the short run.
- 5) The general price level will remains essentially stable in the short run.
- 6) Sales and production level are synchronized, that is inventory remains essentially constant or zero,
- 7) Efficiently and productivity per person will remains essentially unchanged in the short run.

2.4. 4 Limitation of Break-Even Analysis:

The break-even analysis is based on some unrealistic assumptions. Its main limitations are as follows;

- 1) According to the assumption of break-even point, total cost can be divided into fixed and variable cost only which is not practicable in real life. There are some costs, which are neither fixed nor variable. Those costs are described as semi-fixed or semi-variable costs.
- 2) The assumption that fixed cost always remains constant is not true. Sometimes, it can be increased especially in that situation when production or operation technique is changed.
- 3) The assumption that variable cost per unit always remains constant can't be entirely true.
- 4) Constant selling price is also not true. In case of increase in sales volume, some modification can be made in selling price by considering the nature of demands for the goods.
- 5) The assumption that either the firm produces only a single product or product mix ratio remains constant is also obviously quite unrealistic. An industry producing several types of goods has to bring about modification in the product mix ratio from the time to time.
- 6) The assumption that the production level and sales level should be equal is another drawback of break-even point. Such a condition is hardly found in practice.
- 7) The capital invested in business is also a significant element of profit planning and control. However, the place is not given to it in break-even point.

2.4.5 Cash Break-Even Point:

To know the volume of the sales that will equalize the cash outflows during a particular period, cash break-even point is used. It is a modification of the traditional accrual basis break-even analysis. The fixed costs are divided into two groups for finding out the cash break-even point. They are;

- i. Fixed cost are requiring cash e.g. salary, rent, wage, insurance, etc.

- ii. Fixed costs not requiring cash e.g. depreciation, differed expenditure such as advertising, research and developing expenses etc.

The following is used as for finding out cash break-even point;

$$\text{Cash Break-even Point} = \frac{\text{Cash Fixed Cost}}{\text{Contribution Margin per unit}}$$

2.5 Margin of Safety:

The soundness of business is indicated by margin of safety. The different between total sales and break-even sales is identified by margin of safety. The high margin of safety is good for business. It indicates that there can be substantial falling of sales and yet profit can still be made. On the other hand, if the margin of safety is small, it indicates that weak position of business the small margin of safety shows that even a small reduction in sales or production will adversely affected the profit position of business. If margin of safety is unsatisfactory, the following steps can be taken: -

- i. By increasing the sales and production volume.
- ii. By increasing the selling price.
- iii. By decreasing the fixed cost.
- iv. By reducing the variable cost.
- v. By changing the sales or product mix ratio.

Margin of safety is ascertained by using the following formula:

a) Margin of Safety = Actual sales – Break-even sales

b) Margin of Safety(in unit) = $\frac{\text{Profit}}{\text{Unit contribution margin}}$

c) Margin of Safety(in Rs) = $\frac{\text{Profit}}{\text{Profit volume ratio}}$

d) Margin of Safety(%) = $\frac{\text{Actual Sales}-\text{Break-even Sales}}{\text{Actual Sales}} \times 100$

$$e) \text{ Margin of Safety ratio} = \frac{\text{Margin of safety}}{\text{Actual sales}}$$

2.6 Formula of Cost Volume Profit Analysis:

1) Determination of contribution margin per units (CMPU);

Contribution margin per unit = Selling price per unit – Variable cost per unit

2) Calculation of Profit Volume Ratio (PV ratio);

$$\begin{aligned} \text{i.} \quad \text{PV ratio} &= 1 - \frac{\text{Variable cost}}{\text{Sales}} \\ \text{ii.} \quad \text{PV ratio} &= \frac{\text{Contribution margin}}{\text{Sales}} \\ \text{iii.} \quad \text{PV ratio} &= \frac{\text{Fixed cost} + \text{Pfofit}}{\text{Sales}} \end{aligned}$$

When sales and Profit or costs of two periods are given:

$$\text{PV ratio} = \frac{\text{Different in Profit}}{\text{Different in sales}}$$

3) Calculation of Break-even Point(BEP):

$$\begin{aligned} \text{i.} \quad \text{BEP units} &= \frac{\text{Fixed cost}}{\text{Units Selling price} - \text{Unit variable cost}} \\ \text{ii.} \quad \text{BEP units} &= \frac{\text{Fixed cost}}{\text{Unit contribution margin Price}} \\ \text{iii.} \quad \text{BEP Rs} &= \frac{\text{Fixed cost}}{\text{PV ratio}} \end{aligned}$$

4) Calculation of Variable cost-volume ratio(V/C ratio):

$$\begin{aligned} \text{i.} \quad \text{V/C ratio} &= 1 - \text{PV ratio} \\ \text{ii.} \quad \text{V/C ratio} &= \frac{\text{Unit variable cost}}{\text{Unit selling Price}} \end{aligned}$$

When cost and sales of two periods are given:

$$\text{V/C ratio} = \frac{\text{Different in cost}}{\text{Different in Price}}$$

5) Determination of margin of safety(MOS):

$$\text{i.} \quad \text{Margin of safety} = \text{Actual sales} - \text{Break-even sales}$$

$$\text{ii. } \text{MOS}(\text{unit}) = \frac{\text{Profit}}{\text{CMPU}}$$

$$\text{iii. } \text{MOS}(\text{Rs}) = \frac{\text{Profit}}{\text{PV ratio}}$$

$$\text{iv. } \text{MOS}(\%) = \frac{\text{Actual sales} - \text{Break-even Sales}}{\text{Actual sales}}$$

6) Fixation of sales volume to earn a desired profit:

$$\text{i. } \text{Required sales}(\text{units}) = \frac{\text{Fixed cost} + \text{Desires profit}}{\text{Contribution margin per unit}}$$

$$\text{ii. } \text{Required Sales}(\text{Rs}) = \frac{\text{Fixed cost} + \text{Desired profit}}{\text{PV Ratio}}$$

7) Fixation of sales volume to earn a desired profit after tax(DPAT):

$$\text{i. } \text{Required sales}(\text{unit}) = \frac{\text{Fixed cost} + \frac{\text{DPAT}}{1 - \text{tax rate}}}{\text{CMPU}} \text{S}$$

$$\text{ii. } \text{Required sales}(\text{Rs}) = \frac{\text{Fixed cost} + \frac{\text{DPAT}}{1 - \text{tax rate}}}{\text{PV Ratio}}$$

8) Determination of profit:

$$\text{i. } \text{Profit} = (\text{Sales amount} \times \text{PV ratio}) - \text{Fixed cost}$$

$$\text{ii. } \text{Profit} = (\text{sales unit} \times \text{CMPU}) - \text{Fixed cost}$$

$$\text{iii. } \text{Profit} = (\text{Actual sales} - \text{Break-even sales}) \times \text{PV ratio}$$

$$\text{iv. } \text{Profit} = (\text{Actual sales units} - \text{Break-even units}) \times \text{CMPU}$$

$$\text{v. } \text{Profit} = \text{Sales} - \text{variable cost} - \text{Fixed cost}$$

9) Calculation of required sales volume in relation to change in selling price:

$$\text{i. } \text{Required sales}(\text{units}) = \frac{\text{Fixed Cost} + \text{Profit}}{\text{New selling price per unit} - \text{Unit variable cost}}$$

$$\text{ii. } \text{Required sales}(\text{Rs}) = \frac{\text{Fixed Cost} + \text{Profit}}{\text{New PV ratio}}$$

10) Required sales for fixed percentage of profit on sales:

$$\text{Required sales} = \frac{\text{Fixed cost}}{\text{Unit selling price} - \text{Unit variable cist} - \text{Unit Profit}}$$

11) Ascertainment of Fixed cost:

$$\text{i. } \text{Fixed cost} = (\text{sales} \times \text{PV ratio}) - \text{Profit}$$

- ii. Fixed cost = Break-even point(Rs) × PV ratio
- iii. Fixed cost = Break-even point(units) × CMPU

12) Ascertainment of Variable Cost:

- i. Variable cost = Sales – Contribution margin
- ii. Variable cost = Sales – (sales × PV ratio)

13) Measuring the effect of change in Fixed cost(FC):

- i. Revised BEP(units) = $\frac{\text{Present FC} + \text{Proposed FC}}{\text{CMPU}}$
- ii. Revised BEP(Rs) = $\frac{\text{Present FC} + \text{Proposed FC}}{\text{PV Ratio}}$
- iii. Requires sales amount to earn present profit = $\frac{\text{Present FC} + \text{Proposed FC} + \text{Present profit}}{\text{PV Ratio}}$
- iv. Requires sales unit to earn present profit = $\frac{\text{Present FC} + \text{Proposed FC} + \text{Present profit}}{\text{CMPU}}$
- v. Requires sales to earn present profit percentage, on investment = $\frac{\text{Present FC} + \text{Proposed FC} + \text{Present profit} + \text{Profit on additional investment}}{\text{PV Ratio}}$

14) Measuring the effect of change in variable cost:

- i. Revised BEP units = $\frac{\text{Fixed Cost}}{\text{New CMPU}}$
- ii. Revised BEP Rs = $\frac{\text{Fixed Cost}}{\text{New PV ratio}}$
- iii. Required sales amount to earn Present Profit = $\frac{\text{FC} + \text{Present Profit}}{\text{New PV ratio}}$
- iv. Required sales units to earn Present Profit = $\frac{\text{FC} + \text{Present Profit}}{\text{New CMPU}}$

15) Calculation of cash break-even Point:

$$\text{Cash break-even point} = \frac{\text{Cash fixed cost}}{\text{New CMPU}}$$

16) Selling price per unit = $\frac{\text{Unit variable cost}}{1 - \text{PV ratio}}$

2.7 Cost Classification:

Classification of an item is to define it as a certain kind. In other words, classification means to put an item or thing under a certain category. Classification of cost depends on the purpose, methods, nature and so on. Same elements of cost can be varied in category depending upon the purpose. Manager of profit planning department should have an in- depth knowledge regarding the nature of costs that on which category does it lie. Otherwise, planning and control of cost is impossible.

2.7.1 Classification According to Element of Cost:

a) **Direct Cost:** All those expenses, which can be directly traced or identified with each unit of the product, are direct costs. Key elements of direct costs are as follows.

i) **Direct Material:** The cost of material, which is directly and conveniently identifiable or traceable to each unit of product, is defined as direct material. Direct material also known as raw material is the main ingredient of the finished product. A tangible product is almost impossible without the direct material.

ii) **Direct Labour:** The cost of labour that can be directly traced to each units of product without any appointment basis is known as direct labour. Direct labour is therefore, defined as the employment of those workers who are physically engaged in the production of the output.

iii) **Direct Expenses:** Any expenses other than the direct material cost and direct labour cost, which are directly incurred on a particular product.

b) Indirect Cost (Overhead Cost):

All those expenses, which cannot be directed traced or identified with each unit of product, are overhead costs. In fact, overhead costs are indirect costs, which cannot be directly charged to a particular unit of product without allocation based on some appropriate methods. All expenses other than prime costs are overhead costs or indirect costs.

i) **Indirect Materials:** Items of indirect materials cannot be identified with any one product; indirect materials are used for the benefits of all products rather than for any one particular product.

ii) Indirect Labour: The remuneration of all employees who do not work on the product itself but who assist on the manufacturing operation are classified as the part of indirect labour costs.

iii) Indirect Expenses: Any expenses other than mentioned above are classified as indirect expenses. One has to apportion indirect expenses over the products on appropriate basis.

2.7.2 Classification According to Function of Cost:

Any organization is consisted with various functions. All of these functions incur costs. For a manufacturing business enterprise, costs can be assigning to the following functions.

i) Manufacturing Cost: Manufacturing costs are all production costs incurred to manufacture the products and to bring them to saleable condition, including the direct material, direct labour and factory overheads. Manufacturing overhead is known as factory expenses, factory overhead or factory burden.

ii) Administrative Cost: Expenses relating to the overall management of the enterprise are administrative costs.

iii) Marketing or Selling Costs: Expenses needed for sales promotion, actual sales activities and post-sales services are included in marketing or selling cost. These would include all cost necessary to receive customer order and get the finished product or service into the hands of the customers.

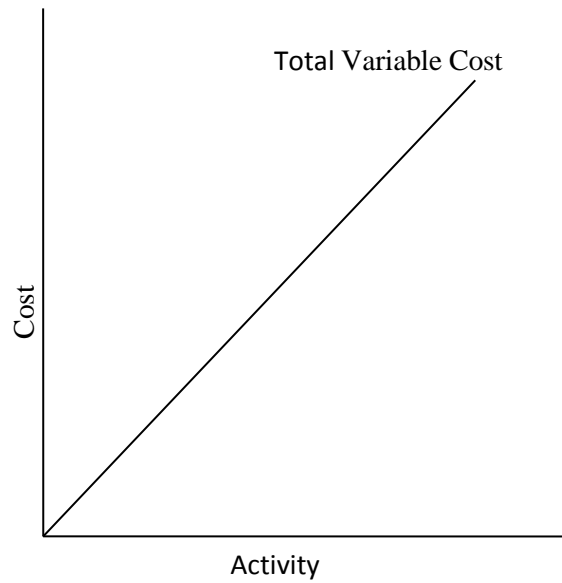
2.7.3 Classification According to Behaviour of Cost:

Management of any organization wants to know how costs will be affected by changes in the organizational activity. There exist relationship between cost and activity. Such relationship between cost and activity is known as cost behaviour, which affect the management functions of planning, controlling and decision-making. Cost behaviour pattern helps to predict the cost for different level of activities.

- 1. Variable Cost:** Variable cost varies in direct proportion to change in the activity level. If the activity level increases by 50 percent, the amount of variable costs also increases by 50 percent as well. Variable cost in total increase or decrease.

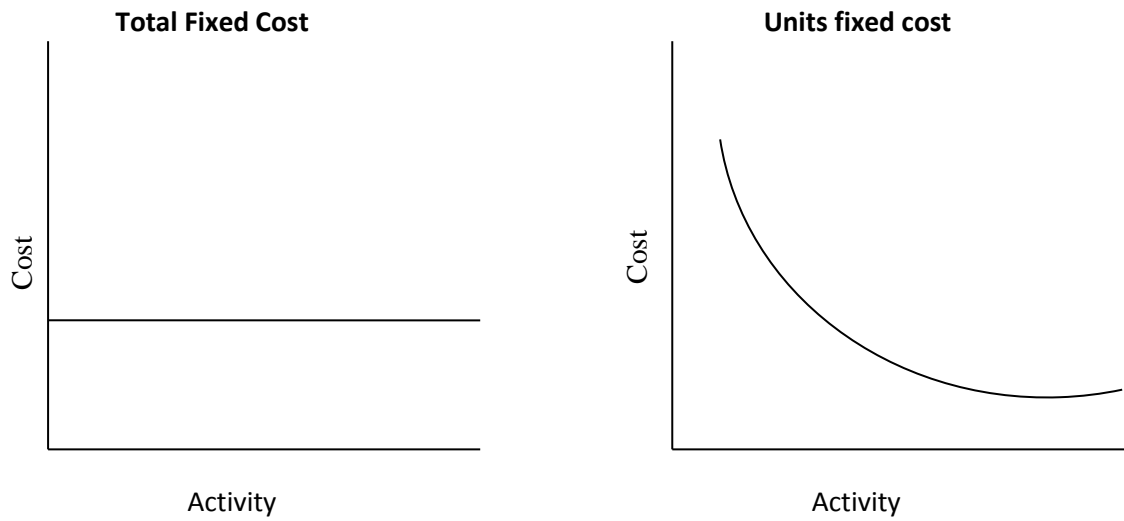
if the activity level increases or decrease but it remains constant if expressed on per unit. The idea that a variable cost per unit is constant but varies in total with the activity level crucial to understanding of cost behaviour patterns.

Figure-2.2



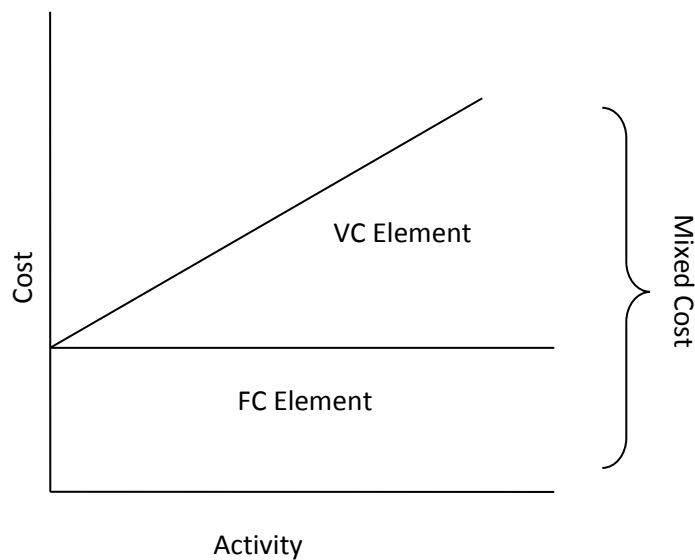
2. Fixed Cost: Fixed costs remain constant in total amount despite the changes in the level of activity. That the fixed cost remains unchanged in total as the activity level varies. But a fixed cost per unit does change as activity varies. Fixed cost per unit decreases as the level of activity increases and vice- versa. But for internal uses, fixed costs should not be expressed on unit basis because of the potential confusion involved.

Figure-2.3



3. **Semi-Variable Cost:** Expenditure that cannot be categorized as purely fixed or variable is termed as mixed cost or semi-variable cost. Mixed cost contains both variable and fixed cost elements. In mixed cost, variable cost element is added to the fixed element as such mixed cost line slopes upward in the graph.

Figure-2.4



In practice, mixed costs are varying common. The fixed portion of a mixed cost represents the basic, minimum cost of just having a service for use. The variable portion of mixed cost represents the cost incurred for actual consumption of goods or services. The variable element varies in proportion to the amount of services or goods that is consumed.

2.7.4 Classification According to Decision-Making:

Decision-making is one most crucial function of management. Decision-making is a process of selecting the best alternative among various courses of actions available. For decision-making costs can be classified as relevant and irrelevant, avoidable and unavoidable costs, out of pocket costs, opportunity cost, sunk cost & differential cost.

i) Relevant Cost: Relevant costs are those costs, which differ from one alternative to the next. Relevant costs pose two fundamental characteristics.

- ❖ Relevant costs are future costs
- ❖ Relevant costs will be different for each alternative

ii) Irrelevant Cost: All costs other than the relevant costs are irrelevant for decision-making.

- ❖ All past costs are irrelevant.
- ❖ Those costs, which are likely to be same, under-either alternative is irrelevant.

iii) Avoidable and Unavoidable Cost: sometimes the terms avoidable and unavoidable costs are used instead of relevant and irrelevant costs. Avoidable costs can be saved by dropping a department or product or an alternative. Therefore, only the avoidable costs are relevant for decision-making.

iv) Out of Pocket Cost: Out of pocket, costs mean the cash incurred on an activity. Since, out of pocket, cost involves a cash outlay; it is very important for external reporting and internal planning & decision making both.

v) Opportunity Cost: An opportunity cost can be defined as the potential benefit that is lost or sacrificed when the choice of one course of action requires the giving up of an alternative course of action. In decision-making, opportunity costs are as equally important as the out of pocket costs which is not cash outlays. Rather these are the benefits foregone in the next best alternative.

vi) Sunk Cost: A sunk cost is that cost which has already been incurred and there cannot be any decision made now or in the future. All sunk costs are irrelevant for decision making because these are past costs, which do not alter with the change in decision.

vii) Differential Cost: The economist's marginal cost concept is same thing as the accountant's differential cost concept. Marginal cost is the change in total cost owing to the change in output. More precisely, marginal cost is the increase in cost due to one more unit of output produced. Marginal cost concept has a greater significance in decision making like accepting or rejecting of short-term special orders, because the price of the product must cover at least marginal cost.

2.7.5 Classification According to Control:

i) Controllable Cost: A cost is considered to be controllable cost if that can be managed or changed with in the related responsibility centre (even lower level of management) and within the given period of time (short run).

ii) Non-Controllable Cost: Any cost which is not subject to change within the related responsibility centre (lower level of management) and within the short time span is called the non-controllable cost. All costs are controllable at some level in a company. Only at the lower level of management, some costs can be considered non-controllable. Controllability of costs fully depends on two horizon i.e. product cost and period cost.

- ❖ **Product Cost:** Those expenses, which matter for the volume of production and inventory valuation, are product costs. Product costs become assets when incur red in the course of production and expensed when outputs are sold.

- ❖ **Period Cost:** Those expenses, which do not matter for the volume of output, rather incur with the passage of time or volume of sales is period costs. All period costs are expensed at the time of occurrence.

2.8 Segregation of Semi-Variable Cost:

There are various types of method to break mixed cost into variable and fixed. But in practice high-low method and least-square method are mostly used.

2.8.1 High - Low Method:

In the high-low point method the semi variable cost is segregated into fixed and the variable components using exactly two data points. The two points consists of selecting the periods of highest and lowest activity levels comprising the changes in cost that result from the two levels.

2.8.2 Least-Square Regression Method:

The term least square means that the sum of the squares of the deviations from the plotted points to the regression line is smaller that would be obtained from any other line fitted to the data. So that in trend line analysis drawn from the relationship between the independent and dependent variables. The least square straight-line trend gives more reliable estimate than any other methods. In cost estimation in relation to activity levels, activity volumes are defined as independent variable(X) and the mixed costs relating to that activity as dependant variable(Y). Then the amount of dependent variable or cost(Y) for any level of independent variable or production(X) can be explained through following least square straight line.

Least square straight line Y on X $Y = a + bx$

Where,

a = Fixed cost per period

b = Variable cost per unit

n = Number of observations

X = Activity measures (units or hours)

Y = Total mixed cost observed

Since (b) stands for variable cost per unit and (a) stands for fixed cost per period, the value of (a) and (b) should be computed to segregate the mixed cost into variable and fixed components. Value of (a) and (b) can be directly estimated using simple mathematical formula.

2.9 Cost-Volume-Profit Analysis for Multiple Product or Sales Mix:

The term product mix and sales mix are used interchangeably. When a firm produce or sales more than one type of commodity, it is described as product or sales mix. In such a situation different selling price, variable cost result indifferent unit contribution margin and contribution margin ratio. As a result, break-even points vary with the relative proportion of the commodities produced or sold. However, the assumption has to be made that sales mix remains constant. It does not change for a specified period.

The different products may have their own different production facilities and fixed cost separately. In that case cost-volume –profit analysis can be done for each product separately. But if common facilities and common fixed cost are being used by different products, cost-volume-profit analysis is performed by averaging data using sales mix and weight. In that case, break-even point is calculated as follows:

For determination of break-even units:

Step 1	To find out sales mix ratio in units
Step 2	To find out unit contribution margin for each product
Step 3	To multiply the sales mix ratio and unit contribution margin of each product separately.
Step 4	To find out weighted average contribution margin by adding product of step 3.
Step 5	To find out overall break-even unit by using following formula: Overall break-even point = $\frac{\text{Fixed Cost}}{\text{Weighted Average Contribution Margin}}$

For determination of break-even in term of Rs:

Step 1	To find out sales mix ratio in sales amount
Step 2	To find out P/V ratio of each product
Step 3	To multiply the sales mix ratio and P/V ratio of each product separately.
Step 4	To find out overall P/V ratio by adding the product of step 3.
Step 5	To find out overall break-even point = $\frac{\text{Fixed Cost}}{\text{Overall PV Ratio}}$

Some important Formula:

$$1) \text{ Overall BEP(in unit)} = \frac{\text{Total Fixed cost}}{\text{Weighted CMPU}}$$

$$2) \text{ Overall BEP(in Rs)} = \frac{\text{Total Fixed cost}}{\text{Weighted PV Ratio}}$$

$$3) \text{ Product wise BEP(in unit)} = \text{Overall BEP in unit} \times \text{Respective Proportion}$$

$$4) \text{ Product wise BEP(in Rs)} = \text{Overall BEP in Rs} \times \text{Respective proportion}$$

$$5) \text{ Required sales for desired profit(in unit)} = \frac{\text{Total Fixed cost} + \text{Desired Profit}}{\text{Weighted CMPU}}$$

$$6) \text{ Required sales for desired profit(Rs)} = \frac{\text{Total Fixed cost} + \text{Desired Profit}}{\text{Weighted PV ratio}}$$

$$7) \text{ Required sales for desired profit after tax(in unit)} = \frac{\text{Fixed cost} + \frac{\text{Desired profit}}{1-\text{Tax rate}}}{\text{Weighted CMPU}}$$

$$8) \text{ Required sales for desired profit after tax(in Rs)} = \frac{\text{Fixed cost} + \frac{\text{Desired profit}}{1-\text{Tax rate}}}{\text{Weighted PV Ratio}}$$

2.10 Sensitivity Analysis of CVP:

Sensitivity analysis is the measurement of elasticity of change in cost, volume and profit factors or break-even point or given profit. The strategist should focus more on the factors which is more sensitive or responsive for profit. To measure the sensitivity of the cost-volume-profit has been increase by 10 percent. In other words sensitivity analysis is the

measurement of responsiveness in outcomes with the change in determinant variables. We know that, of business enterprises is to maximize profits. Profits are the excess of revenue over the total costs.

Net profit = Total sales revenue – Total cost

$$= \text{Sales units} \times \text{SPPU} - \text{sales units} \times \text{VCPU} - \text{FCS}$$

But none of the factors remain unchanged; some time the manager can internally change the price and cost factors a part of strategic decision. But the strategy should focus more the factors, which is more sensitive, or responsive for profit. Therefore, to measure the sensitivity of CVP factors one can see the impact certain percentage of change in volume, price, or cost factors on net profits.

- **Impact of price Changes:** An increase in the selling price will be the increase the PV ratio, and as a result will lower the break-even point. On the contrary a decrease in selling price will reduce the PV ratio and therefore, result in a higher break-even point.
- **Impact of Volume Change:** A change in volume, not accompanied with change in the selling and cost will not affect PV ratio. As a result, the break-even point remains unchanged; profit will increase in volume and will be reduced with the decrease in volume.
- **Impact of Change in Fixed Cost:** A change in fixed cost doesn't influence PV ratio. Other factors remaining unchanged, a fall in fixed costs will however, lower the BEP and raised profits. An increase in fixed costs caused either due to some external factors or due to some changes in the management policy, will raise BEP. Increase in factory rent or insurance and taxes are examples of external factors, while increase depreciation or salaries of managers may be the result of management decisions.
- **Impact of Change in Variable Cost:** The impact of change in variable cost on profit is straight forward if it does not cause any change in selling price and volume. An increase in variable costs will lower PV ratio, push up the BEP reduce profits. On the other hand, if the variable costs decline, PV ratio will increase. BEP will be lowered and profit would rise.
- **Impact of Change in a Combination of Factors:** The management account, evaluating profit plans or budgets, must realize that a change in one factors leads to a

change in another factors. Therefore, all such changes should be carefully visualized and their net impact on profit must be seen.

2.11 CVP and Its Impact on Productivity:

Cost-volume-profit analysis measures the relationship between cost, volume and profit. The real performance of the company is determined by profit. Profit is the final outcomes of the overall activities of the organization. The ultimate goal of the every profit motive organization is to increase profit through satisfying customer's need. The higher profit can be achieved through reducing cost or increasing sales revenue. The most accepted way of achieving efficiency or productivity is cost reduction. Productivity is function of input and output. Achieving high output i.e. cost is defined as productivity.

CVP analysis helps to measure the productivity of the organization. How much cost should be incurred to get different targeted profit? How much cost should be incurred to get zero profit? Are such types of questions, which can be satisfied through cost-volume-profit relationship? Certain costs are incurred to produce the product. There are different types of costs, i.e. fixed and variable. The nature of fixed and variable cost is totally different from such other. Fixed cost is constant cost, which does not change with changes directly or proportionately with change in activity level. Due to the constant in nature, the organization should invest lower in fixed cost to get higher profit at lower level of sales volume. As the sales increase profitability also increases because only the variable cost change or increase but fixed cost remains same.

In practice many organization produce more than one product. In such type of multi-product firm, the product firm, the product has different contribution toward profit. The product, which involves huge amount of cost but contribution toward profit is small, should be drop out. Whereas products which provide significance profit with small amount of cost comparing to other product should be continued. In this way the limited resources of the organization should be managed properly to increase the overall profitability of the organization, which is called productivity that can be possible only through CVP analysis.

2.12 Limitation of Cost-Volume-Profit Analysis:

Cost volume profit analysis constitutes a very useful tool for management planning. However, certain underlying assumption upon which it rests place definite limitations on conclusion which can be drawn from its result. The following are the major limitation in the cost-volume-profit analysis.

- 1) It is assumed that the production facilities anticipated for the purpose of cost-volume-profit analysis do not undergo any change. Such analysis given misleading result if expansion or reduction of capacity takes place.
- 2) In case where a variety of products with varying margin of profit are manufactured, it is difficult to forecast with reasonable accuracy the volume of sales mix which would optimize the profit.
- 3) The analysis will be correct only if input price and selling price remain fairly constant which in reality is difficult to find. Thus, if a cost reduction program is undertaken or selling price is changed, the relationship between cost and profit will not be accurately depicted.
- 4) In cost-volume-profit analysis, it is assumed that variable costs are perfectly and completely variable at all level of activity and fixed cost remains, constant throughout the range of volume being considered. However, such situation may not arise in practical situation. Overall many variable costs are curvilinear costs.
- 5) It is assume that the change in opening and closing inventories are not significant, through sometimes they may be significant.
- 6) Inventories are valued at variable cost and fixed cost is treated as period cost. Therefore, closing stock carried over to the next financial year does not contain any component of fixed cost. Inventory should be valued at full cost in reality.

2.13 Review of previous research works:

To get the idea and knowledge of some previous studies, related to the subject matter various thesis needs to be studied and under taken. Since research works related to application of CVP analysis so thesis related to particular subject are reviewed. It is very hard to get the previous dissertation in CVP analysis of Bottlers Nepal Company Ltd. However, some related thesis is reviewed to get related information which is discussed below;

Mr. Dhaka (2005) has conducted research work on “Cost volume profit analysis as a tools to measure the effectiveness of profit planning and control: A Case Study of Gorkhakhali Rubber industry Limited” in the partial fulfillment for MBS, submitted to Shanker Dev Campus, Tribhuvan University.

The main objectives of the study:

- To analyze the cost volume profit for the company.
- To measure the effectiveness of profit planning and control tools.
- To examine the variation between production plan and actual production.

The Major findings of the study:

- Sales plan of GRIL is not properly maintained. The industry uses the various methods for sales planning like market survey, distribution network etc. But up to date record are not maintained. So they have poor budgeting system.
- GRIL is in high interest bracket, out of the total fixed costs almost 60% is to be paid for interest.
- This industry does not have any detailed and systematic practice of planning of cost which is one of the essential elements of profit planning and control.

Miss Ghale (2006) has submitted research work on “cost volume profit analysis as a tool of profit planning and control”. She has selected Nebico Private limited for study.

The main objectives of the study:

- To manufactures quality biscuits and confectionaries in the country.
- To make available quality goods at reasonable price as well as be self sufficient in itself and try to export in other countries.
- To purchase, hire or receive necessary tools & equipment through suitable method in order to operate their services.

The Major findings of the Study:

- There is a great lack of skilled employees to prepare budgeting and analyze their financial position.
- Nebico has relatively high fixed cost (i.e. Interest, Depreciation, repair, salary and wages, provident fund, subsidies etc).
- Variable cost of Nebico is proportionally higher than fixed or total cost, hampering the overall company's profit.

Mr. Poudel (2007) has conducted research work on topic “A study on cost volume profit analysis tools used to project by salt trading corporation limited”. The aim of the study was to determine how CVP analysis is to use project profit in Salt trading corporation limited.

The main objectives of the study

- To analyze the cost and profit and loss of STCL.
- To study the relationship of cost, volume and profit.
- To analyze the impact of CVP of the company of productivity.

The major findings of the study:

- Total sales of the corporation were unstable.
- Expenses of STCL were fluctuated. Variable cost as well as fixed cost increased or decreased during the period.
- The corporation has no details of systematic expenses plan. The fixed, variable, and mixed expenses planning are essential for profit planning and control.

Mr, Adhikari (2008) has done a research on topic “A study on cost volume profit analysis as managerial tools to plan profit of Bottlers Nepal ltd.

The main objectives of the study:

- To study relationship to cost volume and profit as managerial tool to plan profit.
- To analyze the cost volume profit of the company and its impact in planning profit.

- To evaluate the sensitivity on profitability.
- To provide suggestion and recommendation of operation of BNL

The major findings the study:

- Segregation of fixed and variable cost is ignored by BNL. No any method has been adopted to segregate cost into fixed or variable.
- Sales and production target are not achieving because there is not an effective forecasting system.
- Enterprises has no financial plan, they have only sales and production plan in terms of required budget.

Mr. Kairatee(2009) Had conducted research entitled “Cost-Volume-Profit analysis of in decision making of Butwal Hydropower company ltd and Chilime hydropower company ltd.

The main Objectives of the study:

- To study an analysis the variable and fixed cost of BPC and CHPCL along with contribution margin and operating profit.
- To analysis the breakeven level and margin of safety of both companies and compare them.
- To evaluative the sensitivity of various factors on profitability of both companies.

Major Findings of the study:

- The generation of electricity from the both companies is found increasing every year. But steel they are unable to meet their installed capacity.
- The fixed cost of CHPCL is much higher than BPC.
- Operating leverage of both companies is determined to sensitivity of profit with sales.

CHAPTER-III

RESEARCH METHODOLOGY

3.1 Introduction:

This chapter is concerned with the method employed in the analysis of data. It contains research design, population and sample, nature and sources of data, and tools used for the analysis purpose.

3.2 Research Design:

This study attempts to analyze the relationship between cost, volume and profit. This study is basically based on secondary data. To conduct the study, analytical and descriptive research approach is adopted for the readily available historical data.

3.3 Population and Sample:

As per the objectives of the study, the population comprise of all the Nepalese business enterprises operating with the objectives of earning profit. Since, there was no any limitation for the selection of the enterprise; BNL was selected randomly for the convenience of the study.

3.4 Sources of data:

The data used for the study are secondary in nature. Besides, other accounting documents were also taken as the secondary sources of the study. We have also used accounting tools for the analysis of data.

3.5 Process of data collection:

The data for the study have been collected from various sources. Unofficial and unstructured conversation with the concerned authority was taken as the primary sources and financial

statements and other documents were taken as the secondary sources of data. Those accounting data are obtained from the corporate office BNL.

3.6 Research Variables:

This research work is focused to profit planning of BNL through CVP analysis. There are different variables to be analyze under CVP analysis for profit planning which are the research variable for the study. They include:

- Sales
- Variable cost
- Cost
- Volume in term of amount
- Price
- Profit, etc.

3.7 Analysis Tools:

This study is based on the data collected from varying sources. The first step was to process of the gathered data by using methods like tabulation and classification. After then it was further analyzed by using distinct tools as and where required. Some of the prominent tools are listed below:

3.7.1 Accounting Tools:

As per the demand of the research topic of the cost of the company is supported to be dividing into fixed and variable in the first step. Then the different tools of cost-volume-profit analysis are to be used. On the basis of available time constant, data constant and other resources constant different tools of CVP i.e. BEP analysis, required sales for target profit, margin of safety, Sensitivity analysis have been used as accounting tools in this research work.

CVP analysis was included the following techniques:

Contribution Margin (CM) = Sales – Variable cost

Profit Volume ratio (PV ratio) = $\frac{\text{Contribution margin}}{\text{Sales}}$

$$\text{Break-even point (BEP in unit)} = \frac{\text{Total fixed cost}}{\text{SPPU} - \text{VCPU}}$$

$$\text{Break-even point (BEP Rs)} = \frac{\text{Total fixed cost}}{\text{PV Ratio}}$$

$$\text{Margin of safety (in unit)} = \frac{\text{Profit}}{\text{CMPU}}$$

$$\text{Margin of safety (in Rs)} = \frac{\text{Profit}}{\text{PV Ratio}}$$

$$\text{Required sales for desired profit (in unit)} = \frac{\text{Fixed cost} + \text{Desired profit}}{\text{CMPU}}$$

$$\text{Required sales for desired profit (in Rs)} = \frac{\text{Fixed cost} + \text{Desired profit}}{\text{PV Ratio}}$$

$$\text{Required sales for desired profit after tax (in unit)} = \frac{\text{Fixed cost} + \frac{\text{DP}}{1-\text{Tax rate}}}{\text{CMPU}}$$

$$\text{Required sales for desired profit after tax (in Rs)} = \frac{\text{Fixed cost} + \frac{\text{DP}}{1-\text{Tax rate}}}{\text{PV Ratio}}$$

$$\text{Cash break-even point (in Rs)} = \frac{\text{fixed cost} - \text{Non cash outlay}}{1 - \frac{\text{Variable cost}}{\text{Sales} - \text{Non cash outlay}}}$$

3.7.2 Statistical Tools:

For the purpose of analysis and presentation of research work in beautiful manner different statistical tools and techniques have been used in this thesis. It is hope that the tools and techniques will be sufficient enough to present the analysis and findings of the research work in simple but beautiful manner. Data tabulation, graphic approach, regression methods have been used for the sake of tabulation of data and classification the mixed cost into fixed and variable costs. In this study the following statistical tools are used:

- **Bar Diagram :**

Bar diagram are one of the easiest and the most commonly used methods of presenting the numerical date. They present the data by means of bars, or

rectangles of equal width. The length of the bars represents the given figures and the width may be of any size.

- **Mean**

The sum of all the observations divided by the number of observations is called Mean. In such cases all the items are equally important. It is usually denoted by \bar{X} . It is defined by the following formula:

$$\text{Mean } (\bar{X}) = \frac{\sum X}{N}$$

Where,

$$\sum X = \text{Sum of Observations}$$

$$N = \text{Number of Observations}$$

- **Standard Deviation (S.D.)**

The standard deviation is defined as the positive root of the mean of the squared deviation from their mean of a set of values. It is also known as Root Mean Square Deviation. It is usually denoted by the Greek letter σ (Small Sigma)

The SD is calculated by the following formula:

$$SD = \sqrt{\frac{\sum X^2}{N}}$$

$$\text{Where, } X = X - \bar{X} \text{ and } (\bar{x}) = \frac{\sum x}{N}$$

- **Coefficient of Standard Deviation (CSD)**

The relative measure of dispersion based on SD is called coefficient of SD. Thus,

$$\text{Coefficient of SD} = \frac{\sigma}{\bar{X}}$$

Where, σ = Standard deviation

100 times coefficient of SD is called coefficient of variation. It is denoted by C.V. thus,

$$\text{Coefficient of SD} = \frac{\sigma}{\bar{X}} \times 100$$

- **Correlation Analysis**

The degree of relationship between two variables at a time is called correlation. In other words, two variables are correlated in such way that if one variable changes then other variables also changes subsequently.

$$\text{Coefficient of correlation}(r) = \frac{n \sum XY - \sum X \sum Y}{\sqrt{n \sum X^2 - (\sum X)^2} \sqrt{n \sum Y^2 - (\sum Y)^2}}$$

The correlation coefficient measures the degree of correlation between Yon X. It should be between + 1 and -1. If not there is no correlation between two variables.

- **Coefficient of Determination (r²)**

A meaningful analysis id available from the square of correlation coefficient (r²), which is called the coefficient of determination and calculated using the following formula:

$$\text{Co- efficient of determination (r)} = r \times r$$

3.7.3 Financial Tools:

The financial analysis is also calculated. The various types of ratios are presented below:

- Current Ratio
- Quick Ratio
- Debt Ratio
- Debt-equity Ratio
- Gross profit margin
- Net profit margin

CHAPTER-IV

DATA PRESENTATION AND ANALYSIS

4.1 Introduction:

Planning sets the paper objective and goal for an organization. Profit planning develops the specific actions plans to achieve the determined goal and objective. CVP analysis can be used to plan the profit and it also measure the effectiveness of profit planning and control. CVP analysis analyzes the relation among the Cost, Revenue and Profit. It helps the management in cost control and profit planning.

Use of CVP in profit planning is the basic objective of this study. It will examine the present practice of CVP analysis and identify the area where CVP analysis can be applied in BNL. For this purpose historical data taken from the internal and final audit reports of BNL were used in this study.

4.2 Revenue and Expenditure Summary:

Every business entity is with the motive of making profit. Profit is the different between Revenue and Expenditure. Every effective and efficient business entity would like to maximize revenue and minimize expenditure.

Table 4.1

Sales, Expenses and Profit (Amount in Rs.'000')

year	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010
Sales	621,827	634,190	746,582	1,002,720	1,588,150
% Change in Profit	-	1.99	17.72	34.31	58.38
Expenses	587,863	657,301	764,086	969,399	1,301,507
% Change in	-	11.81	16.25	26.84	34.26

Expenses					
Profit	33,964	(23,111)	(17,504)	33,321	286,643
% Change in Profit	-	(168.05)	(24.26)	290.36	760.25

(Source: Annual Report of BNL)

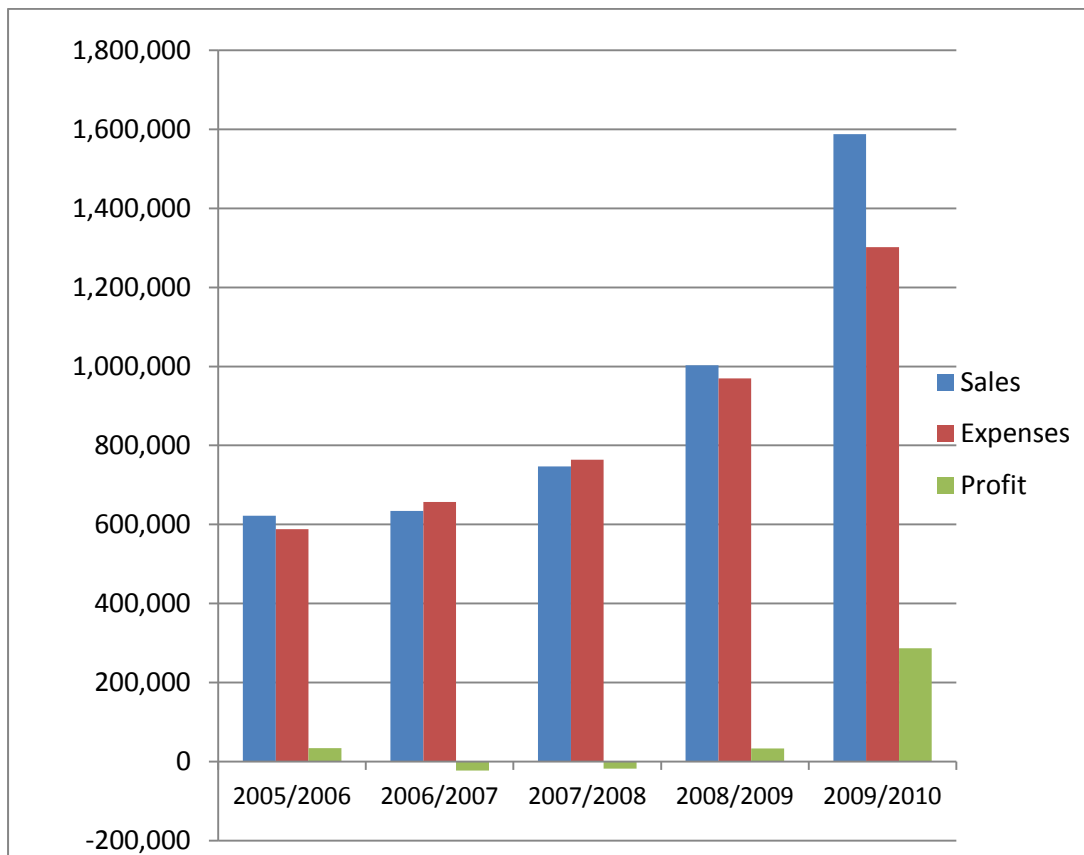
As per above table the highest sales was on fiscal year 2009/2010 i.e. 1,588,150,000. The sale in fiscal year 2005/2006 was Rs. 621,827,000. After then the sales trend has been increasing since 2009/2010. The expense in fiscal year 2005/2006 was Rs. 587,863,000. After then expenses also has been increasing. The Expenses in fiscal year 2009/2010 was Rs. 1,301,507,000. Profit was highest in fiscal year 2009/2010 i.e. Rs. 286,643,000. In fiscal year 2006/2007, there was more losses Rs. 23,111,000. After this year the profit position has been increasing. It shows that, the profit position has been increasing from last three years.

As per the norms regarding the relationship between the sales and expenses i.e. cost are directly related. That is the reason for increment in sales figures and also expenses. Therefore, in fiscal year 2006/2007 and 2007/2008, there are losses, because the increment of the sales is less than the increment of expenses. In this year, percentage of expenses is more than percentage of sales. So that, in these fiscal year the company bared losses. But after that year, percentage of sales is greater than percentage of expenses. In these years company made profit. The company made improvement in last two years resulting large profit in fiscal year 2009/2010.

Figure 4.1

Sales, Expenses and Profit

(In Rs '000')



(Source: Table 4.1)

Figure no 1 clearly depict the indication of above table. We can show that in fiscal year 2006/2007 and 2007/2008, the company bared losses. The company made his highest profit in fiscal year 2009/2010 which is clearly shown by the figure above.

4.3 Relationship between Sales, Fixed Cost, and Variable Cost:

As per the basic assumption of CVP analysis, the relation between the sales and variable cost are directly proportional which means the increment in the amount of sales revenue, increment of variable cost is more likely. It should be proportionate in fact if the perfect relationship is there between variable cost and sales revenue. However, sometimes it is very difficult to figure out which one of the expenses bears fixed quality or variable quality making the analysis challenging.

Table 4.2**Sales, Fixed Cost and Variable Cost****(Rs. '000)**

Year	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010
Sales	621,827	634,190	746,582	1,002,720	1,588,150
% Change in Sales	-	1.99	17.72	34.31	58.38
Variable Cost	351,080	389,258	455,134	621,894	887,112
% Change in Variable Cost	-	10.87	16.92	36.64	42.26
Fixed Cost	236,783	268,043	308,952	347,505	414,395
% Change in Fixed Cost	-	13.20	15.26	12.48	19.25
Variable Cost/ Sales in %	56.65	61.38	61	62	55.86
Fixed Cost/Sales in %	38.08	42.27	41.38	34.66	26.09

(Source: Annual Report of BNL)

The relationship between sales, fixed costs and variable costs has shown by above table. The table does have cleared the relationship between sales with variable cost and sales with fixed cost. The percentage of variable cost with sales in fiscal year 2205/2006, 2006/2007, 2007/2008, 2008/2009 and 2009/2010 are 56.65%, 61.38%, 61%, 62%, and 55.86% respectively. In fiscal year 2008/2009, percentage of variable cost with sales is maximum i.e. 62%. It is decreased in fiscal year 2009/2010 i.e. 55.86%, which is minimum percentage of variable cost with sales. The highest variable cost with sales indicates that, the company bears maximum variable cost. And the lowest variable cost with sales indicates that, the company bears minimum variable cost.

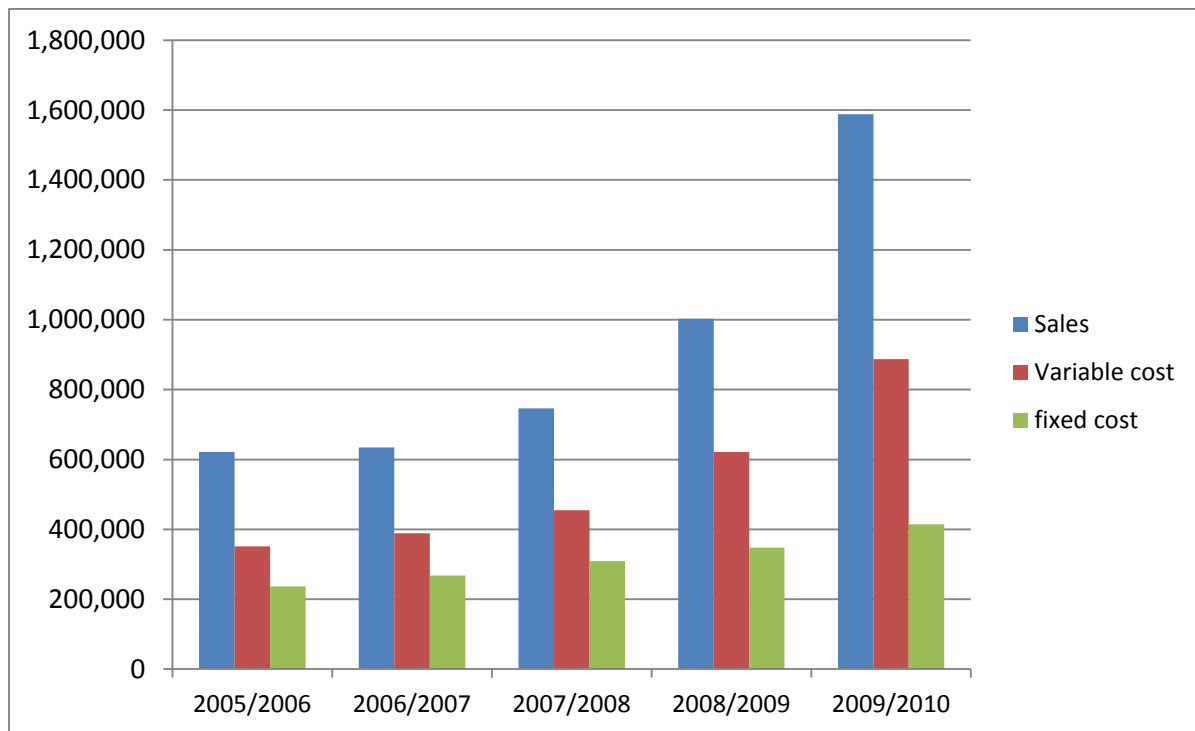
The percentage with fixed cost with sales in fiscal year 2005/2006, 2006/2007, 2007/2008, 2008/2009 and 2009/2010 are 38.08%, 42.27%, 41.38%, 34.66% and 26.09% respectively. The highest percentage of fixed cost with sales is in fiscal year 2006/2007, in this year the company bears more fixed expenses. And the percentage of fixed cost with sales in fiscal year 2009/2010 is 26.09%. It shows that, in this year the company bears less fixed cost than in other years. In this way, the company improves their profitability position for the year.

Alternative in selection of supplier and highly dynamic management committee are always available with the freedom of access to low cost labors and materials. With the change in the technological advancement the cost of man power will be minimal. These mentioned reasons are likely to be the major cases for variable cost not going according to the sales.

Increment of fixed costs is due to the expenses heavily incurred like interest on loan for financing fixed assets i.e. capital intensive sophisticated plants and machinery. In addition to it the loss suffered by the company at the time of disposal of old (out dated) plants and machineries are also the part of fixed cost.

Figure -4.2

Sales, Fixed cost and Variable cost (In Rs. '000')



(Source: Table 2)

Figure 2 is the graphical representation of the table portrayed above having no2 with the change in the level of sales the change in variable cost is varying but the changes in fixed cost is not so volatile in comparison to variable cost.

4.4 Contribution Margin Analysis:

In simple terms, the contribution margin is total revenue minus total variable cost. This difference can be expressed as a percentage of total revenue. A company's contribution margin can be expressed as the percentage of each sale that remains after the variable costs are subtracted. Given the contribution margin, a manager can make better decisions about whether to add or subtract a product line, about how to price a product or service, and about how to structure sales commission or bonuses. The contribution margin is computed using a special type of income statement that has been reformatted to group together a business's fixed costs and variable costs. The contribution margin of BNL is given below:

Table 4.3

Contribution Margin (In Rs. '000)

Year	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010
Sales	621,827	634,190	746,582	1,002,720	1,588,158
Variable cost	351,080	389,258	455,134	621,894	887,112
Contribution margin = Sales – VC	270,747	244,932	291,448	380,826	701,038
PV Ratio = Sales/VC (in %)	43.54	38.62	39.04	37.98	44.14
% Change in PV ratio	-	(11.30)	1.09	(2.72)	16.22

(Source: Annual Report of BNL)

The contribution margin from above table in fiscal year 2005/2006, 2006/2007, 2007/2008, 2008/2009, and 2009/2010 are Rs270,747, Rs244,932, Rs291,448, Rs380,826 and Rs701,038 respectively. The highest contribution margin is in fiscal year 2009/2010 i.e. Rs 701,038,000. It shows that company has made better performance. Similarly, the lowest contribution margin is in fiscal year 2006/2007 i.e. Rs244, 932,000. It shows that, company has made bad profitability position.

Profit volume ratio establishes a relationship between the contribution and sales volume. The factors profit and volume were interconnected and dependent with each other. Profits depend upon sales, it can express by:-

$$\text{Profit volume ratio} = \frac{\text{Contribution margin}}{\text{Sales}}$$

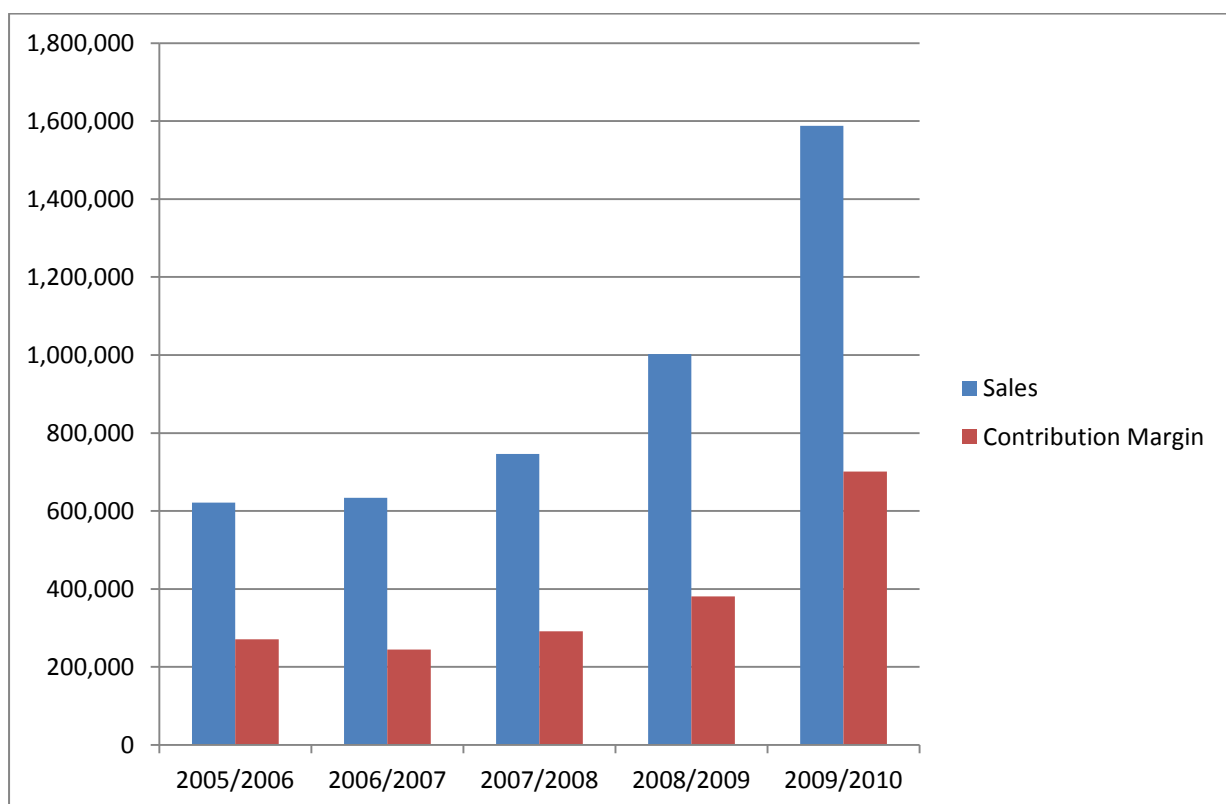
The above table 4.3 showed the contribution margin ratio of BNL for the five years period. The profit volume ratio was 43.54%, 38.62%, 39.04%, 37.98% and 44.14% for the fiscal year 2005/2006, 2006/2007, 2007/2008, 2008/2009 and 2009/2010 respectively. The highest profit volume ratio is in fiscal year 2009/2010 and the lowest profit volume ratio in fiscal year 2008/2009. An increased in the contribution margin means increases in profit only because fixed costs were assumed to be constant at all levels of production. This ratio would remain constant at different levels of production since variable costs as of proportion to sales remains constant at various levels. Management should try to increase the value of the ratio by reducing the variable costs or by increasing the selling price.

The multiple bar-diagrams for the Sales and Contribution margin presented below:

Figure 4.3

Sales and Contribution Margin

(In Rs '000')



(Source: Table 4.3)

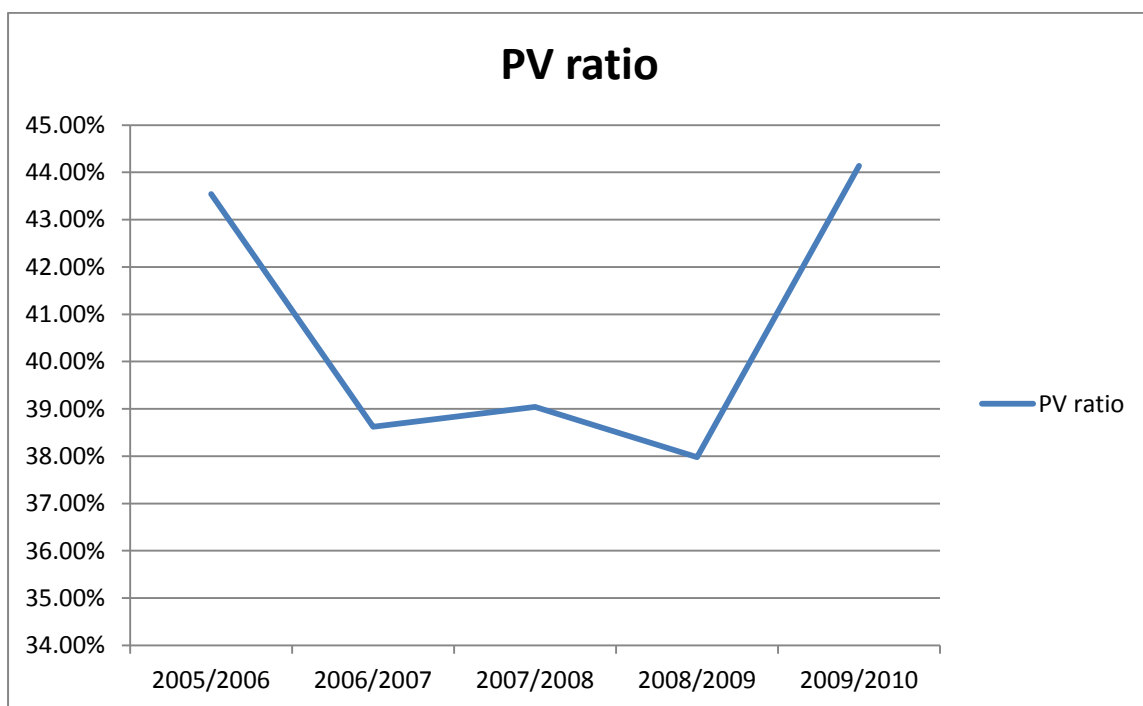
We have known the relationship between Sales and Contribution margin from above figure which is derived by table 4.3. The figure shows clearly the relation between sales and contribution margin. In fiscal year 2009/2010, sales and contribution margin both are high. It indicates that, this year the company has made more profit than other years. The contribution margin gives the actual profitability position of the company. The high contribution margin indicates better performance and low contribution margin indicates bad performance of the companies.

It also can be cleared from profit volume ratio's figure which is presented following figure:

Figure 4.4

Profit Volume Ratio

(In Rs '000')



(Source: Table 4.3)

In fiscal year 2005/2006, the PV ratio is high i.e. 43.54% but after that year the PV ratio is decreasing. In fiscal year 2008/2009 the PV ratio is maximum low but fiscal year 2009/2010, it is maximum high. The PV ratio indicates that, how the company has made their profitability position. High PV ratio gives more profit and low PV ratio gives less profit to the companies. Therefore, it plays important role for companies.

4.5 Sales and Profit Relation of BNL:

The basic objective of running any business organization is to earn profit. Profit is taken to measure the companies and efficiency of the management. In other words, profit is the primary measurement of business success in any company. Profit is a residual income left after the payment to other factors of production. The difference between the outflow of expenses and inflow of income is called profit. It is a reward for business activities. Profit determines the strength of financial position of the company.

The uniformity of variability of net profit of BNL was analyzed and relation between actual sales and net profit was also studied under this topic. The actual sales and net profit of the company during the five years period is presented in the table below:

Table 4.4

Actual Sales and Actual Profit

(In Rs '000')

Year	Sales (X)	Increased/Decreased in %	Profit (Y)	Increased/Decreased in %
2005/2006	621,827	-	24,962	-
2006/2007	634,190	1.99	(30,303)	(221.42)
2007/2008	746,582	17.72	33,415	210.25
2008/2009	1,002,720	34.31	30,460	(8.84)
2009/2010	1,588,150	58.38	228,439	649.96

(Source: Annual Report of BNL)

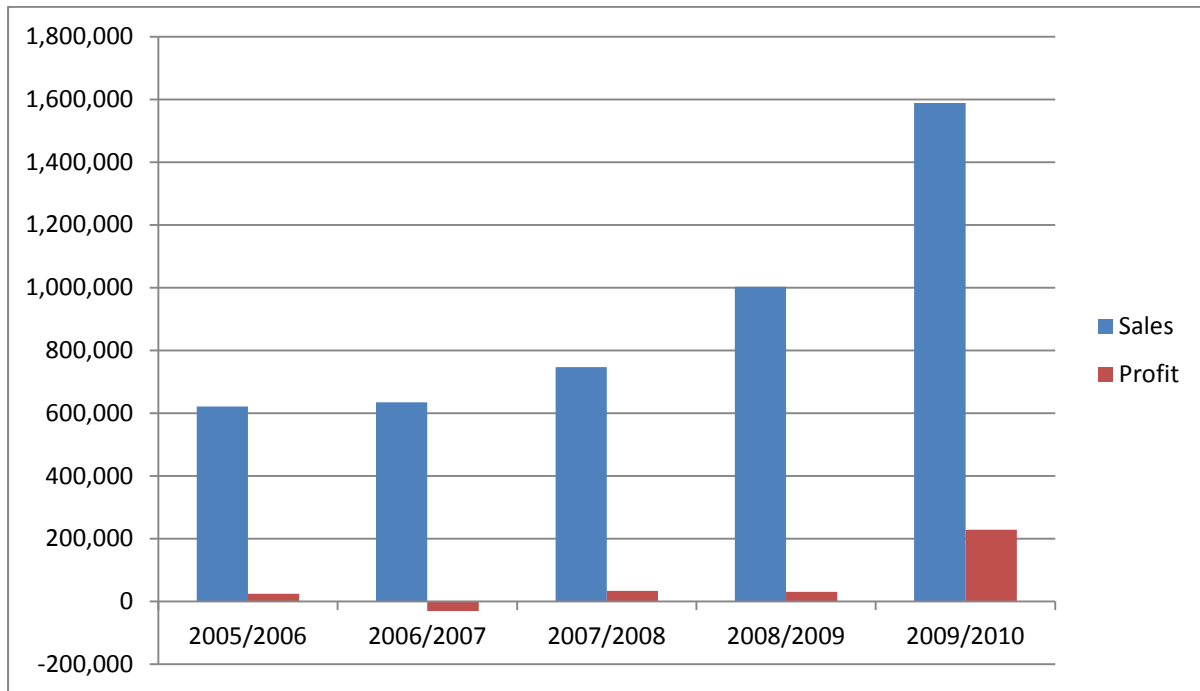
The above table shows that the actual sales are in an increasing trend. But the profit of the company is in a fluctuating trend. The highest increasing rate in the actual sales is 58.38% in fiscal year 2009/2010 and it was 649.96% change in profit in the same year. Therefore, there is a large profit earned by the company in fiscal year 2009/2010.

It is also presented following figure:

Figure 4.5

Actual Sales and Actual Profit

(In Rs '000')



(Source: Table 4.4)

The figure cleared that the relationship between sales and actual net profit of the BNL. The company bears loss in fiscal year 2006/2007. After that year the company earns profit but it is very less. In fiscal year 2009/2010, the profit is maximum than other year. It shows that, in this year the company sales more product and they minimize their expenses than sales.

In order to examine the nature of variability of actual sales and profit of different years, the arithmetic means, standard deviation, and coefficient of variation calculated in appendix 1, have presented in table 5:

Table 4.5

Summary of Statistical Calculation of Sales and Profit:

Particulars	Sales (X)	Profit (Y)
Mean	$\bar{X} = \text{Rs } 918,694,000$	$\bar{Y} = \text{Rs } 57,394,000$

Standard Deviation (S.D.)	$\sigma_x = \text{Rs } 361,643,000$	$\sigma_y = \text{Rs } 88,657,000$
Coefficient of Variation (C.V.)	$CV_x = 39.36\%$	$CV_y = 154.47\%$
Correlation Coefficient (r)	0.9416	
Probable Error (P.E.)	0.0342	
Coefficient of Determination (r^2)	0.8866	

(Source: Appendix:-1)

From the result, sales achievements are less fluctuated than profit being the lower CV of Actual sales lesser than that profit. Other statistical measurements correlation coefficient is presented in table 4.5 which show the relationship between sales and profit. The value of correlation coefficient is 0.9416 which explains that there are perfectly positive correlation between sales and profit. The value of the probable error is 0.0342 that explains the value of correlation coefficient is significant, since correlation coefficient is greater than six times of probable error.

4.6 Break-Even Point Analysis:

The term “break-even” implies that point at which the company neither makes a profit nor suffers a loss. A break-even analysis indicates at what level cost and revenue is equilibrium. The break-even point of BNL is presented below:

Table 4.6

Break-Even Point

(In Rs ‘000’)

Year	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010
Sales	621,827	634,190	746,582	1,002,720	1,588,150
Variable cost	351,080	389,258	455,134	621,894	887,112
Fixed cost	236,783	268,043	308,952	347,505	414,395
Contribution margin = Sales-Variable cost	270,747	244,932	291,448	380,826	701,038
PV Ratio = Sales/CM	0.4354	0.3862	0.3904	0.3798	0.4414

BEP = Fixed cost/PV Ratio	543,829	694,052	791,373	914,968	938,820
% Change in BEP	-	27.62	14.022	15.62	2.61

(Source: Annual Report of BNL)

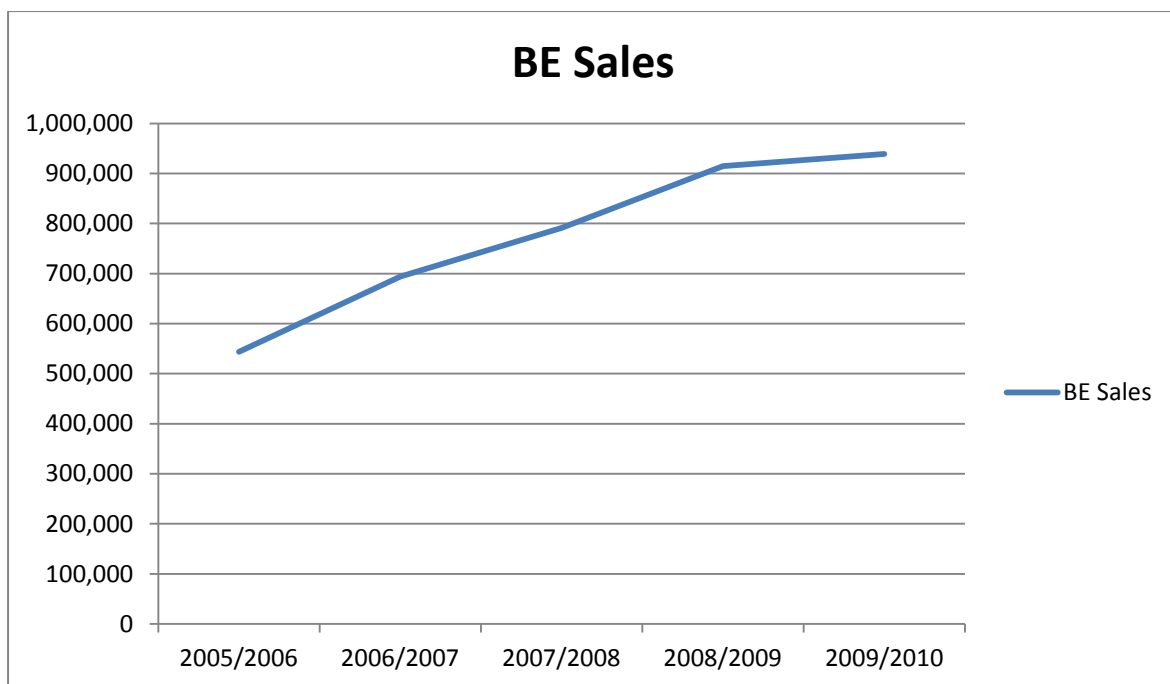
From the above table we can be cleared that, the company minimize their fixed cost because the percentage of break-even BEP is in decreasing trend. The break-even point is Rs 543,829, Rs694, 052, Rs791,373, Rs914,968 and Rs938,820 for the fiscal year 2005/2006, 2006/2007, 2007/2008, 2008/2009, and 2009/2010 respectively. The company has minimized their fixed cost in further year. It shows that company is making better performance onward.

The figure of break-even point can be presented below:

Figure 4.6

Break-Even Point

(In Rs ‘000’)



(Source: Table 4.6)

In the above figure, table 4.6. We can see that the line is going upward in every year but the slope of line is going upward slowly in coming year. It shows that the company has decreased fixed cost in onward year.

4.7 Proportion of BEP Sales on Actual Sales:

The actual sales and break-even sales measure the performance of the companies. If actual sales is greater than BEP sales, the company makes better performance but actual sales is less than BEP sales, the company makes bad performance. The proportion of BNL of BEP sales on actual sales is presented below:

Table 4.7

Actual sales and Break-Even sales (In Rs '000')

Fiscal year	Actual Sales (X)	BEP Sales (Y)	BEP sales on actual sales (%)
2005/2006	621,827	543,829	87.46
2006/2007	634,190	694,052	109.44
2007/2008	746,582	791,373	106
2008/2009	1,002,720	914,968	91.25
2009/2010	1,588,150	938,820	59.11
Total	4,593,496	3,883,042	

(Source: Annual Report of BNL)

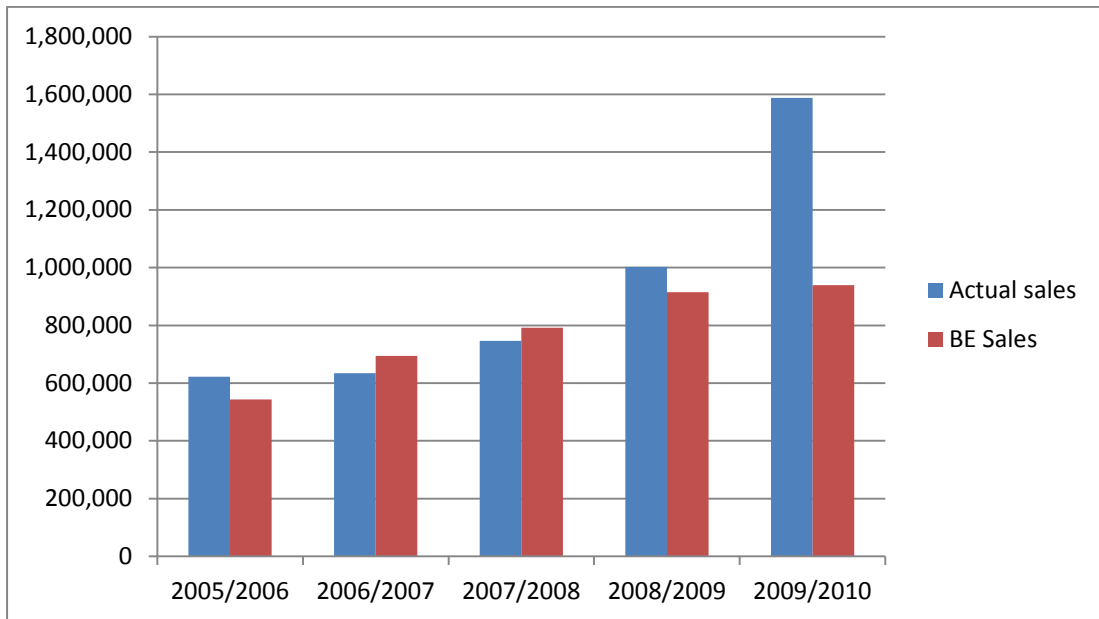
The above table presents the proportion of BEP sales on actual sales. There is fluctuation between Actual sales and BEP sales. In fiscal year 2006/2007 and 2007/2008, BEP sales is more than actual sales. In this period the company bears losses. Otherwise the company's BEP sales are less than actual sales. In fiscal year 2009/2010, actual sales are much more than BEP sales i.e. 59.11% BEP sales of actual sales. In this period the company has minimized the fixed cost and got more profit.

The graphical representation of same is given below in the multiple bar diagram which is explanatory to its viewers.

Figure 4.7

Actual Sales and BEP Sales

(In Rs ‘000’)



(Source: Table 4.7)

We can be cleared from above figure about the proportion between actual sales and BEP sales of the company. It presents that; if actual sales are less than BEP sales the company bears loss. We can see the figure in fiscal year 2006/2007 and 2007/2008, the actual sales are less than BEP sales. It indicates that the company can't make their profitability position in those years. But in other year the actual sales are greater than BEP sales. So, the company can make their profitability position onward year.

In order to find out the nature of variability, we can calculate different type of statistical tools like arithmetic mean, standard deviation, coefficient of determination and probable error. The details calculations of those figure is shown in appendix II.

Table 4.8

Summary of Statistical Calculation of Actual Sales and BEP Sales

Particulars	Actual Sales (X)	BE Sales (Y)
Mean	$\bar{X} = \text{Rs } 918,694,000$	$\bar{Y} = \text{Rs } 776,608,000$
Standard Deviation (S.D.)	σ_x	$\sigma_y = \text{Rs } 146,014,000$

	Rs354,227,000	
Coefficient of Variation (C.V.)	CV _x = 68.56%	CV _y = 18.80%
Correlation Coefficient (r)	0.8004	
Coefficient of determination (r ²)	0.7057	
Probable Error (P.E.)	0.0888	

(Source: Appendix II)

This table indicates that arithmetic means of actual sales is higher than the BEP sales and standard deviation of actual sales is also higher than BEP sales. Similarly, the coefficient of variation is also higher than BEP sales, which shows that actual sales are more than the BEP sales. On this way actual sales is in the nature of higher variability than the BEP sales.

To find out the correlation between actual sales and BEP sales, there is most commonly used tool named Karl Pearson's coefficient of correlation. It is the tool for measuring the relationship between the two or more variables. The value of coefficient of correlation (r) lies between +1 and -1.

The value of coefficient of correlation is 0.8004. It refers that there is perfectly positive correlation between the actual sales and BEP sales. The value of coefficient of determination is 0.7057 which states that only 70.57% of the variation in the BEP sales has been explained by actual sales.

The significance of correlation (r) can be tested by probable error (P.E.). The probable error (PE) is 0.0888 which is less than correlation coefficient (r) i.e. 0.8004 which explains that the value of correlation coefficient is significantly greater than six times of probable error.

4.8 Margin of Safety Analysis:

The different between the total sales and break-even sales is identified by margin of safety. The high margin of safety is good for business. It indicates that there can be substantial falling of sales and yet profit can still be made on the other hand, if the margin of safety is small, it indicates that weak position of business. The small margin of safety shows that even a small reduction in sales or production will adversely affected the profit position of business. The calculation of margin of safety of BNL is presented below:

Table 4.9**Margin of safety**

(In Rs '000')

Year	2005/2006	2006/2007	2007//2008	2008/2009	2009/2010
Sales	621,827	634,190	746,582	1,002,720	1,588,150
Variable Cost	351,080	389,258	455,134	621,894	887,112
Fixed cost	236,783	268,043	308,952	347,505	414,395
CM = Sales – VC	270,747	244,932	291,448	380,826	701,038
PV Ratio = Sales/CM	0.4354	0.3862	0.3904	0.3798	0.4414
BEP = FC/PV Ratio	543,829	694,052	791,373	914,968	938,820
Margin of Safety = Actual Sales–BE Sales	77,998	(59,862)	(44,791)	87,752	649,330
% of MOS on Sales	12.54	(9.44)	(6)	8.75	40.89

(Source: Annual Report of BNL)

We can see that margin of safety from the above table. In fiscal year 2005/2006, 2006/2007, 2007/2008, 2008/2009, and 2009/2010 its value are 12.54%, (9.44%), (6%), 8.75%, and 40.89% respectively. In fiscal year 2006/2007 and 2007/2008, margin of safety is negative. It shows that in that period company's profitability position is highly negative. After that year, the margin of safety of the company is positive. It indicates that, the company has able to make their profitability position. In fiscal year 2009/2010, the margin of safety % is maximum, it means in that period company has earned more profit than other year.

We can be cleared about MOS from the graph which has presented below:

Figure 4.8

Margin of Safety

(In Rs '000')



(Source: Table 4.9)

Margin of safety is presented in the figure above. In fiscal year 2005/2006, the margin of safety is positive but very less. It indicates that the MOS is decreasing in further year. It has proved that in the year 2006/2007, the MOS is highly negative but in year 2007/2008, the margin of safety is negative but increasing trend. The margin of safety is positive for the year 2008/2009. In fiscal year 2009/2010, it is highly positive. In this period the company made more profit than other year. We can predict that the company will Increase their MOS in further year because the margin of safety is increasing trend.

4.9 Financial Analysis of BNL:

Ratio analysis is a powerful tool of financial analysis. A ratio is defined as “the indicated quotient of two mathematical expressions” and as “the relationship between two or more things”. In financial analysis, a ratio is used as a benchmark for evaluating the financial position and performance of a firm. The absolute accounting figures reported in the financial statement do not provide a meaningful understanding of the performance and financial position of a firm. An accounting figure conveys meaning when it is related to some other relevant information for example a Rs 5 crore net profit may look impressive, but the firms performance can be said to be good or bad only when the net profit figure is related to the

firm's investment. The relationship between two accounting figure, expressed mathematically, is known as a financial ratio. Ratios help to summaries large quantities of financial data and to make quantitative judgment about the firm's financial performance. The various type of ratio analysis of BNL are presented below:

4.9.1 Liquidity Ratio:

Liquidity ratios measure the ability if the firm to meet its current obligation. A firm should ensure that it does not suffer from lack of liquidity, and also that it does not have excess liquidity. The failure of a company to meet its obligations due to lack of sufficient liquidity, will result in a poor creditworthiness, loss of creditors' confidence, or even in legal tangles resulting in the closure of the company. A very high degree of liquidity is also bad; idle assets earn nothing. The firm's fund will be unnecessarily tied up in current assets. Therefore, it is necessary to strike a proper balance between high liquidity and lack of liquidity. The current ratio and Quick ratio are presented in liquidity ratio as below:

4.9.1.1 Current Ratio of BNL:

The current ratio is calculated by dividing current assets by current liabilities.

$$\text{Current Ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

Current assets include cash and those assets which can be converted into cash within a year, such as marketable securities, debtors and inventories, prepaid expenses are also included in current assets as they represents the payment that will not be made by the firm in the future. All obligations maturing within a year are included in current liabilities. Current liabilities include creditors, bills payable, accrued expenses, short-term bank loan, income-tax liability and long-term maturing in the current year. Current ratio of BNL is presented below:

Table 4.10

Current Ratio (In Rs '000')

Year	Current Assets	Current Liabilities	Current Ratio
2005/2006	436,045	275,483	1.58:1
2006/2007	511,066	807,243	0.63:1
2007/2008	434,557	507,996	0.86:1

2008/2009	505,093	594,873	0.85:1
2009/2010	681,439	764,365	0.89:1

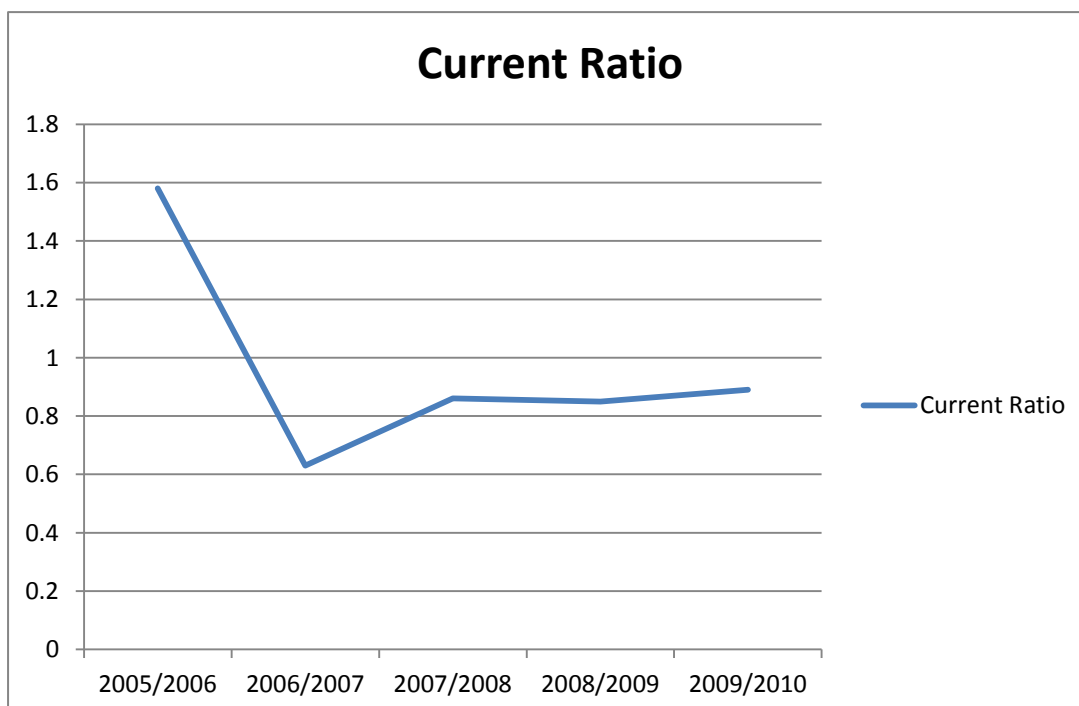
(Source: Audit Report of BNL)

The table presents the current ratio of BNL. In fiscal year 2005/2006, current ratio is 1.58:1, indicates that current assets is more than 1.58 times than current liabilities. But in other year current assets are less than current liabilities. In these years it is less than 1 times. It indicates that there is unable to payment current liabilities of the company. According to the principle of current ratio, current assets are more than two times of current liabilities. But the BNL's current assets are less than current liabilities in all year.

As a rule, a current ratio of 2 to 1 or more is considered satisfactory. This rule is based on the logic that in a worse situation, even if the value of current assets becomes half, the firm will be able to meet its obligation. The current ratio, the greater the margin of safety; the longer the amount of current assets is relation to current liabilities, the more the firm's ability to meet its current obligations however, an arbitrary standard of 2 to 1 should not be blindly followed. Firms with less than 2 to 1 current ratio may be doing well while firms with 2 to 1 or even higher current ratio may be struggling to meet their obligations.

It is presented as figure as below:

Figure 4.9



(Source: table 4.10)

The above figure presents the current ratio which. In the year 2005/2006 current ratio is high but less than 2 times. But in fiscal year 2007/2008 it is very low i.e. 0.63:1. After that year it is increasing trends. It shows that the hold of current assets of the company is increasing trend. But it is less than current liabilities in all fiscal year.

4.9.1.2 Quick Ratio of BNL:

Quick ratio establishes a relationship between quick or liquid assets and current liabilities. An asset is liquid if it can be converted into cash immediately or reasonably soon without a loss of value. Cash is the most liquid assets. Other assets which are considered to be relatively liquid and included in quick assets are debtors and bills receivable and marketable securities. Investors are consider to be less liquid inventories normally require some time for realizing in to cash; their value also has a tendency to fluctuate the quick ratio is found out by dividing quick assets by current liabilities.

$$\text{Quick ratio} = \frac{\text{Current Assets}-\text{Inventories}-\text{prepaid expenses}}{\text{Current Liabilities}}$$

The quick ratio of BNL is presented below:

Table 4.11

Quick Ratio (In Rs ‘000’)

Year	Quick Assets	Current Liabilities	Quick Ratio
2005/2006	256,172	275,483	0.93:1
2006/2007	315,390	807,243	0.39:1
2007/2008	274,730	507,996	0.54:1
2008/2009	289,498	594,873	0.49:1
2009/2010	370,123	764,365	0.48:1

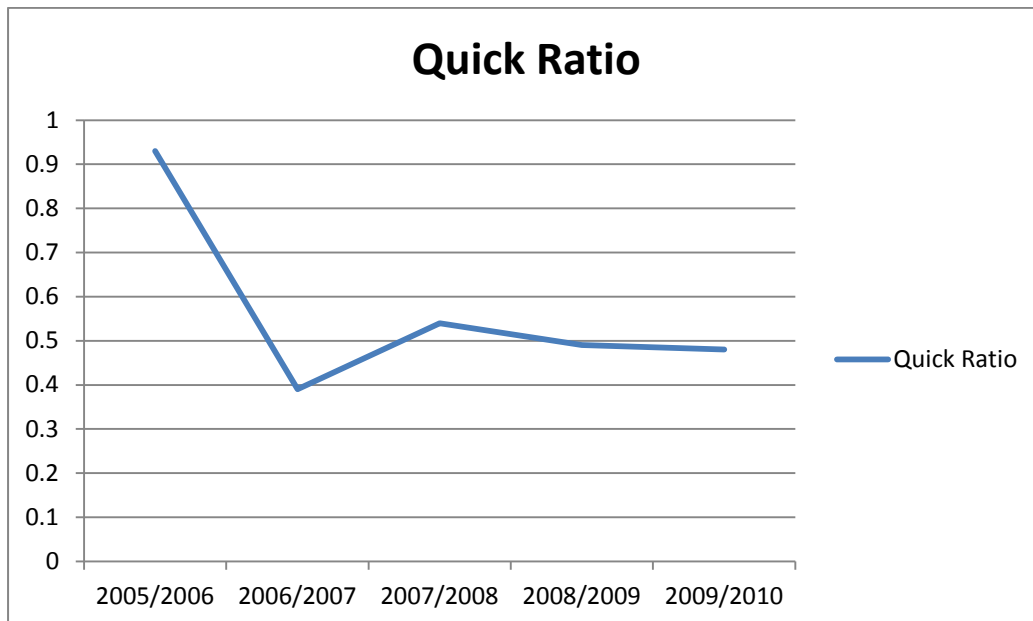
(Source: Annual Repot of BNL)

The table presents the quick ratio of BNL. It is less than 1 times in all year. Thus, if the BNL’s inventories do not sell, and it has to pay all its current liabilities, it may find difficult to meet its obligations because its quick assets are 0.93 times, 0.39 times, 0.54 times, 0.49 times and 0.48 times for the fiscal year 2005/2006, 2006/2007, 2007/2008, 2008/2009, and

2009/2010 respectively. It is unfavorable for the company because quick assets are less than current liabilities. It must be 1:1.

It is also cleared from following figure

Figure 4.10



(Source: Table 4.11)

Above figure showed the quick ratio parenthesis in times. In all years the quick ratio is less than one times. In fiscal year 2006/2007, quick ratio is very low. In fiscal year 2007/2008, it has increased but after that year it is decreasing trend. It indicates that, the company is unable to pay current liabilities in the time.

4.9.2 Leverage Ratio:

The short-term creditors, like bankers and suppliers of raw materials are more concerned with firm's current debt paying ability. On the other hand, long-term creditors, like debenture holders, financial institutions etc. are more concerned with the firm's long-term financial strength. In fact, a firm should have a strong short-term as well as long-term financial position. Of the firm, financial leverage, or capital structure, ratio are calculated. These ratios indicate mix of funds provided by owners and lenders. As a general rule, there should be an appropriate mix of debt and owners' equity in financing the firm's assets.

Leverage ratios are also called long-term solvency ratios or capital structure ratios. The term ‘solvency’ implies the ability of a company to meet the payments associated with its long-term debts. Thus, solvency ratios are the measure of the company’s ability to meet its obligations. Generally, these ratios are expressed in proportions. However, if the ratio is in fraction or less than one, it is expressed in percentage.

The following are the major types of leverage ratio:

4.9.2.1 Debt Ratio of BNL:

Several debt ratios may be used to analyse the long-term solvency of a firm. The firm may be interested in knowing the proportion of the interest-bearing debt in the capital structure. It may, therefore, compute debt ratio by dividing the total debt by capital employed or net assets. Total debt will include short and long-term borrowings from financial institution, debenture/ bonds, deferred payment arrangements for buying capital equipments, bank borrowings, public deposit and any other interest-bearing loan. Capital employed will include total debt and net worth, the ratio is ascertained by using the following formula:

$$\text{Debt Ratio} = \frac{\text{Total Debt}}{\text{Capital Employed}}$$

The debt ratios of BNL are presented below:

Table 4.12

Debt Ratio (In Rs ‘000’)

Years	Total Debt	Capital Employed	Debt Ratio
2005/2006	347,483	776,570	0.45:1
2006/2007	807,243	448,762	1.80:1
2007/2008	707,996	682,177	1.04:1
2008/2009	735,545	680,488	1.08:1
2009/2010	844,324	708,766	1.19:1

(Source: Annual Report of BNL)

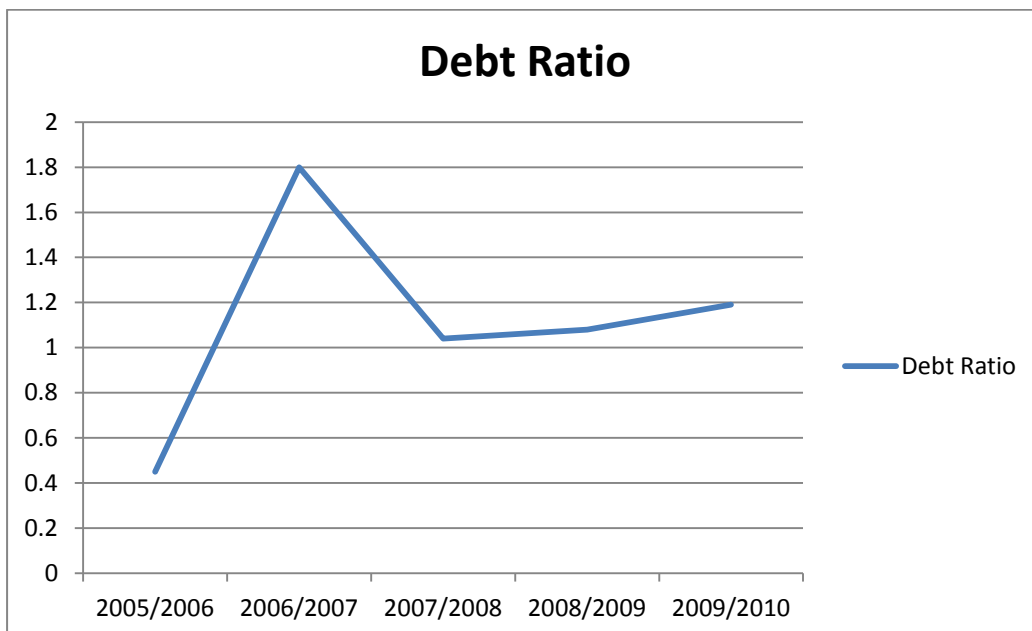
The table presents the debt ratio in proportion. In fiscal year 2005/2006, debt ratio is less than one i.e. 0.45, means in this year the company has more assets than debt. It is good for business. But in the other year debt ratios are more than one, means the company has more

debt than assets it means the company has bear more risk in those years. In fiscal year 2006/2007 it is 1.80, it indicates that, the company has more debt in this year. But after that year it is decreasing trend.

Investopedia explains debt ratio “A debt ratio of greater than one indicates that a company has more debt than assets, meanwhile, a debt ratio of less than one indicates that a company has more assets than debt. Used in conjunction with other measure of financial health, the debt ratio can help investors determine a company’s level of risk.”

It is cleared from following figure:

Figure 4.11



(Source: Table 4.12)

The figure shows the debt ratios of BNL. In fiscal year 2005/2006, debt ratio is very less but after that year it is increasing trend. The less debt ratios are better than high debt ratios for the company. The debt ratio less than one indicate that the company has more assets than debt. But the debt ratios more than one indicates that, the company has more debt than assets. The BNL has more debt than assets since before four years.

4.9.2.2 Debt-Equity Ratio of BNL:

The debt-equity ratio is calculated to ascertain the soundness of the company’s long-term as well as short-term financial position. It indicates the extent to which it depends upon

borrowed funds for its existence. It portrays the proportion of its total funds acquired by way of external financing. The ratio is ascertained by following formula:

$$\text{Debt-equity Ratio} = \frac{\text{Total Debt}}{\text{Net Worth}}$$

The BNL debt-equity ratio can be presented below:

Table 4.13

Debt –Equity Ratio

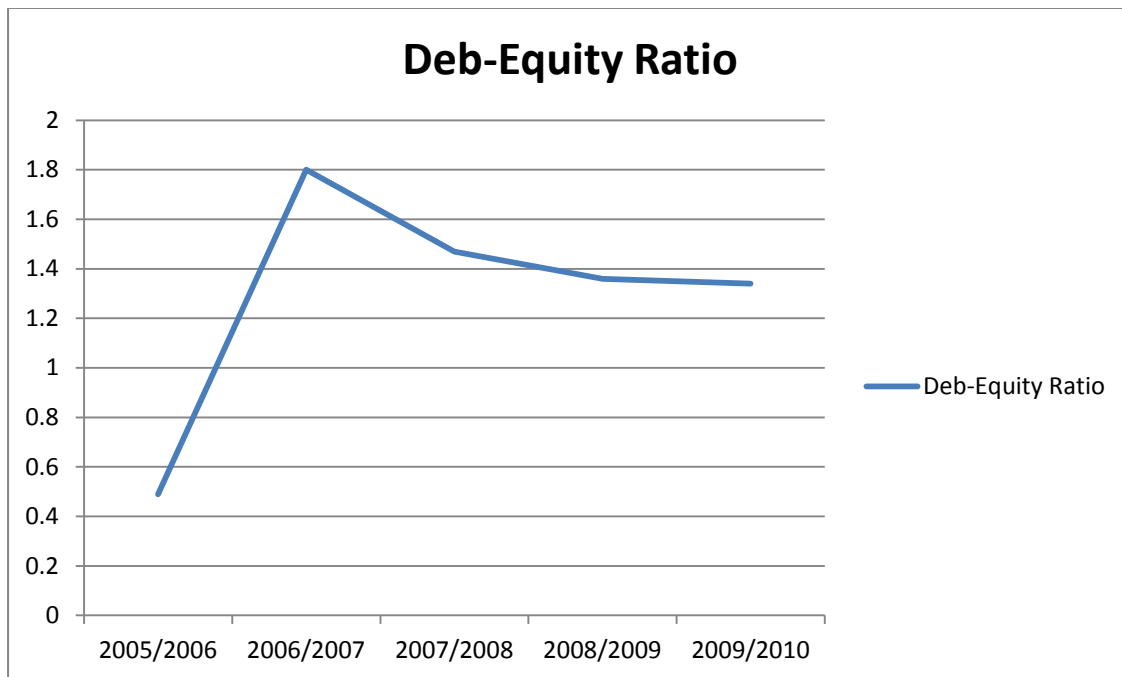
Year	Total Debt	Net Worth	Debt-Equity Ratio
2005/2006	347,483	704,570	0.49:1
2006/2007	807,243	448,762	1.80:1
2007/2008	707,996	482,177	1.47:1
2008/2009	735,545	539,816	1.36:1
2009/2010	844,324	628,807	1.34:1

(Annual Report of BNL)

The table presents the debt-equity ratio of BNL. We can be cleared about debt and equity relation from the above table. In fiscal year 2005/2006, debt-equity ratio is 0.49. It means the company has contributed more equity fund than debt. But in the other years it is more than one times, means the debt is more than equity. The debt is more risky from the firm’s point of view. In those cases, if the interest rate is less than company’s return, the company can get benefits but the company’s return is less than interest rate company can get loss.

It can be also presented as figure:

Figure 4.12



(Source: Table 4.13)

The figure clearly shows the debt-equity ratio. In fiscal year 2005/2006, the line is less than 0.50; it means there is more equity than debt. But after that year equity is less than debt, it means the company has operated by debt.

4.9.3 Profitability Ratio:

Profit is the difference between revenue and expenses over a period of time. Profit is the ultimate 'output' of a company, and it will have no future if it fails to make sufficient profits. Therefore, the financial manager should continuously evaluate the efficiency of the company in term of profits. The profitability ratios are calculated to measure the operating efficiency of the company besides management of the company, creditors and owners are also interested in the profitability of the firm. Creditors want to get interest and repayment of the principal regularly. Owners want to get a required rate of return on their investment. This is possible only when the company earn enough profits. The various type of profitability ratios are as follows:

4.9.3.1 Gross Profit Margin of BNL:

The first profitability ratio in relation to sales is the gross profit margin. It is calculated by dividing the gross profit by sales

$$\text{Gross Profit Margin} = \frac{\text{Gross Profit}}{\text{Sales}}$$

The gross profit margin reflects the efficiency with which management produces each unit of product. This ratio indicates the average spread between the cost of goods sold and the sales revenue. When we subtract the gross profit margin from 100 percent, we obtain the ratio of cost of goods sold to sales. Both these ratio show profits relative to sales the deduction of production cost and indicates the relation between production cost and selling price. A high gross profit margin relative to the industry average implies the firm is able to produce at relative lower cost. A high gross profit margin ratio is a sign of good management. A low gross profit margin may reflect higher cost of goods sold due to the firm's inability to purchase raw material of favourable terms, inefficient utilization of plant and machinery; or over investment in plant and machinery, resulting in higher cost of production. The gross profits margins of BNL are presented below:

Table 4.14

Gross Profit Margin

Year	Gross Profit	Sales	Gross Profit Margin
2005/2006	270,747	6221,827	43.54%
2006/2007	244,932	634,190	38.62%
2007/2008	291,448	746,582	39.04%
2008/2009	380,827	1,002,720	37.98%
2009/2010	701,038	1,588,150	44.14%

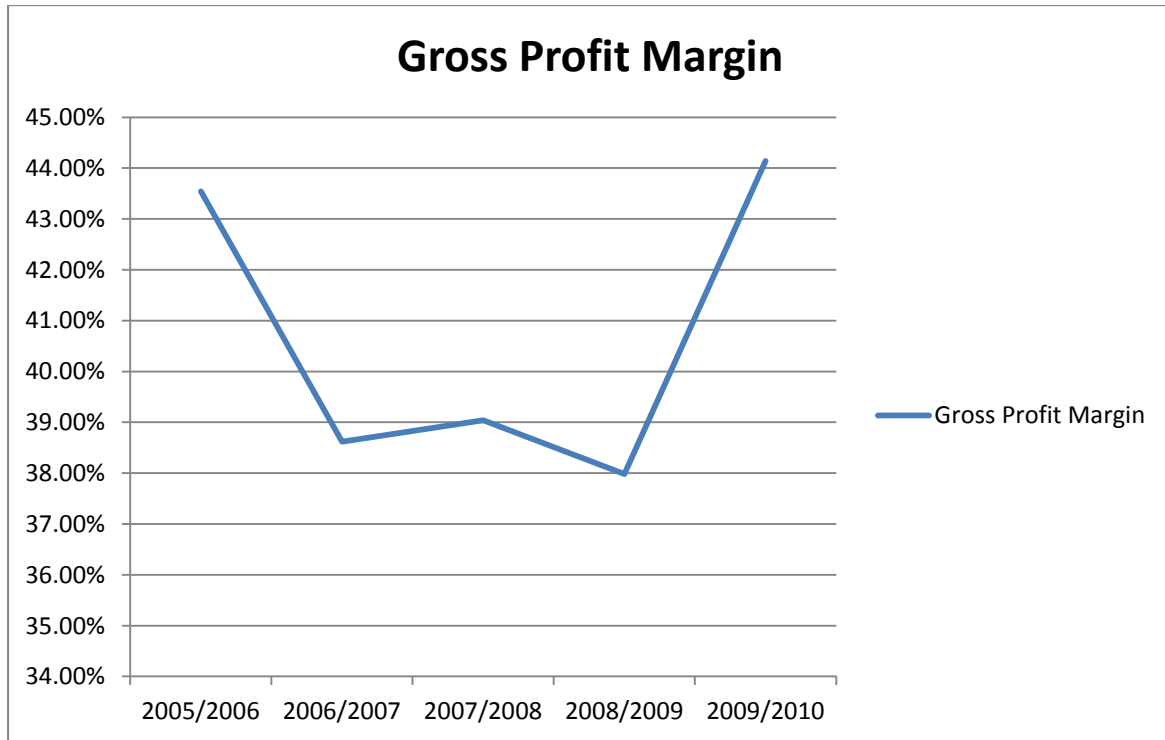
(Source: Annual Report of BNL)

The above table presents the gross profit margin of BNL. The gross profit margin in fiscal year 2005/2006, 2006/2007, 2007/2008, 2008/2009, and 2009/2010 are 43.54%, 38.62%, 39.04%, 37.98%, and 44.14% respectively. The lowest gross profit margin in fiscal year 2008/2009 i.e. 37.98% and the highest gross profit margin in fiscal year 2009/2010 i.e. 44.14%. The low gross profit margin implies that, in that year purchase of material is

inefficient, inefficient utilization of plant and machinery and so on. The high gross profit margin indicates that, the company has able to purchase raw materials, efficient utilization of plant and machinery and so on.

It can be also presented as graph which is as follows:

Figure 4.13



The graph clearly shows the gross profit margin which is given by above table. The gross profit margin is fluctuate trend.

4.9.3.2 Net Profit Margin of BNL:

Net profit is obtained when operating expenses, interest and taxes are subtracted from the gross profit. The net profit margin ratio is measured by dividing profit after tax by sales:

$$\text{Net Profit Margin} = \frac{\text{Profit after Tax}}{\text{Sales}}$$

Net profit margin ratio establishes a relationship between net profit and sales and indicates management's efficiency in manufacturing, administering and selling the products. This ratio is the inadequate; the firm will fail to achieve satisfactory return on shareholder's funds.

This ratio also indicates the firm's capacity to without adverse economic conditions. A firm with a high net margin in ratio would be in an advantageous position to survive in the fact of falling selling prices, rising cost of production or declining demand for the product. It would really be difficult for a low net margin firm to withstand these advertise. Similarly, a firm with high net profit margin can make better use of favourable conditions, such as rising selling prices, falling cost of production or increasing demand for the product. Such a firm will be able to accelerate its profits as a faster than a firm with low net profit margin. The net profit margins of BNL are presented below:

Table 4.15
Net Profit Margin

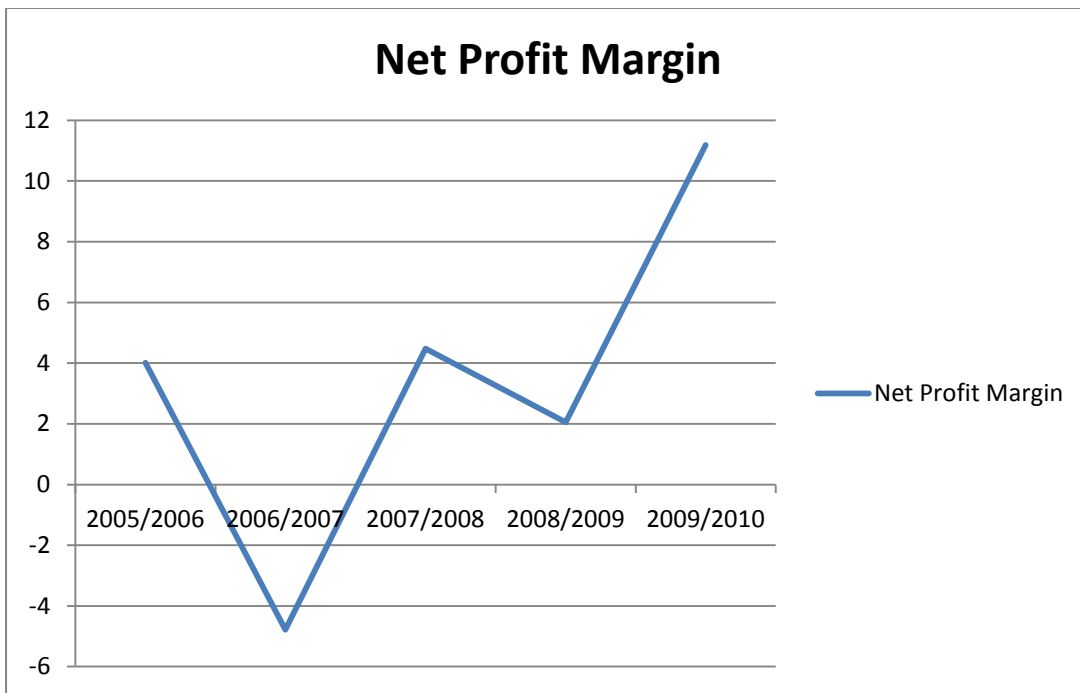
Year	Net Profit	Sales	Net Profit Margin
2005/2006	24,962	621,827	4.01%
2006/2007	(30,308)	634,190	(4.78%)
2007/2008	33,415	746,582	4.48%
2008/2009	20,531	1,002,720	2.05%
2009/2010	177,502	1,588,150	11.18%

(Source: Annual Report of BNL)

The above table presents net profit margin of BNL. It is expressed in percentage. The company couldn't achieve their goal when they are unable to make more profit. The main objectives of the companies are to maximize the profit. In fiscal year 2006/2007, company has bear loss because the profit is negative. In that year expenses is more than revenue. The company can't control its operating expenses. But in the other year profit is positive but very minimum. It indicates that company can't make more profitability. In fiscal year 2009/2010, the company has made more profit i.e. 11.18%, it is good for business. In this period the company is successful to minimize its operating expenses.

It is also presented as graph which is as follows:

Figure 4.14



4.10 Major Findings:

The major findings of the study are listed below:

1. The sales and total expenses of the company are in increasing trend. The sales are increased by 58.38% in fiscal year 2009/2010 as compared to 2008/2009. Whereas, the total expenses is increased by 34.26% in fiscal year 2009/2010 as compared to 2008/2009. But the profit is in fluctuating trend.
2. The variable cost and fixed cost is controlled by the company. In fiscal year 2009/2010, the variable cost with sales is 55.86% for the company whereas it is 62% in fiscal year 2008/2009. Similarly, the fixed cost with sales in the fiscal year 2009/2010 is 26.09% whereas it is 34.66% in fiscal year 2008/2009. It shows that, the total expense is controlled by the company and profit is made in further year.
3. The PV ratios are in fluctuating trend. The highest profit volume ratio is 44.14% in fiscal year 2009/2010 and the lowest profit volume ratio is 37.98% in fiscal year 2008/2009. The company has made higher profit in fiscal year 2009/2010 since PV ratio is high in that year. It is very low due to the huge amount of variable cost.
4. The break-even sales are in fluctuating trend. The high break-even sales create loss and the low break-even sales create profit for the company. It means, the high BEP

sales make loss and the low BEP sales make profit. For example: the high proportion of BEP sales on actual sales is 109.44% for the year 2006/2007, means loss for the company whereas the lowest proportion of BEP sales on actual sales is in fiscal year 2009/2010 i.e. 59.11%, means profit for the company.

5. The margin of the company is in fluctuating trend. The lowest MOS is in fiscal year 2006/2007 i.e. -9.44%, means the company bear loss in that year. Similarly, the highest MOS is in fiscal year 2009/2010 i.e. 40.89%, means the company bear maximum profit in that year. It is found that, there is positive relation between MOS and profit. Higher the MOS higher will be profit and lower the MOS lower will be profit.
6. The Current ratios of the Company are lesser than two times. Which conclude that, the company is unable to pay its current liabilities.
7. The quick ratios of the company are lesser than one times in all five year. If the BNL's inventories are not sold, the company couldn't meet its obligation.
8. The company has more debt than assets because debt ratio is greater than one for the last four year. It means the company was in risk in those years.
9. The company is operated by maximum debt because debt equity ratio is greater than one. Its current liabilities are maximum.
10. The company couldn't utilize their plant and machinery effectively. Insufficient purchase of raw material is found to be in fiscal year 2006/2007 to 2008/2009 because its gross margin is minimum but in fiscal year 2005/2006 and 2009/2010, the company's gross profit margin is maximum, it means in those year, the company was able to purchase raw material and utilize direct expenses effectively.
11. The net profit margin is in fluctuating trend. But in the fiscal year 2009/2010, the profit is high, means in that year the company minimize their variable cost as well as fixed cost. The company is able to utilize their resources and controlled its operating expenses.

CHAPTER V

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary:

A comprehensive profit planning and controlling is a systematic and formalized approach for starting and communicating the firm's expectation and accomplishing management in such a way as to maximize the case of a profit plan and to achieve the maximum profit from the resource available to an organization over the particular span of time. It serves basically as tools for management control. The effective operation of a business concern resulting into the excess of income over expenditure fully depends upon as to what extent the management to follow proper planning, effective co-ordination and dynamic control. Organization cannot achieve its goals without proper planning and implementation. So profit planning is one of the most important management tools for planning and controlling business operations. CVP analysis has become a powerful instrument in managerial decision making especially in the control of cost control and profit planning. The CVP analysis is a specific way of presenting and studying the interrelationship between cost, volume and profit.

The main objective of this research is to examine the use of cost-volume-profit analysis in Bottlers Nepal Limited (BNL). The focuses of the study is to identify cost structure, sales volume, and their relation including break-even analysis and margin of safety analysis for profit planning. The study is based on secondary data. It is limited only in five years i.e. fiscal year 2005/2006 to 2009/2010. The descriptive and analytical approaches are used throughout the study. The whole study is divided in to five chapter including introduction, review of literature, research methodology, data presentation and analysis and summary, conclusion and recommendation of the company.

CVP analysis under this study aims to determine sales, cost structure, contribution margin, break-even point and margin of safety. Financial analysis of the company is also calculated here in. The sales trend of the company is increased. Total expenses are also in increasing trend. But the increased sales trend is greater than increased trend of total expenses in further year. The percentage of change in sales in 2006/2007 is 1.99% whereas it is 58.38 in

2009/2010. It shows that, there is highly increasing sales in coming year. Similarly, the percentage of total expenses in fiscal year 2006/2007 is 11.81% whereas it is 34.26% in fiscal year 2009/2010. The percentage of variable cost is in increasing trend but the fixed cost is in fluctuated trend. The profit is also in fluctuating trend. There is loss in fiscal year 2006/2007 and 2007/2008. The profit volume is in fluctuating trend. The high PV ratio is 44.14% in fiscal year 2009/2010. The company is able to made higher profit in this year. The correlation of sales and profit is perfectly positive i.e.0.9416. The percentage of change in BEP is 2.61 in fiscal year 2009/2010; it is the lowest percentage change in BEP. In that year company effectively minimize their total cost and got more profit. The proportion of the BEP in fiscal year 2006/2007 is 109.44%. Which is the maximum BEP and it is bad for the company because high BEP creates loss for the company. The highest margin of safety is 40.89% for the fiscal year 2009/2010. The highest margin of safety is better for the company. The lowest margin of safety of the company is 9.44% in fiscal year 2006/2007. That year company is found to be in loss. The financial analysis is also show here. The financial position of the companies is weak. The company has more current liabilities than current assets. The current ratios and quick ratios are less than one. It means the company has not enough current assets. The leverage ratios are also shown. The company is not operated by only their own capital. Mostly, the company depends on debts. The profitability of the company is satisfactory level in current year.

5.2 Conclusion:

The company cannot apply CVP analysis for the company to see their annual report. Here, the CVP analysis can be calculated under annual report of the company. However, the company cannot get highest return. In some years the company has gone to loss. There is little profit but is very less. In fiscal year 2009/2010, the company has success to get more profit.

The sales trend of the company has been increasing. Similarly, the total cost is also in increasing trend. Last four year, the company couldn't get more profit because there is high cost beard by the company. But the company has got success to earn more profit in fiscal year 2009/2010; in this year company has minimized their total cost. The profit volume ratio is less than 50% in all five year because of high variable cost. The BEP sales are also increased causing the increase of fixed cost. Therefore, the margin of safety is very less in last four years but the company was able to earn profit in fiscal year 2009/2010 because in that year company's margin of safety is very high.

The financial analysis is also shown here. The current assets are lesser than current liabilities in all year. Its current ratio is less than two times in all year. Quick ratios are less than one times. It shows that, the liquidation position of the company is very weak. Similarly, the debt ratios are also high. It is greater than one times. It shows that, the company has more liabilities than assets. The company is operated by maximum debt capital because debt equity ratios are very high. It indicates that the company has more debt than equity capital. It means, the company bears more risk. In last four years, the profitability ratios are very low because the company cannot minimize their variable cost and fixed cost. In that year, the company is unable to minimize their operating expenses. But the company is able to success to minimize their operating expenses in fiscal year 2009/2010. In this year the company has gain more profit.

The company has beard loss in some of the year because of its high operating expenses. Some of the year company has earned profit but it is very less. But in the fiscal year 2009/2010, the company has earned more profit because in that year company's sales are high and the company is success to minimize their operating expenses.

5.3 Recommendation:

On the basis of the study of CVP analysis as a tool to measure effectiveness of profit planning and control of BNL; it seems necessary to make CVP analysis effectively. Nepal is stepping towards globalization with membership of WTO. Nepalese companies should integrate with the global environment with the best fit managerial strategies. As the competition is very high in the context of liberalization, every company should give attention on cost minimization rather than profit maximization. For this, CVP analysis tools can help

adequately. Thus, the following recommendations can be endorsed based on the finding of research study:

1. Cost planning and controlling should be focused because the total cost is very high of the company.
2. The company should focus on BEP analysis while preparing revenue plan, operation plan and setting price of its product.
3. Separate cost control department should be established for the effective management of cost.
4. The company must minimize their variable cost as well as fixed cost.
5. The company should be mobilized for the maximization of sales and profit.
6. Systematic and periodicals performance reports should be strictly followed to trace poor performance and take corrective action immediately and timely.
7. The company should issue share and maximize their own capital.
8. The company should increase their liquidation position.
9. Company should add new scheme, facilities and service. Market studies on demand and pricing should be carried out and loss oriented costs should be identified and controlled.
10. Profit, sales and costs should be analyzed by preparing budgeting or planning with actual performance with in a periodic term such as monthly, quarterly and semi quarterly which will help to improve the profit planning and controlling of the company.
11. A systematic approach should be made toward comprehensive profit planning tool like CVP analysis. This can considerably contribute to increase the profitability of BNL.

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Appendix

Appendix 1

Calculation of statistical Measurement of Actual Sales and Actual Profit:

Year	Actual sales(X)	Actual Profit(Y)	$x=X-\bar{X}$	$y=Y-\bar{Y}$	xy	x^2	y^2
2005/06	621827	24962	-296866	-32430	9627364380	88130015690	1051834624
2006/207	634190	(30308)	-284504	-87702	24951569810	80942526020	7691640804
2007/08	746582	33415	-172112	-23979	4127073648	29622540540	574992441
2008/09	1002720	30460	84026	-26934	-2263156284	7060368676	725440356
2009/10	1588150	228439	669456	171045	114507101500	448171335900	29256392030
Total	$\sum X=$ 4593469	$\sum Y=$			$\sum xy=$ 150949953100	$\sum x^2$ 653926786900	$\sum y^2=$ 39300170530

$$\text{Mean Actual Sales } (\bar{X}) = \frac{\sum X}{N} = \frac{4,593,469}{5} = \text{Rs } 918,694,000$$

$$\text{Mean Actual Profit } (\bar{Y}) = \frac{\sum Y}{N} = \frac{286,968}{5} = \text{Rs } 57,394,000$$

$$\begin{aligned} \text{Standard deviation of Actual Sales } (\sigma_x) &= \sqrt{\frac{x^2}{N}} = \sqrt{\frac{653,926,786,900}{5}} \\ &= 361,643,000 \end{aligned}$$

$$\begin{aligned} \text{Standard deviation of Actual Profit } (\sigma_y) &= \sqrt{\frac{y^2}{N}} = \sqrt{\frac{39,300,170,530}{5}} \\ &= 88,657,000 \end{aligned}$$

$$\begin{aligned} \text{Coefficient of variation of Actual Sales } (CV_x) &= \frac{\sigma_x}{\bar{X}} \times 100 = \frac{361,643}{918,694} \times 100 \\ &= 39.36\% \end{aligned}$$

$$\begin{aligned} \text{Coefficient of variation of Actual Profit (CV}_y) &= \frac{\sigma_y}{\bar{Y}} \times 100 = \frac{88,657}{57,394} \times 100 \\ &= 154.47\% \end{aligned}$$

$$\begin{aligned} \text{Correlation Coefficient (r}_{xy}) &= \frac{\sum xy}{\sqrt{\sum x^2} \sqrt{\sum y^2}} \\ &= \frac{150,949,953,100}{\sqrt{653,926,786,900} \sqrt{39,300,170,530}} \\ &= \frac{150,949,953,100}{808,657 \times 198,243} \\ &= 0.9416 \end{aligned}$$

$$\begin{aligned} \text{Coefficient of Determination (r}^2) &= r \times r = 0.9416^2 \\ &= 0.8866 \end{aligned}$$

$$\begin{aligned} \text{Probable Error (P.E)} &= 0.6745 \times \frac{1-r^2}{\sqrt{N}} \\ &= 0.6745 \times \frac{1-0.8866}{\sqrt{5}} \\ &= 0.6745 \times 0.05071 \\ &= 0.03421 \end{aligned}$$

$$\begin{aligned} 6 \text{ P.E.} &= 6 \times 0.03421 \\ &= 0.2052 \end{aligned}$$

Since, $r^2 > 6 \text{ P.E.}$ we conclude that r is significant.

Appendix 2

Calculation of statistical Measurement of Actual Sales and BEP Sales:

Year	Actual sales(X)	Actual Profit(Y)	$x=X-\bar{X}$	$y=Y-\bar{Y}$	xy	x^2	y^2
2005/06	621827	543829	-296866	-232779	69104403390	88130015690	54186062840
2006/207	634190	694052	-284504	-82556	23487512220	80942526020	6815499136
2007/08	746582	791373	-172112	14765	-2541233680	29622540540	218005225
2008/09	1002720	914968	84026	138090	11603150340	7060368676	19068848100
2009/10	1588150	938820	669456	162212	105329118000	448171335900	26312732940
Total	$\sum X=$ 4593469	$\sum Y=$ 3883042			$\sum xy=$ 206982950200	$\sum x^2$ 653926786900	$\sum y^2=$ 106601142200

$$\text{Mean Actual Sales } (\bar{X}) = \frac{\sum X}{N} = \frac{4,593,469}{5} = \text{Rs } 918,694,000$$

$$\text{Mean BEP Sales } (\bar{Y}) = \frac{\sum Y}{N} = \frac{3,883,042}{5} = \text{Rs } 776,608,000$$

$$\begin{aligned} \text{Standard deviation of Actual Sales } (\sigma_x) &= \sqrt{\frac{x^2}{N}} = \sqrt{\frac{653,926,786,900}{5}} \\ &= 361,643,000 \end{aligned}$$

$$\begin{aligned} \text{Standard deviation of BEP Sales } (\sigma_y) &= \sqrt{\frac{y^2}{N}} = \sqrt{\frac{106,601,142,200}{5}} \\ &= 146,014,000 \end{aligned}$$

$$\begin{aligned} \text{Coefficient of variation of Actual Sales } (CV_x) &= \frac{\sigma_x}{\bar{X}} \times 100 = \frac{361,643}{918,694} \times 100 \\ &= 39.36\% \end{aligned}$$

$$\begin{aligned} \text{Coefficient of variation of BEP Sales (CV}_y) &= \frac{\sigma_y}{\bar{Y}} \times 100 = \frac{146,014,000}{776,608,000} \times 100 \\ &= 18.80\% \end{aligned}$$

$$\begin{aligned} \text{Correlation Coefficient (r}_{xy}) &= \frac{\sum xy}{\sqrt{\sum x^2} \sqrt{\sum y^2}} \quad \text{Type equation here.} \\ &= \frac{206,982,950,200}{\sqrt{653,926,786,900} \sqrt{106,601,142,200}} \\ &= \frac{206,982,950,200}{792,076 \times 326,498} \\ &= 0.8004 \end{aligned}$$

$$\begin{aligned} \text{Coefficient of Determination (r}^2) &= r \times r = 0.8004^2 \\ &= 0.7057 \end{aligned}$$

$$\begin{aligned} \text{Probable Error (P.E)} &= 0.6745 \times \frac{1-r^2}{\sqrt{N}} \\ &= 0.6745 \times \frac{1-0.7057}{\sqrt{5}} \\ &= 0.0888 \end{aligned}$$

$$\begin{aligned} 6 \text{ P.E.} &= 6 \times 0.0888 \\ &= 0.5328 \end{aligned}$$

Since, $r^2 > 6 \text{ P.E.}$ we conclude that r is significant.

Appendix 3

Balance sheet of BNL for the year 2005/2006 to 2009/2010

Particulars	2005/06	2006/07	2007/08	2008/09	2009/10
<u>Capital and Liabilities</u>					
<u>Capital and Reserves</u>					
Share capital	194,889	194,889	194,889	194,889	194,889
Reserve and retained earnings	509,681	253,873	287,288	344,927	344,927
<u>Long term liabilities</u>					
Bank Loan	72,000	-	200,000	133,332	66,666
Deferred liabilities	-	-	-	7,340	3,252
Deferred income	-	-	-	-	10,041
Grand Total	776,570	448,762	682,177	680,488	708,766
Assets					
Fixed assets	323,573	593,868	588,538	614,378	643,249
Capital work in progress	176,107	38,196	84,426	23,645	22,499
Investments	112,628	112,628	112,628	112,628	112,627
Current assets					
Inventories	176,936	189,256	144,003	208,777	304,121
Trade and other receivables	63,657	52,823	36,802	30,205	35,387
Cash and bank balances	35,926	3,464	2,428	3,658	28,780
Prepaid, advance, loans and deposits	159,526	224,159	204,609	262,453	313,151
Deferred Tax Assets	-	41,364	46,715	-	-
Total current assets	436,045	511,066	434,557	505,093	681,439
Less: Current liabilities and provisions					
Current liabilities	210,702	743,338	432,637	501,179	513,126
Provisions	64,781	63,905	75,359	93,694	251,239
Total current liabilities and provisions	275,483	807,246	507,996	594,873	764,365
Net current assets	160,462	(296,177)	(73,439)	(89,780)	(89,780)
Deferred expenses(to the extent not written off)	3,700	247	24	19,618	19,618
Grand Total	776,570	448,762	682,177	680,488	680,488

Appendix 4

Income Statement of BNL for the year 2005/2006 to 2009/2010

Particulars	2005/06	2006/07	2007/08	2008/09	2009/10
Sales	621,827	634,190	746,582	1,002,720	1,588,150
Cost of goods sold	351,080	389,258	455,134	621,894	887,112
Gross profit	270,747	244,932	291,448	380,827	701,038
Other income	859	1,092	1,317	(30,701)	(1,984)
Business expenses					
Distribution expenses	16,955	21,179	25,972	34,823	49,727
Administrative expenses	155,663	186,637	217,565	244,810	292,927
Profit from operation	98,988	38,208	49,228	131,895	360,368
Interest	1,329	8,875	20,790	26,193	20,393
Depreciation	64,165	60,227	65,415	67,872	71,741
Impairment	503	37,672	-	-	-
Amortization	-	532	1,031	2,571	6889
Dividend from BNL(Terai) Ltd, a subsidiary company	(2,861)	-	(83,484)	-	(31,306)
Profit/Loss on disposal of fixed assets	1,793	(385)	10,071	(10)	28,143
Provision for staff quarter	3,096	-	1,770	1,763	13,225
Provision for bonus	-	-	3,363	3,046	22,844
Profit before tax	30,963	(68,713)	30,272	30,460	228,439
Income tax	5,539	2,959	2,209	717	55,025
Deferred tax income	462	(41,364)	(5,352)	9,212	(4,088)
Net profit after tax	24,962	(30,308)	33,415	20531	177,502
Balance brought forward	399,913	342,593	86,786	167054	177840
Provision for tax in respect to earlier years	24,332	1,377	-	-	-
Depreciation expenses for earlier years	57,949	-	-	-	-
Profit available for Appropriation	342,594	310,908	120,201	187,585	355,342
Proposed Dividend for the year	-	224,122	-	9,744	77,955
Previous year tax expenses	-	-	-	-	10,556
Capital reserve transferred	-	-	-	-	(2,000)
Balance of profit transferred to balance Sheet	342,594	86,786	120,201	177,840	268,831