CHAPTER - ONE

INTRODUCTION

1.1 Background of the Study

The key motive of business organization is to make and maximize profit. Profit does not happen by chance. It is to be managed. Cost-Volume-Profit analysis is a most important tool of profit planning means of predicting the effects of changes in cost and sales level on the income of business. In this simplest form, it involves the determination of sales level at which a company neither earns profit nor incurs a loss, or in the other words the point at which it breaks even. Break-even point is only a special case of CVP analysis. However, CVP analysis included to find out sales volume to earn zero profit or desire profit, to affect income by changes in selling price, to check income if new machine will be installed, to examine operating profit if fixed cost as well as unit variable cost will be changes etc.

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

Cost volume profit analysis is a management accounting tool to show the relationship between the ingredients of profit planning. Profit planning is function of selling price of the product, the variable costs and volume to be sold. The scope of profit planning associated with CVP relationship is break-even analysis. Break even analysis is concerned with the study of revenues and costs in relation to sales

at which the firm's revenue and total cost will be exactly equal (or net income is zero). Thus the breakeven point (BEP) may be defined a point at which the firm's total revenues are exactly equal to total costs, yielding zero income. The "no profit no loss" is a break-even point or a point at which losses cease and profit begins.

CVP analysis is an important media through which the management can have and insight into effects on profit on account of variance in cost and sales and take appropriate decisions. Profit planning can be done only when the management has the information about the cost of the product and selling price of the product, the key motive of business enterprise is to make and maximize profit. Profit does not happen by chance. It is to be managed. CVP is a supplementary tool of planning of profit. It is immensely helpful for developing cost estimation. CVP is an accounting technique showing the relationship between the above-mentioned variables. This technique is equally important in profit making and non-profit making organization (Bajracharya, 2008).

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

1.1.1 History of Dairy Development in Nepal

The production of yak cheese had been started in Lang tang in 1952. But formally the dairy development activities in Nepal has been started in Tusal, a village of Kavre District in 1954 on experiment basis with a small scale milk processing under the department of agriculture. In the year 1956, as the initiative of Dairy Development Board, the central dairy plant was established and started milk collection at the rate of 500 lt/hr in processing and marketing department. The first five-year plan stressed upon the need of development modern dairy industries in public sector. As the demand of milk and milk product was increased day by day. Dairy Development Corporation was established in 1969. It has been difficult for DDC to fulfill the increase demand of people; hence private dairies have been started in 1980. The status of dairy sector in Nepal has been as presented as follows:

Table 1.1: Status of Dairy Sector in Nepal

Livestock sector contribution	15% in GDP
Dairy sector contribution	2/3 of livestock sectors
Growth of milk production	30% in last 10 years
Annual milk production	1.2 million mt. (3227mt./dat)
Total milk market in Nepal	16% of the total production

Source: Record of Dairy Development Corporation, 2010

1.2 Introduction Kathmandu Dairy Pvt Ltd

Kathmandu Dairy today has been making the finest quality dairy products. It has been enjoying well establish reputation of “The Cream of Diary”. Kathmandu Dairy safeguards the interest of the rural milk producers by providing highly competitive price. Kathmandu Dairy is committed for providing the highest quality product to its consumers’ at the most reasonable price. Milk and milk products are getting wide acceptance by general consumers day by day. In the meantime the challenge of providing safe and hygienic milk and milk products are standing a head in the Nepalese context.

Kathmandu Dairy aims to be the leading Dairy and food processing industry in country. It has been successfully introducing varieties of dairy products harmonizing with the changing taste of upcoming generation. It is firmly committed to high quality production of world- class standard at most reasonable price and giving consumer’s services of high satisfaction. It is aimed to do the based create conducive environment to its customers at its various outlet. From the angle of national interests its whole effort has been found to center around at solving the national problem of milk holiday at the services of poor milk farmers.

Kathmandu Dairy Pvt. Ltd focuses its business model to be the industry leader by producing and marketing of a milk product with assured quality an affordable price. The strategies of the Kathmandu Dairy to achieve its goals are:

- Add more value to dairy products for the more profit margins.
- Extend the life of the products
- Focus on investing on information technology to keep track of research and development, scheduling, accounting and customer information.

Management trading partners across your supply chain and raw material intake.

- A better way to reduce linkage and wastage to reduce the operation cost.

1.2.1 Goal of Kathmandu Dairy

The following goals of Kathmandu Dairy are as:

a. Kathmandu dairy aims to be the leading dairy and food processing industry in Nepal.
b. We have successfully introducing varieties of dairy products harmonizing with the changing taste of upcoming generation.
c. We are firmly committed to high quality production of world-class standard at most reasonable price and giving consumer's services of high satisfaction.
d. We do our best to create conducive environment to our customers at our various outlets.
e. From the angle of national interest, our whole effort is found to center around at solving the national problem of milk holiday at the service of poor milk farmers.

1.3 Statement of the Problem

Like an every business organizations, Kathmandu dairy is also established to earn certain amount of profit. Mostly success is measured in terms of profit. To earn desired level of profit, it is to be planned and managed. Cost-volume- profit analysis provides the technique of profit planning framework based on the annual report published. Performance of Nepalese industries cannot be considered as satisfactory. Poor performance is the outcome of poor planning, controlling and decision-making. This has raised the question whether Nepalese managers are

competent enough? Do they practice CVP tools and technique to carryout planning controlling function and decision-making? KD is currently facing problem to have fair estimate of total cost, total revenue and profit at various sales volume. Due to the lack of application of profit planning tools, they can't forecast budgeted sales to recover total cost and to achieve profit. In the above light, the study attempts to answer the following research questions.

a. Is the company practicing CVP analysis for its profit planning?
b. What is the profitability and performance of KD?
c. How is the risk associated with KD?
d. What are the major difficulties faced by KD in the application of CVP analysis?

1.4 Objectives of the Study

The main objective of this study is to examine "cost-volume profit analysis as a tool to measure the effectiveness of Kathmandu Dairy". To achieve this, the following objectives have been carried out:

a. To study the application of CVP analysis as a tool of budgeting.
b. To analyze and evaluate the profitability and financial performance of 'Kathmandu Dairy'
c. To examine and assess the risk of the company with the help of operating leverage technique.
d. To make recommendations to improve sales and profit of 'Kathmandu Dairy' on the basis of study result

1.5 Significance of the Study

Because of the globalization, today market has become very competitive. A few studies has been made in relation to the tools of profit planning in Nepalese context and most of the studies are related to the profit planning and control of the public enterprises where CVP as one of the tools of PPC is hardly studied. This study is significant in the sense that it has treated to study the CVP analysis of the dairy company, which is one of the most important tools of PPC. This study is further significant because it highlight the relationship of CVP as applicable tool of budgeting and it also highlight the sensitivity of cost profit volume variables. The study would be very useful for entrepreneurs, decision makers, researchers and the managers because it deals with the practices of CVP analysis of KD as a very important tool of PPC.

1.6 Limitation of the Study

This study consists of some limitations, which can be presented as follows:

a. The study covers the data of five years only i.e. 2063/64 to 2068/69.
b. The focuses limit over the availability of data and sufficient literature.
c. Analysis is concentrated in some managerial, financial and accounting aspect and it does not cover the areas of enterprises.
d. The comprehensive and the accuracy of the study are based on the data available from the management of KD.
e. Being a researcher as a student and due to the limited resources constraints, the study is neither comprehensive nor extensive.
f. The research is purely based upon the secondary data.

1.7 Organization of the Study

This whole study has organized into five different chapters. Each chapters and unit will be on the prescribed format of thesis writing to the partial fulfillment of MBS program. Each unit gives the clear picture or road map of the study.

First chapter consist of an introduction of the study in this chapter, separate unit of background, significance, objectives and limitations of the study mentioned.

In second chapter various relevant studies such as different books, journals, articles and previous thesis mentioned.

Third chapter described review of literature. Review of literature is very useful tools of the study because it gives guideline for the researcher to verify the steps to be taken.

Other chapters includes in next chapters accordingly such as research methodology, analysis, interpretation, finding, conclusion and recommendations.

The chapter five deals with summary, conclusions and recommendations. Besides this, bibliography and appendices are included in the last of the research.

CHAPTER - TWO

REVIEW OF LITERATURE

In this chapter the researcher has been reviewed the related literature form different books, journals, previous studies and other reliable sources. As for this study concern, journals of account, previous thesis, related books, reports and related research works has been briefly reviewed.

2.1 Profit

A payment or commitment to a person undertaking the hazards of enterprise, remuneration or reward for uncertainty bearing, “pure” profits a residual and cannot ordinarily be predetermined. By the way of contrast, risk, it is being calculable in advance, like rent, and frequently insurable, as a cost rather than a profit. In any objective probability sense, profit can be accurately measured only in expected; hence any preliminary imputation of profit is wholly subjective in character and is labeled accordingly (Koheler, 1975).

Several economists have their different views in respect of the term profit. According to F.B. Hawley, profit is the reward for risk taking in business Schumpeter expressed that an entrepreneur earns profit as a reward for his introducing innovation. J.M. Keynes held the view that profit resulted from favorable movements of general price level. Robinson and chamberlain opined that the greater the degree of monopoly power, the profit made by the entrepreneur (Kapur, 1993,).

In marketing, excess of selling price overall cost and expenses incurred in making a sale.

In finance, the reward to the entrepreneur for the risks assumed by him or her in the establishment, operation and management of a given enterprise or undertaking (Jerry, 1983).

2.2 Planning

Planning is essential for accomplish goals. It reduces uncertainty and provides direction to employees by determining the course of action in advance, formal planning, indicates the responsibilities of management and provides an alternative to grow. Planning on the other hand involves, the determination of what should be done, how the goals may be received as what individuals are to assume responsibility and to be held accountability (Chaudhari, 1972).

The planning process of the enterprise would generally involve four fundamental steps (Pandey, 1995).

a. Establishing the objectives.
b. Determining the short-range objectives or goals.
c. Developing strategies.
d. Formulating profit plan or budgets.

Planning is deciding in advance who will do what a certain time and how it is to be achieved. In order to achieve anything of importance it is necessary to look ahead and plan. It focuses in on making thing happen. It is the first management function. Planning involves the determination of objectives based on intelligent forecasting and development of prosperity of any organization in a competitive and ever-changing environment. Planning is essential to accomplish goals. It reduces uncertainty and provides direction to the employees by determining the course of action in advance.

2.3 Profit Planning and Control

Once the planning is determined, it must be carried out under control. Controlling shares management activity and for this, managers compare actual performance against the planned performance and find out the decision taking remedial steps to remove the deviations. Immediate action should be taken to remove the deviations to make an improvement in the performance because promptness is the essence of an effective control. Controlling is the measurement and correction of performance in order to make sure those enterprise objectives and the plans devised to attain them are accomplished.

Profit planning involves streaming activities in order to get employees profit minded and to secure maximum benefit from minimum effort and expenditure. A best result seems to be obtained from a single product. The planner is a given the right to prove economics, the organization, the mode of operation, the pricing m the marketing or any other fact of making and selling the product that in his judgment affects profit acquiring from that product. The concentration of profit efforts upon to gross traditional boundaries of the enterprise to translate needs from one group to another and to obtain consumed profit building efforts among these who can affect profits are the fundamental factors that contribute to the success of profit planning (Chamberlain). Profit planning is a comprehensive plan expressed in financial terms by which an operating program is effective for a given period of time. Business managers are continually involved in planning, organizing and controlling the operation of both large and small business organizations. Budgeting is one of the most important management tool used to plan and control business operations. Budgets are financial plans prepared as a guide to plan and control business operations. A financial plan must be designed to serve as a guide for the

activities. Best results are obtained when the planning period is the same as the company's fiscal year. The annual budget is broken down by months, weeks and days of operations. The budget should be designed to co-ordinate the effort of the sales department and the other entire department.

Controlling means evaluating the firm's activities against the plan and deciding what should be done if the plan is not being followed. It is a process of ensuring that actual activities confirm to plan activities. Control helps in correction. Therefore, planning and controlling are the major functions of management.

Of course, it is difficult to confess the actual meaning and definition of PPC. But now a days it has been realized that PPC is somewhat, rather than narrow traditional view of a budget as a critically derived set of quantitative schedules prepared by an accountant. In the past year, there has also been a tendency to view the budget primarily as mathematical model for an organization development by computer programmers.

a. These views completely overlook the three most relevant aspect of the PPC concept.
b. PPC requires major planning decisions by management.
c. PPC entails pervasive management control activities.
d. PPC recognizes many of the critical behavioral implication through the organization.

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

2.3.1 Principle and Purpose of Profit Planning and Control

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

a. To provide a realistic estimate of income and expenses for a period and the financial position at the close of the period detailed by areas of management responsibility.
b. To provide a co- ordinate plans of action, which is designed to active the estimates reflected in the budget.
c. To provide a comparison of actual results with those budgeted and an analysis and interpretation on of deviation on by areas responsibility to indicate course of corrective action and to lead to improvement in procedures in building future plan.
d. To provide a guide for management decision in adjusting plans and objectives as uncontrollable conditions change.
e. To prove a ready basis for making forecasts during the budget period to guide management in making day-to-day division (Welsch, 2001).

2.3.2 Advantages and Importance of Profit Planning and Control

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

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

a. PPC focuses basic policies to initiatives.
b. It sets responsibilities of employees in relation to each function.
c. It creates the feeling of co-operation and understanding between different departments of enterprises.
d. It leads to maximum and most economical utilization of material, labor, capital and other sources with a view to ensure maximum return.
e. It forces the management to keep adequate and correct historical data in the business.
f. In competed management to plan future, the budgeting process forces management to look a need and become more effective and efficient administration in the business operations.
g. It forces the management to take necessary steps for getting satisfactory results.
h. It improves the quality of communication. The enterprises objectives budget, goal, plan, authority and responsibility and procedures to implement plans are clearly written and communicates through budgets to all individuals in the enterprise. This results in better understanding and harmonious relations among managerial and sub-ordinates.
i. Develops and atmosphere of profit mindedness and cost consciousness.
j. It highlights upon the efficiency of lack of it in the business and thus helps the management to take remedial action.
k. It tends to remove the cloud of uncertainty that exists in many firms especially among lower levels of management relative to basic policies and enterprises objectives.

l. Profit planning necessitates a periodical and critical appraisal of every elements of a business.

2.3.3 Basic Assumption and Limitation of Profit Plan

There are so many assumptions for using profit-planning programs. First of all it is required to measure the basic plan in terms of money. Secondly co-ordination every aspect of the business for the optimum profit goals and thirdly, profit gives guidelines about what to do? It things happened as forecast but it also gives guidelines of things work out differently from the forecast.

a. In developing and using of profit planning and control program, the following additional limitations should be kept in mind.
b. The profit plan based on estimates.
c. PPC program must be continually adopted to fit changing circumstances.
d. Execution of a profit plan will not occur automatically.
e. The profit plan is not a substitute of management.

2.4 Cost-Volume-Profit Analysis as a Tool of Profit Planning and Control

CVP analysis is an important tool of profit planning because it provides the information about the behaviour of cost in relation to volume, volume of production or sales where the business will break-even sensitivity of profit due to variance of output, amount of profit for a projected sales volume and quantity of production and quality of production and sales for the target profit level etc. Therefore CVP analysis may be defined as a managerial tool showing the relationship between various ingredients of profit planning. CVP analysis is an important media through which the management can have an insight into effects on profit on account of variance in cost and sales and take appropriate decisions. CVP

analysis is great helpful in managerial decision-making. Especially cost control and profit planning is possible with the help of CVP analysis. Profit planning is the fundamental part of the overall management functions. Profit planning can be done only when the management has the information about the cost of the product and selling price of the product.

2.5 Concept of Cost-Volume-Profit Analysis

In dictionary we find that cost is price paid to acquire, produce, accomplish or maintain anything volume in mass or quantity of something or amount, profit is the ratio of such pecuniary gain to the amount of capital invested and analysis is resolution, separation or breaking into parts. In facts, CVP analysis is an analytical tool for studying the relationship between volume, cost, price, and profit. Basically CVP analysis is the technique involves finding the most favorable combination of different types of costs. CVP analysis provides the managers with a powerful tool for identifying those courses of action that will or will not increase profitability. CVP analysis is the technique that explores the relationship, which exists, between cost, revenue, output level and resulting profit. CVP analysis can be extended to cover the effects on profit of changes in the selling prices or service fees, cost, income tax rate, total cost, total revenue, and profit at various sales volumes. CVP analysis provides the management with a comprehensive overview of the effects on revenue and costs of all kinds of short-run financial changes. It is related to profit, sales volume and cost. CVP analysis provides information regarding (Munankarmi, 2003).

a. Minimum level of sales to avoid losses
b. Sales level to earn target profit
c. Effects of changes of price, cost and volume of profit

d. New break-even point for changes
e. Impact of expansion plan on CVP relationship
f. Products those are most profitable and least profitable
g. Whether to continue or discontinue the sales of product or operation of plan
h. Effects on operating profit with the increase in fixed costs.

CVP analysis can be extended to cover the effects on profits of changes in selling price service fees, cost, income tax rate, product mix etc. It estimate total cost, total revenue and profit at various sales volume. It provides only an overview of the profit planning process. CVPA provides management with comprehensive overview of the effects on revenue and costs of all kinds of short run financial changes. It is related to profit, sales volume and cost (Munankarmi, 2003).

Cost volume profit (CVP) analysis examines the behaviour of total revenues total cost and operating income as changes occur in the output level, the selling price, the variables cost per unit and fixed cost of a product (Horn green, Dater &Foster, 2003).

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

Cost volume profit analysis is a systematic method of examining the relationship between changes in activity (i.e. output) and changes in total sales revenue, expenses and net profit. As a model of their relationship CVP analysis simplifies the real world conditions that a firm will face like most models, which are abstractions from reality. CVP analysis is a subject to number of underlying assumptions and limitations. Never the less it is powerful tool for decision making in certain situation (Drury, 2000).

2.5.1 Use of CVP Analysis in Profit Planning

Planning, controlling and the decision-making are the essential managerial functions. CVP analysis helps the managers to plan for profit, to control cost and make decision. As such it helps (Munankarmi, 2002).

a. To determine the break -even point in terms of unit or sales value
b. To determine the margin of safety.
c. To estimate profits or losses at various level of output.
d. To assess the likely effects of management decisions such as an increase or decrease in selling price, adoption of new method of production to reduce direct labor and increase output.
e. To help management to find the most profitable combination of costs and volume.
f. To determine the optimum selling price.
g. To determine the sales volume at which the profit goal of the firm will be achieved.
h. To determine the most profitable and least profitable product.
i. To determine new break-even point for changes in fixed or variable cost.

2.5.2 Application of CVP Analysis

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

a. Contribution Margin Analysis
b. Break-Even Analysis
c. Profit-Volume Analysis

2.6 Computation of CVP Analysis

2.6.1 Break-even Analysis

Break-even analysis is the term used to study of the relationship between cost, volume and profit at various level of activity. It is the most widely known from of CVP analysis. Break-even analysis is a special case of CVP analysis.

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

fixed and variable components of cost. It is usually applied on a “total company” basis (Saksena, 2002).

The break-even point is that point where total revenue equals total costs incurred. Thus it is the point at which a company begins to earn a profit. There is neither a profit nor a loss at the BEP. Although management typically plans for a profit each period, the break-even point is concern, if sales fall below the BEP, losses are incurred. Management must determine the break-even point in order to compute the margin of safety. When planning new venture or product lines, management can quickly measure the likelihood success finding the projects BEP.

2.6.1.1 Determining the Break-even Point

The following three approaches can be used to compute the break-even point.

a. Contribution Margin Approach (Income Statement)
b. Formula Approach (Equilibrium Method)
c. Graphic Approach

a. Contribution Margin Approach:

Contribution margin is the excess of revenue over all variable costs related to particular sales volume. A product lines contribution margin represents its net contribution to pay off fixed cost and to profit. Adding contribution margin CVP analysis changes the make-up of the equations as well as the format of the income statement. The equation now becomes.

S-VC = CM-FC = NI (i.e. Contribution)

Contribution margin may be expressed as total absolute amount, a unit absolute amount, a ratio and a percentage. The variable cost ratio or variable cost percentage is defined as all variable costs divided by s ales. Thus a contribution margin ratio of 20% means that the variable cost ratio is 80 percent.

$$\text{Contribution Margin Ratio} = \frac{\text{Sales Z Variable Cost}}{\text{Sales}}$$

$$= \frac{\text{Sales}}{\text{Sales}} \text{Z} \frac{\text{Variable Cost}}{\text{Sales}}$$

$$= 1 \text{Z} \frac{\text{Variable Cost}}{\text{Sales}}$$

The CM ratio of 20% or 0.20 indicates that 20% of sales are available to cover fixed costs and generate profit. In the other words, Rs 0.20 of Rs. 1 sales is available to cover fixed costs and earn a profit. Since profit at the BEP is zero, dividing fixed costs by the contribution margin ratio gives the sales volume that is necessary to cover total fixed costs.

b. Formula Approach:

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

The BEP can be computed in terms of unit or in terms of monetary value of sales volume or as a percentage of estimated capacity while formula approach is followed. The calculation in the equation approach is similar to that of the contribution margin statement approach. The equation is merely a restatement of the other. To develop the cost volume profit equation.

Contribution Margin Approach	Symbol or Equations
Sales volume (units)	Q
Selling price per unit	p
Sales revenue (Rs.)	Q× P
Less: Variable cost	Q×VCPU
Contribution margin	Q×P─Q×VCPU
Less: Fixed cost	FC
Net profit	Q×P─Q×VCPU─FC

The table helps to understand the computation of the net profit easily, in which the multiplication of the sales volume and selling price per unit has generated the total sales revenue. When we deduct variable cost from the sales revenue then the result comes as a contribution margin. Contribution margin measures the organizations profitability and higher the contribution margin shows better position of an organization but it is not sufficient indicator at all where the fixed cost included in fixed assets are not included. Net profit is that profit which shows the proper profitability position of an organization and it is taken as a basic indicator to measure the financial position of an organization.

2.6.1.2 Application of Break-even Analysis

Break-even analysis concept can be used to formulate different policies in a business enterprise. Some of these applications are (Maheshwari, 2000).

a. Determination of profit at different level of sales and margin of safety.
b. To find the level of output to get the desired profit.
c. Effect of price reduction on sales volume and changes in sale mix
d. Effects of fixed cost or variable cost changed on sales volume.
e. Selection of most profitable alternative, make or buy decision and drop and or add decisions.

2.6.1.3 Assumptions 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 (Maheshwari, 2000).

a. All cost can be classified in to two parts, fixed cost and variable cost.
b. There is a relevant range of validity (activity) for using the result of the analysis and sales change.
c. There is only one product or in case of multi products, the sales mix among the products remains constant.
d. Basic management policy about operation will not change materially in short run.
e. The general price level (inflation/deflation) will remain essentially stable in the short run.
f. Sales and production levels are synchronized, that is inventory remains essentially constant or zero.

g. Effectively and productivity per person will remains essentially unchanged in the short run.
h. If any of the above assumptions were changed, revised budget would be needed for a new analysis.

2.6.1.4 Limitations of Break-even Analysis

Break-even analysis in many business situations can be used effective decision making, but there are many short coming s or limitations in its analysis and interpretations. Some of these can be listed as (Maheshori, 2000).

a. The assumptions of producer's market phenomenon not hold goods for all types.
b. The fixed cost may remain constant as well as the variable costs may not vary in fixed proportion at different level of output.
c. With variance in the prices of the items or services, which also depend on the factors, affecting the demand and supply will certainly affect the demand of the commodity. This phenomenon is not covered in break-even analysis.
d. Identification of fixed and variable costs involved in production process is very complicated. A shift in product mix may change the break-even point.
e. Customers may be given certain discount on purchase to promote sales. This revenue may not be perfectly variable with level of sales output.

2.6.1.5 Application of Break-even Analysis

The applications of break-even analysis are as follows:

a. Sales volume required to produce desired operating profit/target net profit.
b. Sales volume required to produce the desired profit after tax.

c. Operating profit at a given level of sales volume.
d. Effect on operating profit at a given percentage increase in sales volume (in Rs).
e. Additional sales volume required offsetting a reduction in selling price or sales volume needed to maintain present profit level or a sales volume to offset reduced selling price.
f. Effects of changes in fixed cost.

2.7 Sensitivity analysis on CVP Analysis

Sensitivity analysis is the measurement of elasticity of the change in CVP factors on break-even point or given profit. The strategist should focus more on the factor, which is more sensitive or responsive for profit. To measure the sensitivity of CVP factors one can see the impact of certain percentage or amount change in volume price or cost factors on net profit. I n other words, sensitivity analysis is the measurement of responsiveness in outcome with the changes in determinant variables. We know that the goal of business enterprises is To Whom It May Concern: maximizing profit. Profit is the excess of revenue over the total cost.

Profit = Total Sales Revenue – Total Sales

Net Profit = Sales Unit × SPPU – Sales Unit × VCPU – Fixed Cost – Taxes

So that, Profit = F (Sales volume, selling price, VC, FC, tax etc.)

Means profits are the function of volume, price, VC, FC, Taxes and so on. But none of the factors remain unchanged: sometimes the manger can intentionally change the price and the cost factors as a part of strategic decision. But the strategy focuses more on the factor, which is the more sensitive or responsive for profit. So

to measure the sensitivity of CVP factors, we can see the impact of certain percentage or amount of change in volume, price or cost factors on net profit.

2.8 Risk Measurement on CVP Analysis as Operating Leverage

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

Operating leverage can be measured in terms of the “Degree of operating leverage” (DOL). DOL shows the times of percentage change in net operating income of the given percentage change in sales. DOL may be defined as the percentage change net operating income (NOI) or EBIT associated with a given percentage change in sales (Pandey, 2004).

$$\text{DOL} = \frac{\text{Percentage Change in Net Operating Income}}{\text{Percentage Change in Sales}}$$

Alternatively,

$$\text{DOL} = \frac{\text{Contribution Margine}}{\text{Net Operating Income}}$$

$$DOL = \frac{Q(SP - VCPU)}{Q(SP - VCPU)\ \text{fixed cost}}$$

Effect of price and volume change: A change in price invariable affects volumes. A price reduction may increase demand of the product and consequently, may result in increased volume. On the other hand, increase in price may adversely affect tile demands and thus reduce volume increase substantially. Similarly, a price rise may reduce profits if there is a material fall I volume.

Effect of changes in variable costs: The impact of the changes in variables cost on profit is straight forward if it does not cause any changes in selling price & or volume. An increase in variables costs will lower P/V ratio, push up the BEP and reduce profits. On the other hand if the variable costs decline, P/V ratio will increase BEP will be increase and profits would rise.

Effect of changes in fixed costs: A changes in fixed costs does not influence P/V ratio. Other factor remaining unchanged, a fall in the fixed cost will, however, lower the BEP and raise profits. An increase in fixed costs caused either due to some external factors or due to some changes in management policy, will raise the BEP. Increase in factory rent or insurance and taxes are examples of external factors, while increased deprecation or salaries of managers may be the result of management decision.

Effect of Changes in a Combination of Factors: The financial manager or the management accountant, evaluation the profit plans or budget, must realize that a change in one factors leads to a change in another factors. Therefore, all such their net impact on profit must be seen.

The calculation in the equation approach is similar to that of the contribution margin statement approach. The equation is merely a restatement of the other.

BE sales values = FC + VC ± profit.
Therefore, BE sales value = FC + VC ±
BE sales unit × SPPU = FC + (BE sales × VCPU) ± profit
The graphic Approach to CVP Analysis

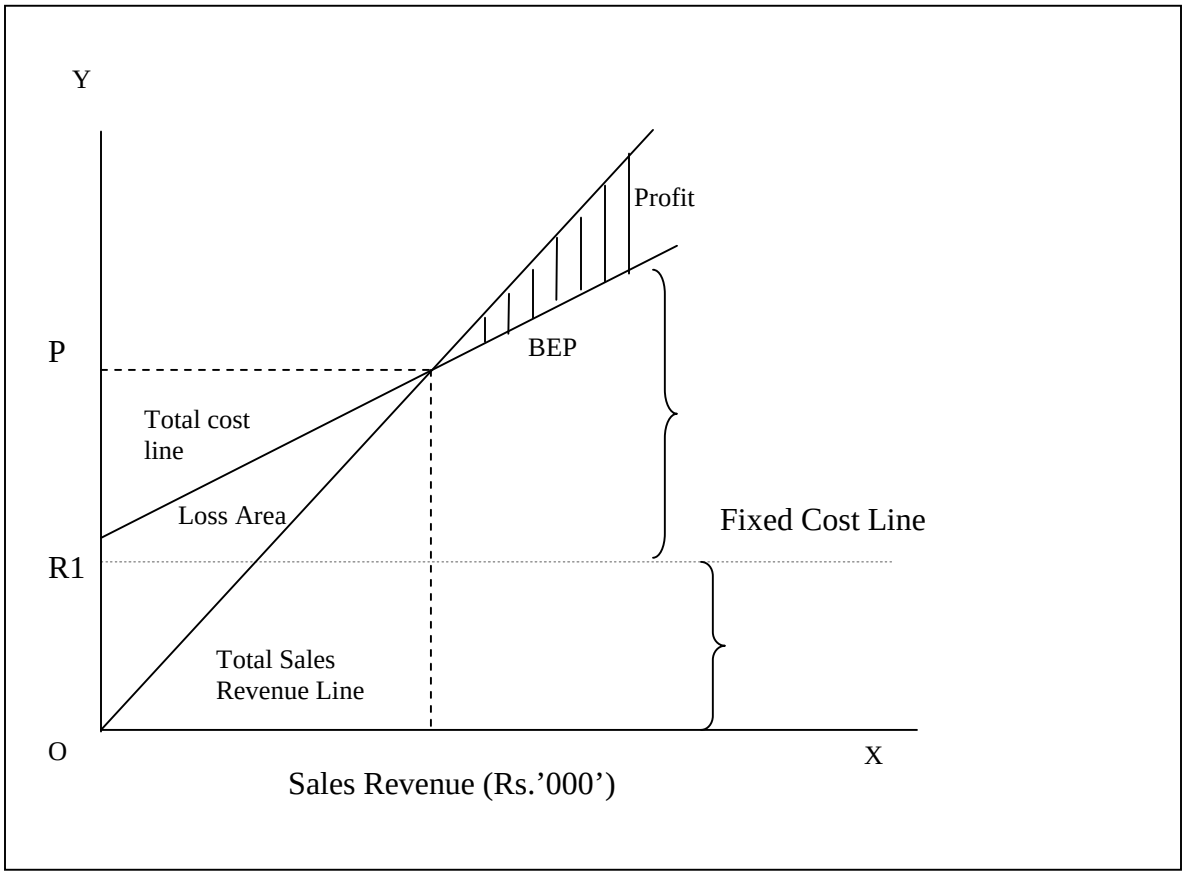
A break-even chart is to graphically depict the relationships among revenues, variable costs, fixed costs and profit (losses). The no profit, no loss point (the breakeven point) is located at the point where the total cost & total revenue lines cross. Below this point, the firm losses, and above this point, the firm earns profit (Bajracharya, et.al, 2006).

In the graph given below the find costs remain constant within the relevant range, the fixed cost curve is parallel to 'OX' axis, variable cost slope downward from the origin to right but the slope depends on variable cost ratio. Te total cost curve parallels the variables cost curve. So, the angle 'O' equals the angle 'V'. It is because Total Cost = Total Fixed Cost + Total variables cost at volume 'Q'.

Total costs = TFC + Q × VCPU
At volume 'Q + n'
Total costs = TFC + (Q + n) × VCPU
ζ Total costs = Q = n × VCPU
ζ Total costs = ζ variable costs.

That's why the slope of the total cost curve equals the slope of variable cost curve.

Figure 2.1: Graphical Approach to CVP



This above graph clearly shows that if the company can reach the point of BEP it can generate sufficient revenues to cover all its operating expenses. At this point, the total revenues equal the total cost. Here, the revenue curve breaks up (intersects) the total cost curve, that's why this point is called break-even point. In short, break-even point is that point where,

Total Sales Revenue = Total Costs

Leverage decision is meant to substitute variable cost by the fixed costs to create a degree of operating leverage means the employment of higher amount of fixed cost

which eventually increases the break-even point also. No DOL is to be said when the DOL occur “1” and in this situation BEP comes to “0”.

Higher fixed cost increase the DOL also increase and also increase the BEP, so there is closed relationship between the degree of operating leverage and the break-even point. A high DOL and high BEP both are indicators of higher Risk (Bajracharya, 2004).

2.9 Measurement of Profitability in CVP Analysis

Profitability analysis helps in critically analyzing and interpreting the current and prospective earning capacity a business corporation within and outside the business. The indices of profit are considered as reliable indicators of the operational efficiency and organization effectiveness of the firms in utilizing its resources to earn satisfactory earning. Profitability in relation to the sales indicates the profit margin on sales. The measure of return on the capital employed can be used to evaluate and to compare profitability of different division of an enterprises as well as the enterprise as a whole. It indicates how well the management has used the funds supplied by creditors and owners. It measures profitability as well as productivity .

Profitability analysis becomes all the more important when within the business there is an earning goal that helps to guide the behaviour of the managers and other employees. Outsides the business to distribution of earning to stockholders, creditors, governmental bodies and other is the basis for social influence and pressure on the activities of the firm. Thus both within and out sides of business, the indices of profit are considered the reliable indicator of the operational

efficiency and organizational effectiveness of the firm in utilizing its resources to earn satisfactory earning .

Profitability is the end result of a number of corporate policies and decisions. It measures how effectively the firm is being operated and managed. Besides owners and managers, creditors are also interested to know the financial soundness of the firm. Owners are eager to know their returns whereas managers are interested in their operating efficiency. So they calculate profitability ratios because expectations of both owners and managers are evaluated in terms of profit earned by the firm. Following are the major ratios used to measure the profitability of a firm.

Net Profit Margin:

Net profit margin is the ratio between net income and sales of the firm. It shows the firm's ability to generate net income per rupee of sales and is calculated as:

Net Profit Margin= Net income/Sales

Higher the net profit margin is preferred by the owners, management as well as creditors.

Gross Profit Margin:

It is the ratio between gross profit and sales of firms and is calculated as:

Gross Profit Margin = Gross profit/Sales

Higher the gross profit margin is preferred as it allows greater cushion to absorb other expenses.

Operating Ratio:

The operating ratio explains the change in the profit margin ratio. It is calculated by dividing operating expenses. Like as cost of goods sold plus selling and administrative expenses (excluding interest) by sales. It is calculated as:

Operating ratio =Cost of goods sold + operating expenses)/ sales

Lower the operating ratio indicates the higher operating profit and higher the operating ratio shows the lower operating profit.

2.10 Review of Related Studies

The main purpose of the literature review is to find out the work have been done in the area of research problem under the study. Moreover what has not been done in the field of the research study being undertaken?

There are some research papers concerning CVP analysis in the area of the profit planning and control. Very few dissertations have been submitted with the relation to CVP analysis. Out of the previous research studies only three researches are conducted under the CVP analysis. Therefore, the study is attempted to review the previous research work on profit planning and control as well as management accounting. The previous related studies to CVP analysis are as follows:

Badu (2006) has submitted a research about profit planning manufacturing public enterprises. In his research, he has tried to point out some features and problems of profit planning in Nepalese manufacturing PEs. For this study he has selected a public enterprise. Dairy Development Corporation and some features and problems

of profit planning, prevailing practices and premises for implementing profit planning in Nepalese PEs are discussed.

The main objectives of this research work were as follows:

a. To analyze the various functional budgets adopted in the enterprise.
b. To examine the capacity utilization of DDC.
c. To assess the financial performance of DDC using BEP analysis
d. To provide required suggestions on profit planning.

For accomplishing the above stated objectives, Research methodology was followed through secondary procedure but for the essential information primary data were also used.

Badu listed the following major findings:

a. DDC has practiced short term planning rather than long term planning.
b. The corporation has no proper practice of segregating cost into variable and fixed.
c. The company fails to maintain its periodic performance report systematically.
d. The top level executive are only involved in planning and decision making and lower level participation is not found.
e. There is not separate planning department and expert plan is prepared on traditional and adhoc basis.

Dumre(2006) has submitted the thesis on the topic “Profit Planning Practice Nepalese Public Enterprise: A case study of DDC”. The study is mainly concerned with the appraisal of Dairy Development Corporation and examines that in what extent the company is applying profit-planning system. Mr. Dumre has covered the

data of five years. In his research paper he has used both primary and secondary data by various sources. He has listed the following major findings:

a. To achieve the basic objective, DDC has not clearly defined its main objective in annual goal or target.
b. The production plan depends upon sales plan but in case of DDC the production plan is basic plan of sales plan because supply side is more important than demand.
c. The reason of failure to raise profit in Nepalese manufacturing PEs is lack of knowledge about the market situation and lack of systematic planning. It is the situation of DDC.
d. The commercial performance of DDC is poor, so the enterprise is not in the position to bear the financing into research and to increase plant capacity by internal fund.
e. There is not separate costing department in DDC. Costing is done by traditional method and there is no practice of the cost as variable and fixed or controllable and not controllable or direct and indirect etc.
f. There is no proper planning for cost control mechanism and performance reporting.
g. DDC has lack of budgeting experts, skilled planners and entrepreneurship. Planning department has no adequate authority to decide and create new ideas to formulate various plans.

Thapa (2007) has tried to point out some features and problems of profit planning in the context of Nepalese manufacturing enterprises: A comparative study on profit planning of Dairy Development Corporation and Sita Ram Dairy Milk, submitted to the Central Development of Management, TU. Thapa has listed the following major findings.

a. DDC has concentrated its whole effort on the survival of the company.
b. Sales figure (both targeted and achievement) of SRD are more inconsistent variable than that of DDC.
c. Both companies have positive correlation between actual and target sales.
d. SRD's capacity utilization is poorer than that of DDC's capacity utilization.
e. SRD has highly been successful to maintain so-ordination than DDC.
f. Overall responsibility of profit planning is under finance department in SRD whereas it is under account department in DDC.
g. Both companies have not proposed profit planning except sales and production plan.
h. DDC and SRD have been suffering from operating loss for many years. The main cause is low contribution margin ratio, high fixed cost and underutilization of capacity.

Bhusal (2007) has submitted the thesis on the topic "A Comparative study on Profit Planning in Manufacturing and non-manufacturing Public Enterprise of Nepal". He had focused his study to highlight the current practice of profit planning and its effectiveness in Nepalese public enterprises. In his research paper he has used primary as well as secondary data.

Major findings of his study were as follows:

a. There is no adequate and clear-cut co-ordination among various units in the organization.
b. Objectives of the enterprises are controversial. There is conflict between profit and social goals.
c. There is inadequate planning of profit due to lack of planning experts.
d. There is lack of entrepreneurship and commercial concept in overall operation of the enterprises.

e. The plans are based on adhoc and unrealistic forecast.
f. There is red-tapism and delay in the implementation phase as shown by the achievement to below the targets.

Thapa(2008) has conducted a research entitled “Profit Planning in Manufacturing Enterprises "A case study of Birjung Sugar Factory Limited". She has focused her research in the application of profit planning in manufacturing companies.

Thapa’s study is based on primary as well as secondary data. In her research, she has pointed out the various findings and recommendation, which are as follows:

Findings of the Study:

a. The management of the BSFL applied annual sales and production budget. There is substantial gap between sales target and achievement each year.
b. Objectives of BSFL are not clear and measurable and top-level management executives are only involved in planning and decision.
c. There is not intra and inter department co-ordination and lack of co-ordination with other concerned authorities.
d. There is poor policy as to sales, production, inventory and material budgets. Attention toward cost structure and control program is not existed.
e. There is no system of systematic forecasting.
f. Expenses are not identified as fixed and variable and BSFL is unable to use contribution margin analysis approach.
g. There is no practice of preparing budget like raw materials, capital expenditure, direct labor budget, cash budget, performance report etc.

Adhikari (2009) has done the research on “profit planning in manufacturing enterprises: A case study of DDC” with the objectives of:

a. To analyze the functional budgets on sales and production sector of DDC.
b. To analyze various accounting ratios, major the profitability and efficiency of DDC, analyze the budget target and its achievement along with reason of deviation (if any), provide valuable recommendations and suggestions based on analysis.

Adhikari has summarized his remarkable findings are:

a. DDC has practice short term planning rather than long term planning; the time is covered by interim period any by product.
b. Production and sales of DDC is increasing annually although the growth rate is fluctuated, the correlation between actual and targeted sales is positive.
c. The corporation has no proper practice in suggestion cost into fixed and variables.
d. There is positive correlation between target actual productions of milk.
e. Most of the budget figures are higher than actual figure.
f. DDC has applied stable inventory policy with opening stock of inventory but this policy is not applied in practices. It has 1% store losses and 0.5% distribution losses of milk.
g. DDC has prepared direct labor budget only based on technical and administration; it is not prepared according to the time and rate.
h. Capacity utilization is very high but production ratio is very low.
i. The CVP analysis shows that DDC is operating below the break-even point and flexible budget of DDC shows 90% variable cost of sales revenue.
j. DDC utilized corporate fund as long-term loan and from international agencies like US aid.

k. DDC has not clear attainable objectives, policies and strategies, timely accounting and auditing work are not maintained, financial statements accounting are out of the financial rules.
l. The present management doesn't have any program of perfect profit planning.

Rijal (2011) has conducted a research " Cost- Volume-Profit Analysis as a Tool to Measure Effectiveness of Profit Planning and Control: A Case Study of Nebiko Private Limited." He has centered his study to examine CVP analysis as a tool in manufacturing industry and to analyze the CVP and its impact in profit planning. Rijal had point out some remarkable findings of research and which are:

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

Katwal (2011) has submitted his thesis on the topic "Cost Volume Profit Analysis of Bottlers Nepal Limited" with some remarkable objectives for measuring the applicability of CVP analysis on budgeting, for finding the profitability of the Bottlers Nepal Pvt. Ltd as a tool of financial performance analysis, for the

examination of the risk position, and then Mr. Katwal concluded some remarkable finding with respect to these objectives are as follows:

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

2.11 Research Gap

Research is a continuous process having no ending point. Every researcher tries his/her efforts to fulfill the gap, which has not been covered by the previous research work. So, the researcher has attempted to fulfill the following matters:

- Most of the studies have been done in respect of comprehensive profit planning and control of manufacturing public enterprises but this study examines the current practice of CVP analysis as a tool of PPC in KD as a private dairy sector.
- Previous studies have compared private dairy to DDC but this research has been contributed sole study on private dairy with reference to KD.
- This study gives a high degree of value as the process and the data used in a systematic way studies of CVP analysis.
- Previous studies have not covered risk measurement associated with KD but this study focuses the risk measurement with the help of operating leverage technique.

So this study will be fruitful to those interested Person, Scholars, Students, Teachers, Government, and Businessman, Civil society and other stakeholders for academic and policy prospective.

CHAPTER – THREE

RESEARCH METHODOLOGY

This chapter is related to the research methodology applied in the entire aspect of the study. Research methodology is a research tool. It refers to the logical sequence of various steps to be adopted by a researcher in studying problems with certain objectives. In others words, research methodology describes the method and process applied in the entire subject of the study.. Research is the systematic method of finding right solution for the problem whereas research methodology refers to the various steps undertaken by the researchers to find the optimum solution. Methodology helps to analyze, examine and interpret various aspect of research work. Methodologies state the method with which data have been used in interpretation of such data to fulfill the objectives. The chapter includes research design; population of sample, Nature and sources of data, analysis of data and tools for analysisfor this purpose following research method has been used in this study.

3.1 Research Design

Research design is the plan and strategy of investigation conceived so as to obtain answers to the research questions and to control the variance. Research design helps in the analysis of data related to research topic. It is a controlling media for the collection of data and it helps to collect accurate information relating to the research subject. Research design is the strategy for concluding research. It describes the general framework for collecting, analyzing and evaluating data.

For this study the researcher has been used both the analytical and descriptive research design for the purpose of CVP analysis. Descriptive design has been used for the conceptual development and scientific and systematic framework of the

research and the analytical design has been used for the systematic interpretation of the numerical data used in this study.

3.2 Sources of Data

There are vital role of the data in research to clear and complete research objectives. Without the data, methodology cannot be utilized to bring the conclusion. Proper and required data should be collected from needed sources.

The secondary data has been used in this study. Basically, secondary data has been collected from the annual reports of KD, company's publications, books and journals/magazines, booklets and Internet etc. Thus, secondary is the main source of data and other necessary information has been obtained throughout the research form authorized staff of KD, Babarmahal, Kathmandu. Some of these data were published while other was unpublished.

3.3 Population and Sample

The total no of Dairy Manufacturing Company is the population of study. The total no of Dairy Manufacturing Company in Nepal is 215. Dairy Manufacturing Companies are most important player in the economic sector.

Selected Dairy Manufacturing Company as sample is Kathmandu Dairy pvt ltd. This is fully owned by Nepalese private sector. In this way, the sample selection has fair representation of the population of total Dairy Industries.

3.4 Process of Data Collection

The research has been done within three months. The first one month has taken for the data collection, next month for analyzing the collected data and last one month for the preparing of the research report more prescribed and systematically.

3.5 Period Covered

This research study covers the last five years i.e. fiscal year 2063/64 to 2068/69 and Kathmandu Dairy's strength and weaknesses of managerial planning and other related things are identified.

3.6 Data Processing Procedures and Tools Used

Relevant data of this study are collected through secondary sources. Tables, charts and graphs have been used as per requirement. Accounting, mathematical and statistical tools are also used to analyze collected data.

3.6.1 Accounting and Financial Tools

Generally, the accounting and financial are used for the purpose of the assessment of the financial position to a particular organization. They are as follows:

a. Contribution Margin Ratio
b. Break-Even Analysis
c. Gross Profit Margin Ratio
d. Net Profit Margin Ratio
e. Operating ratio
f. Degree of Operating Leverage

3.6.2 Mathematical and Statistical Tools

Generally, the statistical tools are used for attaining accuracy on analysis as well as on study. They are as follows:

a. Arithmetic mean $(\overline{X})$

Arithmetic mean is a set of observations in their sum divided by the number of observations. For e.g. the arithmetic mean $(\overline{X})$ of n observation x_1, x_2.....x_n is given by:

$$\overline{X}\ X\frac{1}{n}\ {}_{i Z1}^{n}\ X$$

Source: Bajracharya: 2055, Business statistics

b. Standard Deviation (σ)

Standard deviation, usually denoted by the Greek letter small sigma (σ), is the positive square root of the arithmetic mean of the squares of the deviations of the given values from their arithmetic mean. For the frequency distribution of the given values from their arithmetic mean for the frequency distribution xi/fi, i = 1, 2, 3,....., n

$$\sigma X\sqrt{\frac{1}{N}}\ {}_{i}\ fi(Xi\ Z\overline{X})^{2}$$

Where,

$\overline{X}$ = Arithmetic mean of the distribution

$$\sum_{i} f_i X_N$$

Source: Bajracharya: 2055, Business statistics

c. Coefficient of Variance (C.V.)

Hundred times the coefficient of dispersion based upon standard deviation is called coefficient of variance.

$$CV = 100 \times \frac{\sigma}{\bar{X}}$$

Source: Bajracharya: 2055, Business statistics

d. Karl Pearson's Coefficient of Correlation (r)

Among the several mathematical methods of measuring correlation, the Karl Pearson's method has been popularly known as Pearson's co-efficient of correlation is most widely used in practice. It is one of the very few symbols that are used universally for describing the degree of correlation between two series (Gupta, 1999: E- 10.11). It is denoted by 'r'. In the present context, the context, the coefficient of correlation is computed in order to measure the relationship between budgeted and actual sales of Kathmandu Dairy.

$$r = \frac{N \sum xy - \sum(X)(Y)}{\sqrt{N \sum X^2 - \sum(X)^2}\sqrt{N \sum Y^2 - \sum(Y)^2}}$$

Here,

N = Number of pairs of x and y observed

X = Budgeted sales

Y = Actual sales

r = Person correlation coefficient

Source: Bajracharya: 2055, Business statistics

The correlation should always lie between ±1, r_{xy} = +1 denotes the perfect positive correlation between two variables. As such r_{xy}= -1 denotes the perfect negative correlation between two variables. r_{xy} = 0 denotes independent variables or say non-correlation between the two variables.

e. Probable Error [P.E. (r)]

The probable error of the coefficient helps in interpreting its value. With the help of probable error, it is possible to determine the reliability of the value of the coefficient in so far as it depends on the condition of random sampling (Gupta, 1999: E-10.25). The probable error of the coefficient of correlation is obtained by using the following formula:

$$\text{P.E. X} 0.6745 \frac{(1 \text{Z} r^2)}{\sqrt{N}}$$

Here,

0.6745 is the constant value

r = Coefficient of correlation

N = No. of pairs of observation

Source: Bajracharya: 2055, Business statistics

If the value of 'r' is less than probable error [i.e. if r< P.E.(r)]: there is no significant relation between X and Y.

If the value of r is more than 6 times the probable error [i.e. if r > 6P.E.(r)]; there is a very significant relation between X and Y.

CHAPTER - IV

PRESENTATION AND ANALYSIS OF DATA

The main objective of this study is to examine the application of "Cost - Volume - Profit Analysis in Kathmandu Dairy". For accomplishment of this objective, a definite course of research methodology has been followed, which is described in third chapter. In this chapter, secondary data have been used to accomplish basic objectives as well as analyzing sales trend, budgeted and actual sales. The statistical tools, cost plain, inventory ratio, profitability ratio, operating leverage and CVP analysis are used to reach to the conclusion.

The presentation of data is the basic organization and classification of the data for analysis. The analysis of data assists to interpret the facts and fulfill the objectives of the study by using different tools and techniques.

Collected data have been explained and analyzed to clear the objectives of the study. Basically, following two techniques are used to explain the collected data.

a. Descriptive Techniques
b. Quantitative Techniques

Under this, following tools

i. Accounting and Financial Tools:

Generally, the accounting and financial analysis are used for the purpose of the assessment of the financial position of the organization. They are as follows:

a. CM Ratio
b. Break Even Analysis

c. Gross Profit Margin Ratio
d. Operating Ratio
e. Degree of Operating Leverage

ii. Mathematical Statistical Tools:

Generally the Statistical Tools are used for attaining accuracy on analysis. They are as follows.

a. Arithmetic Mean
b. Standard Deviation
c. Co-efficient of Variance
d. Karl Pearson's Coefficient of Correlation

This study has tried to examine CVP analysis as a tool to measure effectiveness, present practice of CVP analysis, possibility of CVP analysis to be applied to strengthen the Kathmandu Dairy. It presents the analysis and interpretation of data from FY 2064/65 to FY 2068/69.

4.1 Analysis of Sales Variances

To identify the sales trend of past and to forecast the possible future trend of the Kathmandu Dairy, previous years budgeted sales and their achievement is presented in the table. To analyze the previous sales data of Kathmandu Dairy, the following table presents the budgeted sales and actual sales achievement (in Rs.) From FY 2064/65 to FY 2068/69.

Table 4.1: Sales Budget and Achievement

FY	Budgeted sales (Target) (Rs.)	Actual Sales (Rs.)	Achievement	Variance (unfavorable) = (Actual sales-Budgeted Sale)	
				In Amount	In Percentage
2064/65	17861146.41	16475121.45	92.24%	1386024.962	7.76%
2065/66	19653611.07	18547112.77	94.37%	1106498.303	5.63%
2066/67	20631070.17	19682040.94	95.40%	949029.2277	4.60%
2067/68	29446904.67	25657088.04	87.13%	3789816.631	12.87%
2068/69	32700413.20	29459831.71	90.09%	3240581.49	9.91%

Source: P/L a/c and B/S of KD of relevant years

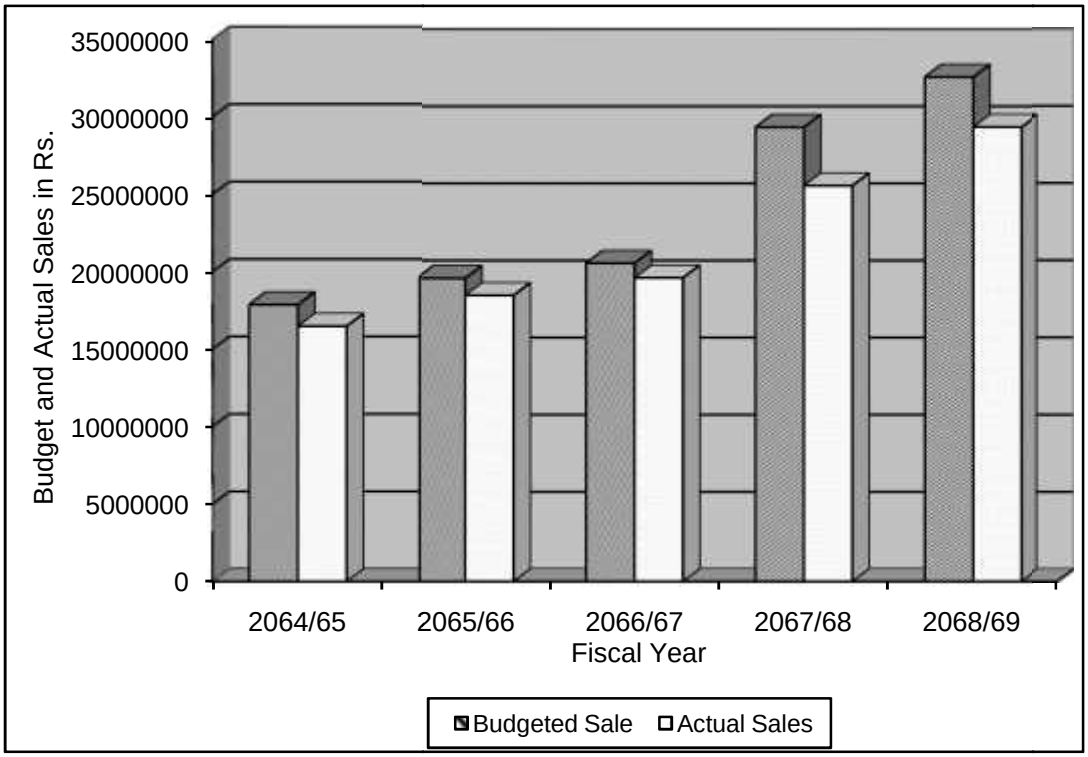
The above table depicts that Kathmandu Dairy is not able to achieve the budgeted sales during the study period of five years. So the sales performance of the enterprise is not quite satisfactory. The sales achievement of KD in the FY 2064/65 was 92.24 percent. However it is sharply increased by 2.13% and reaches to 94.37% in the FY 2065/66. Such increasing trends came up to FY 2066/67 and at the end of FY 2067/68, the sales achievement decreased to 87.13%. In FY 2068/69 the sales achievement increase by 2.96%

The above table also shows that budgeted sales of the enterprise is in increasing order from FY 2064/65 and the actual achievement is also in increasing order. In FY 2066/67, the achievement percentage is 95.4%, which is the highest achievement during the study of 5 years and lowest achievement, is 87.13%, which is in the FY 2067/68. Non-achievement of the target set may be due to certain

factors like, inefficiency of management, higher margin of budgeted sales, political disturbances, quality of products, delivery of products etc.

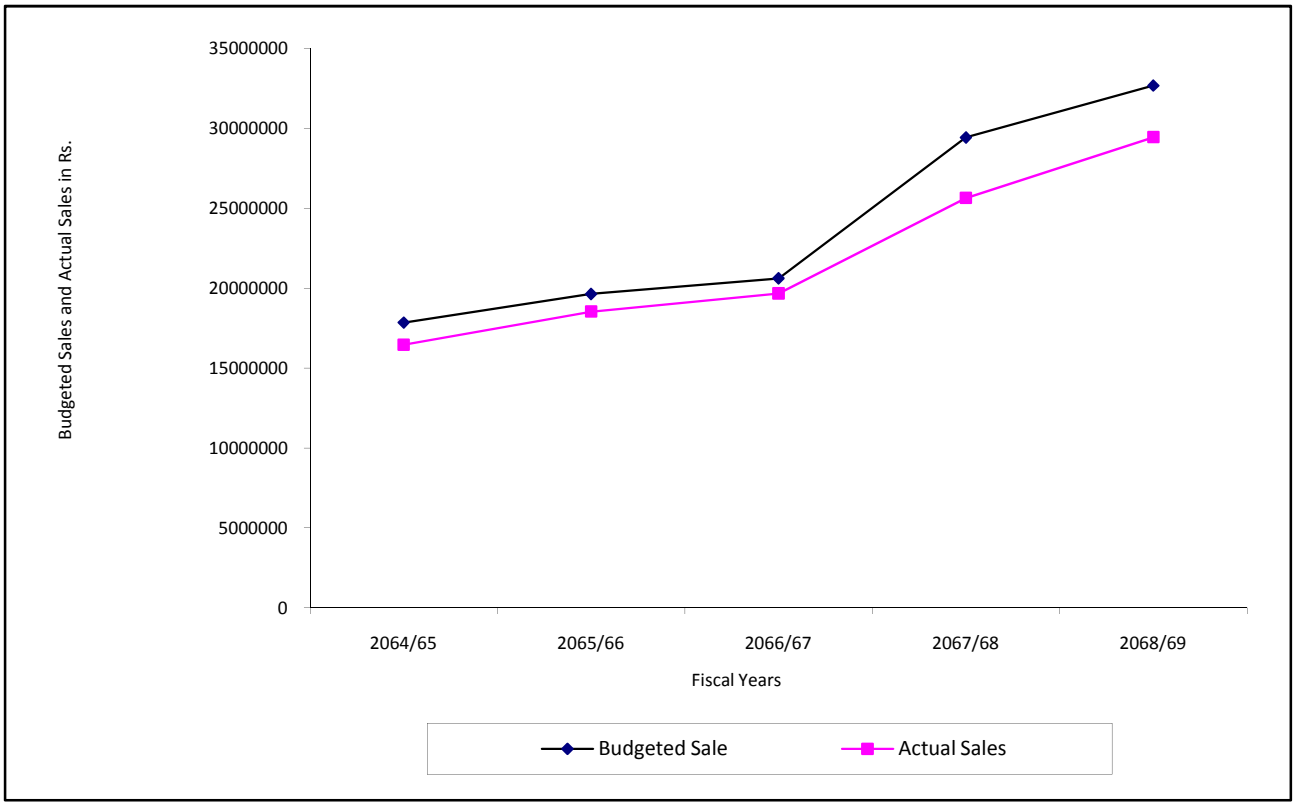
The above table clears that there is no favorable variance in any fiscal year. The unfavorable variance between target sales and actual sales are 7.76%, 5.63%, 4.60%, 12.87%and 9.91% in the FY 2064/65 to 2068/69 respectively. This unfavorable variance percentages shows that there is no systematic and scientific sales plan. To reduce or remove unfavorable variance percentage, the management should set the budgeted sales according to capacity of the enterprises. Budgeted and Actual sales of KD can be presented in the bar diagram and graph as below:

Figure 4.1: Bar Diagram of Budgeted Sales and Actual Sales



The above diagram indicates that actual sales never meet the budgeted sales. The highest achievement is 95.50% in the FY 2066/67 and the lowest achievement is 87.13% in the FY 2067/68.

Figure 4.2: Graphical Presentation of Budgeted Sales and Actual Sales.



The above figure no. 4.2 shows the trend of sales budget and sales achievement. The graphical presentation indicates that the gap between target sales and actual sales is not very high but actual sales are always below the budgeted sales. The gap between budgeted and actual sales is very high in FY 2067/68 and low in FY 2066/67.

Table 4.2: Summary of Statistical Value

Detail	**Budgeted sales (X) (Rs. in '00000')**	**Actual sales (Y) Rs. in '00000'**
Mean $\overline{X}$	240.59	219.64
SD (σ)	58.87	48.34
C.V.	24.47	22.01
Correlation (r)	0.9843	
Probable Error (P.E.)	0.0096	

Source: Appendix III.

The above table no. 4.2 shows that budgeted mean sales of 240.59is more than actual sales of 219.64. It shows that there is no any proper planning for making budget and for achieving the target of the budget. Similarly, the standard deviation and coefficient of variance of actual sales is 48.34 and 22.01% respectively, which is less than standard deviation and coefficient of variance of budgeted sales i.e. 58.87 and 24.47%. It indicates that budgeted sales are more variable than actual sales. It may be due to inefficiency of the budget planner. The above table shows that the correlation between budgeted and actual sales is positive i.e. 0.9843. It shows clearly that if budgeted sales increase, the actual sales also increase and vice-versa. The correlation (r) 0.9843 between budgeted and actual sales is greater than 6 x P.E. (6x0.0094=0.0564). It indicates that the value of r is highly significant. So, we can easily say that the actual sales of KD are in the same direction towards the budgeted sales.

Here, Budgeted sales (X) are assumed to be independent variable and actual sales (Y) is assumed to be dependent variable. The regression line of Y on X be

$$Y - \bar{Y} = r\frac{\pm y}{\pm x}(X - \bar{X})$$

$$Or, Y - 219.64 = 0.9843\frac{48.34}{58.87}(X - 240.59)$$

$$Or, Y - 219.64 = 0.8082(X - 240.59)$$

$$Or, Y = 0.8082X - 194.45 + 219.64$$

$$Or, Y = 0.8082X + 25.19$$

This regression line shows that there is positive relationship between the budgeted sales and actual sales. With the help of this line, we can estimate the expected actual sales in coming period.

4.2 Comparison between Actual Sales and Profit/Loss Trend of KD

KD is running in profit since the beginning period to fiscal year 2068/69 but the profit is not very satisfactory and is fluctuating. The main cause of it is excess burden of fixed administrative and manufacturing costs. The following table shows the actual sales and profit/loss trend of the study period.

Table 4.3: Actual Sales and Profit/ (Loss) Trend of KD

Fiscal Year	Actual Sales (Rs.)	Net Profit/(Loss) in (Rs.)
2064/65	16,475,121.45	376,062.66
2065/66	18,547,112.77	500,974.49
2066/67	19,682,040.94	545,481.82
2067/68	25,657,088.04	630,956.96
2068/69	29,459,831.71	810,959.98
Total	1,09,821,194.9	2,864,435.91
Average	21,964,238.98	572,887.18

Source: Audited Report of KD

The above table no. 4.3 shows that KD is earning profit but is not in the satisfactory level. From the analysis of this table, it is found that minimum profit of Rs. 376,062.66 is earned in the FY 2064/65 and maximum profit of Rs. 810,959.98 is earned in the FY 2068/69. The profit of KD seems to in increasing trend in starting. If the corporation will control the administrative costs, other non-manufacturing costs, production costs and factory expenses, it would earn satisfactory level of profit in coming year.

4.3 Cost Plan of KD

Cost planning and controlling is necessary to maintain reasonable costs level to support objectives and planned programs of the organization. The organization should not focus itself on decreasing the costs only rather it should be for better utilization of limited resources. It should focus to establish the relationship between expenditures and the benefits derived from those expenditures. The organization can reduce costs temporarily but it may bring many difficulties like break down of machines, inefficiency in works etc. In this study, all fixed and variable costs are categorized by cost of goods sold, administrative cost and distribution cost.

Cost of goods sold is also called production cost. Raw materials, production salary and wages, fuel and lubricant costs, electricity cost, water cost, lab chemical cost etc. are the example of cost of goods sold.

Administrative costs and management costs are those coasts, which are not directly related with production. Administrative costs are salary and wages, allowances and incentives, donation, depreciation, interest etc.

Similarly, selling and distribution costs are those costs, which occur in selling activities of any organization such as transportation costs, promotional cost, advertisement etc.

The costs are segregated under administrative and distribution categories as per the view of KD's staffs, intuition judgments and nature of expenses. Like the transportation cost expenses for administrative purpose are categorized under variable administrative cost and the transportation cost expenses for selling and distribution purpose are categorized under variable selling and distribution cost. Hence transportation cost is segregated as 30% variable administrative and 70% selling and distribution cost. In the same way, telephone charges and miscellaneous expenses are categorized as 60% variable administrative and 40% selling and distribution cost. Salary given to administrative staffs is categorized under variable administrative cost and salary given to sales boy is categorized under variable selling and distribution expenses.

4.3.1 Variable Cost Analysis

Variable costs are based on activity. The variable costs should be zero activity. They change directly with change in activity level in a responsibility center. Therefore, if output is doubled, variable expenses is to be doubled, if output increases by 15 percent, the variable expenses also increased by 15 percent, if output is zero, the variable cost also is zero. But variable cost per unit might be changed due to increase in price of material, labor and inventory costs etc.

Table 4.4 (a): Variable Cost Sheet

(In Amount)

FY / Details	2064/65	2065/66	2066/67	2067/68	2068/69
Purchase of milk powder	685,675.00	1,957,819.00	4,300,765.75	3,078,215.98	3,535,451.13
Raw milk	9,974,762.00	10,406,427.00	10,340,750.00	13,362,004.00	13,512,134.00
Sugar	100,200.00	500,875.00	511,000.00	200,319.24	348,216.33
Chemicals	80,120.18	58,425.00	76,482.00	65,423.11	72,423.82
Spice	265,482.07	624,180.45	358,662.42	720,070.37	809,521.74
Ice-cream	14,400.00	111,200.00	49,200.00	110,400.00	148,480.00
Packing materials	1,700,827.00	983,195.00	1,678,382.80	1,610,138.11	1,720,340.20
Cheese	-	-	37,540.00	40,865.00	70,382.00
Purchase of Lubricant	-	357,784.88	-	-	
Fuel consumption for production	277,758.33	0.00	328,696.99	313,934.77	428,816.20
Electricity	240,273.63	236,748.34	409,475.18	521,963.59	598,468.03
Wages and labor charges	440,470.00	540,000.00	436,500.00	436,500.00	436,500.00
Water charges for production	78,891.13	123,114.27	123,515.15	165,642.11	178,426.20
Total	13858859.34	15899768.94	18650970.29	20625476.28	21859159.65
Increase or Decrease		0.1473	0.3458	0.4883	0.5773

Source: Audited Report of KD

The above table no. 4.4 reveals all variable costs, which are used to product dairy products in terms of cost of sales, administrative or operating costs and selling and distribution costs. It also depicts the trend of cost. In the above table, FY 2064/65 is taken as a base year. The cost of sales is in increasing trend. The highest increment is in FY 2068/69 by **0.5773**. The reason of increase in cost may be attributed to high increase in purchase of milk powder, raw milk, sugar etc. To

reduce the cost of sales, KD should try to control in wastage of raw materials, milk powder expenses, and ice-cream con. In FY 2064/65administrative cost that is in increased trend. The highest administrative cost is in FY 2068/69 and is lowest in FY 2064/65. The reasons for increase in administrative cost are higher expenses in telephone charges, transportation and various miscellaneous items. Similarly, selling and distribution expenses cost is also in increasing trend over the study period. The highest selling and distribution cost is in FY 2068/69 and is lowest in FY 2064/65. it shows that KD doesn't have control over costs which proves that it is not using effective planning tools for cost control.

4.3.2 Fixed Cost Analysis

Fixed costs are the cost associated with those inputs, which do not vary with the change in volume of output or activity within a specified range of activity or output (relevant range). Fixed costs, thus, remain constant whether activity increases or decreases within a relevant range. For example, the rent of factory or office premises, property, insurance, senior executive's salary, lease payments, depreciation etc. remain the same whether there is an increase or decrease in the volume of activity.

Table 4.4 (b): Fixed Cost Sheet

(In Amount)

FY / Details	2064/65	2065/66	2066/67	2067/68	2068/69
Factory Insurance Premium	17,957.00	9,365.00	-	-	-
Repair & Maintenance	84,868.08	64,535.78	7,096.20	64,283.68	69,832.68
Total	102,825.08	73,900.78	7,096.20	64,283.68	69,832.68
Increase or Decrease	-	(0.2813)	(0.9310)	(0.3748)	(0.3290)

Source: Audited Report of KD

Table 4.5: Administrative Cost *(In Amount)*

FY / Details	2064/65	2065/66	2066/67	2067/68	2068/69
Audit fee	20,000	20,000	20,000	22,283.79	26,513.85
Repair & Maintenance	81,679.72	61,955.36	127,230.26	144,182.58	204,290.72
Rent	31,200	32,400	33,600	35,160	42,800.00
Printing & Stationary	30,9143	37,559	79,472.80	163,808057	174,213.21
Newspaper	-	-	-	-	4,320.00
Donation	26,800	51,475	20.500	3,000.00	5,000.00
Rates & Taxes	37,502	51,350	2,500	6,200.00	6,700.00
Staff uniform	-	-	1,520	0.00	
Medicine & Treatment	43	-	-	360.00	800.00
Director's Remuneration	66,000	66,000	132,000	216,000	268,000.00
Bad debt	-	77,317.50	-	39,609.55	
Cleaning charge	9,931	33,812	18,800	18,000	17,500.00
Guest Expenses	-	-	22,101,77	12.311	11,800.00
Lab Expenses	-	-	2,517,74	5,816	9,848.00
Lab Expenses	-	-	4,605.00	-	5,000.00
Insurance of Staff	-	-	21,096.39	-	24,242.21
VAT on Non VAT able Goods	-	-	4,605.00	-	
TDS paid for 057/58	-	-	-	19,090	21,000.00
Expenses Written Off	-	-	-	36,263.51	42,240.00
Staff Bonus	-	-	-	63,096	81,096.00
Depreciation	991,388.98	1,095,602.45	1,117,656.49	1,272,992.55	1,484,029.30
Total	1,295,459	1,527,471	1,603,600	2,058,173.55	2,490,593.00
Increase/Decrease		0.1791	0.2379	0.5888	0.9226

Source: Audited Report of KD

In the above table no. 4.5, it is observed that the fixed cost of sales of KD is more in other tears than the FY 2064/65 as taken the base year. The fixed cost is highest in the FY 2064/65 and it may be attributed to the increase in expenses of repair & maintenance and factory insurance premium. Fixed administrative cost is in increasing trend over the study period. The fixed administrative cost s highest in the FY 2068/69 due to more expenses in repair & maintenance, printing & stationary, director's Remuneration, staff Bonus, depreciation. The lowest fixed administrative cost is in the FY 2064/65 over the study period. Fixed distribution cost is increased compared to the FY 2064/65 taken as a base year. It is highest in the FY 2068/69 due to the more expenses in advertisement. It can be concluded that KD is not using effective planning to control the fixed costs.

4.4 Profitability Ratio Analysis

The word 'profitability' may be defined as the ability of given investment to earn a return from its use. Profitability has been considered, to a great extent, as the main criteria to judge the extent to which the management has been successful in efficiently utility the funds at its disposals or in other words, how far the management has been successful in maximizing its profits or minimizing its losses, if any.

The word 'profitability' ratio measures the operating efficiency of the company. Besides management of the company, creditors and owners are also interested in the profitability in relation to investment. But the present study concerns only with the profitability in relation.

Table 4.6: Income Statement for the Ended From 2064/65 to2068/69

(In Amount)

Details	2064/65	2065/66	2066/67	2067/68	2068/69
Sales	16,475,121.45	18,547,112.77	19,6862,040.94	25,657,088.04	29,459,831.71
Cost of sales		-			
Variable cost	13,858,859.34	15,899,76.84	18,650,9470.29	20,625,446028	21,859,159.65
Fixed Cost	102,825.08	73,900.78	7,096.20	64,283.68	69,832.68
Total	13,961,684.42	15,973,669.72	18,658,066.49	20,689,759.96	21,928,992.33
Add: Opening Stock of raw material	1,746,839.62	1,249,520.07	1,536,515.82	3,674,454.69	5,982154.29
Add: Opening Stock of finished goods	1,370,532.89	1,791,233.08	2,252,693.24	2,734,427015	3,028,237.15
Less: Closing Stock of raw material	1,173,520.07	1,551,515.382	3,674,454.70	2989,432.71	3,521,189.71
Less: Closing Stock of finished goods	1,1791,233.08	2,252,693.24	2,734,427015	2,846,550.50	3,430,981.10
Total	14,114,303.78	15,210,213.81	16,038,393.70	21,262,658.59	23,987,212.35
Gross Profit	**2,360,817.67**	**3,336,898.96**	**3,643,647.24**	**4,394,429.45**	**5472619.36**

Source: Audited Report of KD

4.4.1 Gross Profit Margin

Gross profit margin shows the relationship between gross profit and sales of the firm. It reflects the efficiency with which management produces each unit of product. A higher ratio indicates good management of the firm and vice versa. It is calculated by dividing gross profit by sales.

Table 4.7: Gross Profit Margin of the Years

FY	Sales Amount	Gross Profit	Gross Profit Margin
2064/65	16,475.121.77	2,360,817.67	14.3300
2065/66	18,547,112.77	3,336,898.96	17.9900
2066/67	19,682,040.04	4,394,429.45,	18.5100
2067/68	25,657,088.04	4,394,429.45	17.1300
2068/69	29,459,831.71	5472619.36	18.5800
Total	1,09,821,194.9	19,208,412.68	86.5400
Mean	21,964,238.98	3,841,682.54	17.3100

Source: Audited Report of KD

The above table no. 4.7 shows that the gross profit margin of KD is fluctuating. Maximum ratio over the study period is 18.58 in the FY 2068/69 and minimum ratio is 14.33 in the FY 2064/65. The mean gross profit margin is 17.3100, which is not so favorable condition for the company. It can be concluded that gross profit is very poor in every fiscal year.

4.4.2 Net Profit Margin

Net profit margin measures the relation between net profit and sales of the firm. A high profit margin indicates adequate return to the firm and thus enables in withstanding in adverse economic situations. When sales price is declining, cost of

production is rising and demands for the product are falling. A low profit margin shows just the opposite. Net profit margin is computed by dividing net profit by sales. We have,

$$\text{Net Profit Margin X} \frac{\text{Net Profit After Tax}}{\text{Sales}}$$

Table 4.8: Net Profit Margin of the Years

FY	Sales Amount (Rs.)	Net Profit (Rs.)	Net Profit Margin (%)
2064/65	16,475,121.45	376,062.66	2.28
2065/66	18,547,112.77	500,974.49	2.70
2066/67	19,682,040.94	545,481.82	2.77
2067/68	25,657,088.04	630,956.96	2.46
2068/69	29,459,831.71	810,959.98	2.75
Total	1,09,821,194.9	2,864,435.91	12.96
Mean	21,964,238.98	572,887.18	2.59

Source: Audited Report of KD

The above table no. 4.8 shows that the net profit margin of KD is fluctuating over the study period. The highest net profit margin is 2.77% in the FY 2066/67 and lowest is 2.28% in the FY 2064/65. The mean net profit margin of KD is only 2.59%. It proves that the firm's net profit situation is still dissatisfactory.

4.4.3 Operating Ratio

The operating expenses ratio explains the change in the profit margin ratio. It is calculated by dividing operating expenses like as cost of goods sold plus selling

expenses and administrative expenses (excluding interest) by sales. Lower the operating ratio indicates higher the operating profit and vice-versa. We have,

$$\text{Operating Ratio } X\frac{\text{Cost of GoodsSold } \Gamma \text{ Operating Expenses}}{\text{Sales}}$$

Where,

Operating Expenses = Administrative Expenses (excluding interest) + Selling and Distribution Expenses.

Table 4.9: Operating Ratio of Years

FY	Sales Amount (Rs.)	Cost of Sales (Rs.)	Operating Expenses (Rs.)		Operating Ratio
			Administration Expenses	Selling Distribution Expenses	
2064/65	16,475,121.45	13,961,684.42	1,526,323.21	391,731.59	0.96
2065/66	18,547,112.77	15,973,669.72	1,580,885.18	552,576.17	0.98
2066/67	19,682,040.94	18,658,066.49	2,003,888.14	649,011.28	1.08
2067/68	25,657,088.04	20,689,759.96	2,548,959.73	856,694.62	0.94
2068/69	29,459,831.71	21,928,992.33	2,994,844.07	996,894.62	0.88
Total	1,09,821,194.9				
Mean	21,964,238.98				0.9680

Source: Audited Report of KD

The above table no. 4.9 shows that the operating ratio of KD is high over the study period. It is more than 1 in the FY 2066/67. The operating ratio is less than 1 i.e. 0.96, 0.98, 0.94, 0.88 in the FY 2064/65, 2065/66, 2067/68 2068/69 respectively. But still it is not in good position for the company as it indicates the high cost of goods sold and operating expenses of KD resulting low operating profit. The mean

operating ratio is slightly less than 1 so, it indicates that the firm is poor to minimize and control the cost of goods sold and operating expenses.

4.5 Degree of Operating Leverage

A ratio between contribution margin and EBIT is known as operating leverage or a ratio between the percentage changes in EBIT and percentage changes in sales amount is known as operating leverage. It measures the degree of business risk associated at a firm. Higher percent of fixed cost indicates higher degree of operating leverage. It is calculated by dividing contribution margin by EBIT. The greater degree of operating leverage indicates the greater amount of business risk and vice versa. We have,

$$\text{Degree of Operating Leverage} = \frac{\text{Contribution margin}}{\text{Earning Before Interest and Tax}}$$

Table 4.10: Degree of Operating Leverage of the Years

FY	Contribution (Rs.)	EBIT (Rs.)	DOL
2064/65	1,974,568.76	413,363.66	4.78
2065/66	2,638,652.89	859,981,49	3.07
2066/67	2,618,077.39	768,981.49	3.41
2067/68	3,205,176.67	844,174.41	3.80
2068/69	4,835,626.06	912,649.98	5.30
Total	15,272,101.77		20.35
Mean			4.07

Source: Audited Report of KD

The above table no. 4.10 shows that operating leverage of KD is 4.787, 3.07, 3.41, 3.80, and 5.30 in FY 2064/65, 2065/66, 2066/67, 2067/68, and 2068/69 respectively. The mean of DOL is 4.07 if a sale increases by 1% the amount of operating profit (EBIT) increases by 4.07%.

4.6 Cost Volume Profit Analysis

Analyses of various elements, which are used in Cost-Volume-Profit (CVP) Analysis, are:

4.6.1 Contribution Margin

Contribution margin is the difference between the sales revenue and variable cost of production. In other word, contribution margin is the fixed cost and profit. High contribution margin shows high profit and vice-versa. It is calculated by using following formula;

Contribution Margin = Sales Revenue – Variable Cost

Or, Contribution Margin = Fixed Cost + Profit

Table 4.11: Income Statement for the Year Ended from 2064/65 to 2068/69

(Amount)

Details	2064/65	2065/66	2066/67	2067/68	2068/69
Sales	16,475,121.45	18,547,112.77	19,682,040.94	25,657,088.04	29,459,831.71
Variable Cost					
Cost of sales	14,011,478.70	15,136,313.03	16,031,297.50	21,198,374.91	23,246,639.91
Administrative Cost	268,165.51	412,420.87	622,920.69	704,003.63	749,312.36
Selling and distribution cost	220,908.48	359,725.98	409,745.36	549,532.83	628,253.38
Total variable cost	14,500,552.69	15,908,459.88	17,063,963.55	22,451,911.37	24,624,205.65
Contribution Margin	1,974,568.76	2,638,652.89	2,618,077.39	3,205,176.67	4,835,626.06
Fixed cost					
Cost of sales	102,825.08	73,900.78	7,096.20	64,283.68	102,646.23
Administrative Cost	1,332,759.70	1,886,478.31	1,826,233.45	2,271,391.00	3,413,023.84
Selling and distribution cost	170,823.11	192,850.19	239,265.92	307,161.79	508,996.01
Total fixed cost	1,606,407.89	2,153,229.28	2,072,595.57	2,642,836.47	4,024,666.08
Less: Other Expenses	7,901.03	15,550.88	0.00	68,616.76	
Net fixed cost	1,598,506.86	2,137,678.40	2,072,595.57	2,574.219.71	4,024,666.08
Profit	376,061.90	500,974.49	545,481.82	630,956.96	810,959.98

Source: Audited Report of KD

The table no. 4.11 shows that the contribution margin of KD was increasing trend over the study period. Among five fiscal years, the maximum contribution margin is Rs. 4,835,626.06in FY 2068/69 and minimum is Rs. **1,974,568.76** in FY 2064/65.

4.6.2 Profit Volume Ratio

Profit volume ratio is the relationship between the contribution margin and sales revenue. The two factors profit and volume are interconnected and dependent with each other. Profit depends upon sales; selling price to a greater extent will depend upon the volume of production. It is calculated by dividing contribution margin by sales.

We have, $\text{Profit Volume Ratio } X \frac{\text{Contribution Margin}}{\text{Sales}}$

Table 4.12: P/V Ratio of the Years

FY	Sales Amount	Contribution Margin (Rs.)	P/V Ratio
2064/65	16,475,121.45	1,974,568.76	0.1199
2065/66	18,547,112.77	2,638,652.89	0.1432
2066/67	19,682,040.94	2,618,077.39	0.1330
2067/68	25,657,088.04	3,205,176.67	0.1249
2068/69	29,459,831.71	4,835,626.06	0.1641

Source: Audited Report of KD

The above table no. 4.12 shows the profit volume ratio of KD over the study period, which is in fluctuating trend. The highest P/V Ratio is 0.1641 in the FY 2068/69and lowest is 0.1199 in the FY 2064/65.

4.6.3 Break – Even – Analysis

Break-even analysis is the most widely known form of the cost volume profit analysis. Therefore, cost volume profit analysis is also called break-even analysis.

The break-even point is used under Break-even analysis. Break Even Pint is the level of activity at which total cost equals to total revenue. In other words, break-even point is a point of "no profit no loss". If the sales or production is higher than the break-even point volume, there will be profit and if the sales or production is less than BEP sales, there will be loss. Break-even point can be determined by using these methods.

a. Algebraic or Formula Method
b. Graphic or Chart Method

a. Algebraic or Formula Method

$$\text{BEP X} \frac{\text{Total Fixed Cost}}{\text{Profit Volume Ratio}}$$

Table 4.13: Break Even Point of the Year

FY	Fixed Cost	P/V Ratio	BEP (Rs.)
2064/65	1,598,506.86	0.12	13,337,390.52
2065/66	2,137,678.40	0.14	15,025,758.98
2066/67	2,072,595.57	0.13	15,581,247.15
2067/68	2,574.219.71	0.12	20,606,346.71
2068/69	4,024,666.08	0.16	24,540,646.83

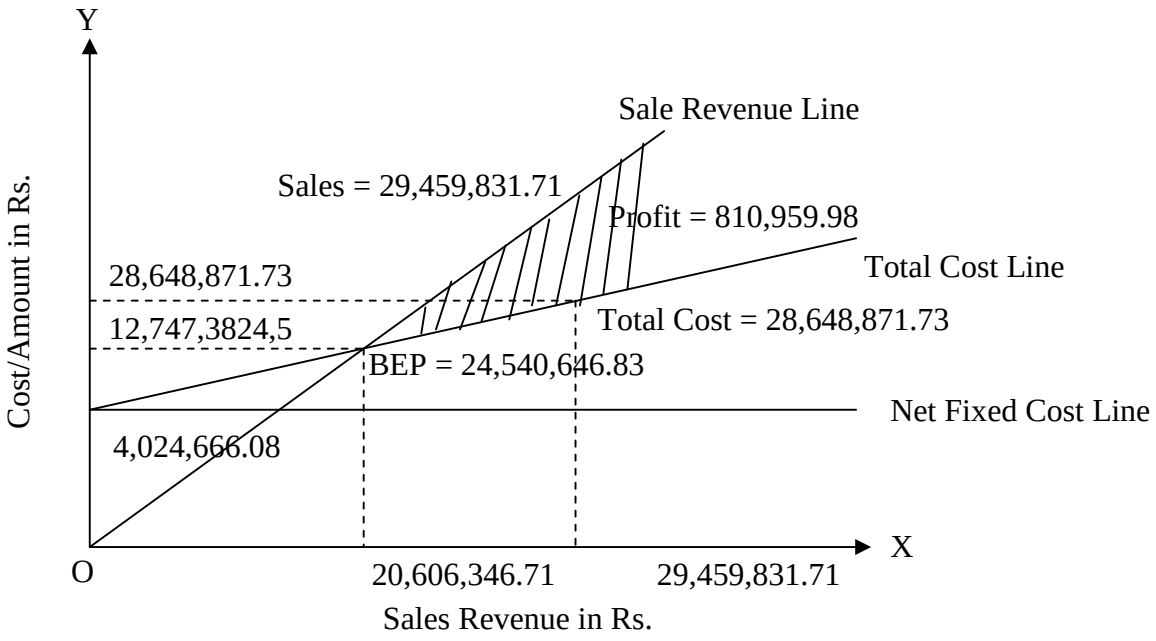
Source: Audited Report of KD

The BEP of KD is shown in table no. 4.13 and it is in increasing trend over the study period of 5 years. The highest BEP of KD is Rs. 24,540,646.83in the FY 2068/69 and lowest BEP is Rs. 13,337,390.52 in the FY 2064/65.

b. Graphic or Chart Method

A specialized form of profit graph, called the break-even-chart, is frequently used to present diagrammatically significant cost-volume-profit relationship; relating total costs at various sales volumes to the expected revenue and profit or loss at each alternative volume. The break-even chart is also for determining the break-even point. The break even indicated in the chart is one at which total cost line and total sales line intersect with each other. The break-even chart of KD for various fiscal years is given below, where sales revenue is shown in x-axis and cost amount is shown in y-axis.

Figure 4.3: Graphic or Chart Method of Break – Even Analysis FY 2064/65



The above chart shows that fixed cost is always equal within a certain level of activity. So fixed cost curve is parallel to x-axis. The total cost curve is sloping upward to right side because total cost amount increases with increases in sales revenue (Sales Units x SPPU). Total cost curve starts from fixed cost line. The amount of fixed cost is Rs. 4,024,666.30 is also total cost when the sales revenue is

zero. The sales revenue curve originates from the origin because sales revenue is zero when the sales volume is zero. The chart shows that the sales revenue curve is slopping upward to right. An equilibrium point between total cost and total revenue curve is known as beak-even point where both the total cost and total revenue is equal to Rs. 24,540,646.83if the actual sales amount is more than break even sales amount. The firm will suffer from loss. Above chart clearly shows that the actual sales amount Rs. 29,459,831.71 is greater than the total cost amount Rs. 28,648,871.73, which generates the profit of Rs. 24,540,646.83. In the similar way, the presentation of Graphic or Chart Method of Break – Even Analysis for other remaining fiscal years are as follows

Figure 4.4: Graphic or Chart Method of Break – Even Analysis for the Remaining FY [2065/66]

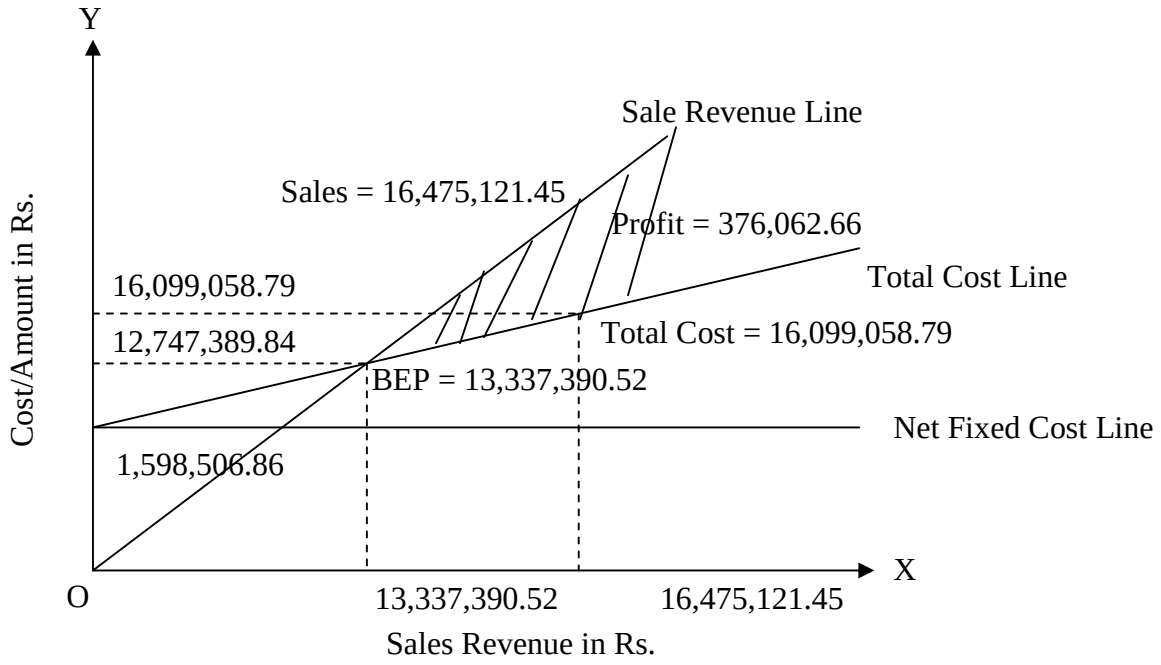


Figure 4.5:Graphic or Chart Method of Break – Even Analysis For The FY 2066/67

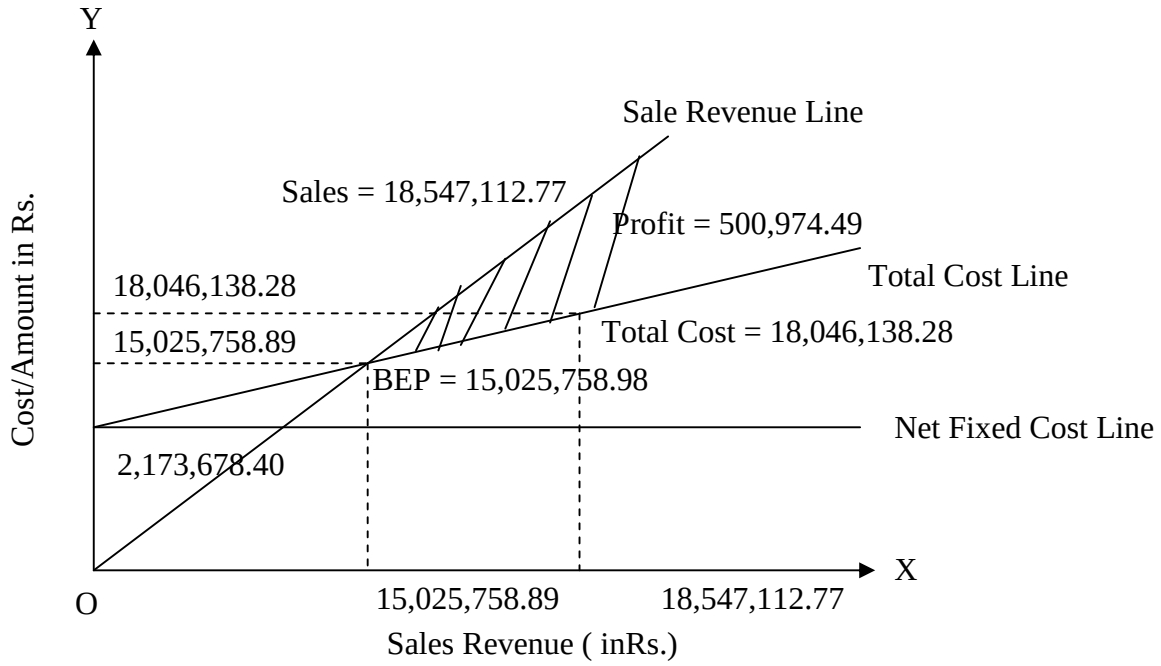


Figure 4.6: Graphics or Chart Methodof Break – Even Analysis For The FY 2067/68

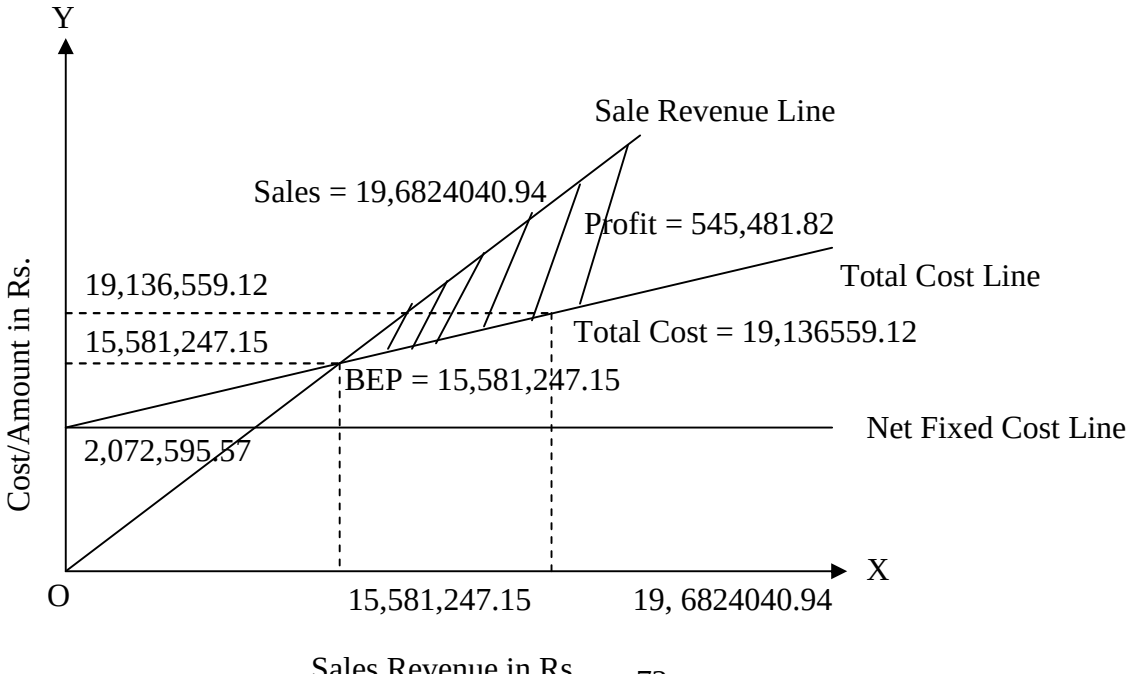
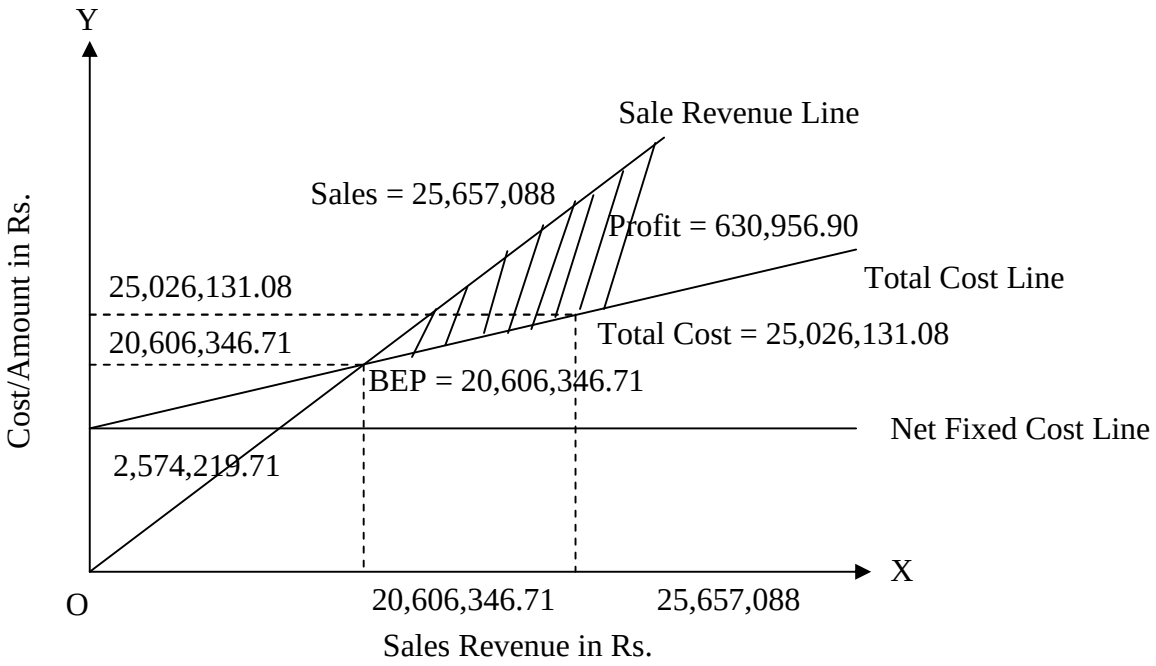


Figure 4.7: Graphic or Chart Method of Break – Even Analysis for the FY 2068/69



4.6.4 Margin of Safety

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

Margin of Safety (MOS) = Actual Sales – Break Even Sales

Table 4.14: Margin of Safety of the Years

(In Amount)

FY	Actual Sales	BEP Sales	Margin of Safety
2064/65	16,475,121.45	13,337,390.52	3,137,730.93
2065/66	18,547,112.77	15,025,758.98	3,521,353.79
2066/67	19,682,040.94	15,581,247.15	4,100,793.79
2067/68	25,657,088.04	20,606,346.71	5,050,741.33
2068/69	29,459,831.71	24,540,646.83	4,919,184.88

Source: Audited Report of KD

The above table no. 4.14 shows the margin of safety of KD over 5 years study period. The margin of safety is regularly increased from 2064/65 till 2067/68 but the regularity has been breaked in year 2068/69 by decreasing comparing with previous year.

4.7 Change Effects and Relationship of CVP Analysis Factors

4.7.1 Change in Sales

The impact of changes in sales value will affect to P/V ratio and BE sales. Increase in sales value increases the profit volume ratio and decrease in BE sales. So, there is positive correlation with profit and negative correlation with BE sales. If sales decrease, the effect will be and vice – versa. If it is assumed that sales increase and decrease by 10 percent and other things remaining constant, and then following results are obtained for the FY 2068/69.

Table 4.15: Income Statement with Change of Sales Value for the FY 2068/69

(In Amount)

Details	Change of Sales Value		
	Original	**10% Increase**	**10% Decrease**
Sales	29,459,831.71	32,405,814.88	26,513,848.54.24
Less Variable Cost	24,624,205.65	24,624,205.65	24,624,205.65
Contribution Margin	4,835,626.06	4,835,626.06	4,835,626.06
Less: Fixed Cost (net)	4,024,666.08	4,024,666.08	4,024,666.08
Profit/(Loss)	810,959.98	375,694.15	(2,135,023.19)
P/V Ratio (CM/sales)	0.16	0.2401	0.0713
BEP (FC/PV ratio)	25,540,646.83	16,762,457.64	56,446,929.59

Source: Audited Report of KD

The above table no. 4.15 shows that with the increase in sales value by 10%, the profit increases by Rs. 2945983.17and P/V Ratio increases from 0.16 to 0.2401 but BEP decreases to Rs. 16,762,457.64. Loss is occurred when sales value is decreased by 10%. P/V Ratio is decreased to 0.0713 and BEP is increased to Rs. 56,446,929.59. It shows that there is positive relationship between sales revenue and P/V ratio and negative relationship between sales revenue and BEP.

4.7.2 Change in Fixed Cost

In general sense, fixed costs do not change within the relevant range. But fixed cost may change due to different conditions. Firstly, the fixed cost may be higher than variable cost due to more amounts spent for administrative improvements and acquiring assets. It may happen for a new corporation, well developed and still in the process of establishment. Secondly, the fixed cost may increase from the previous level, but the rate of increase may or may not coincide with variable cost.

The fixed costs may increase/decrease due to underestimation and over estimation of fixed costs in the previous year. When there is rise in administrative improvement making the best utilization of assets and from the given amount of variable costs. If it is assumed that the fixed cost increases and decreases by 10 percent other things remaining constant, then following result is obtained from the income statement of FY 2068/69.

Table 4.16: Income Statement with Change of Fixed Cost for the FY 2068/69

(In Amount)

Details	Change of Sales Value		
	Original	**10% increase**	**10% decrease**
Sales	29,459,831.71	29,459,831.71	29,459,831.71
Less: Variable cost	24,624,205.65	24,624,205.65	24,624,205.65
Contribution Margin	4,835,626.06	7,781,609.23	1,889,642.89
Less: Fixed cost (net)	4,024,666.08	4,427,132.69	3,622,199.45
Profit	810,959.98	408,493.37	1,213,426.61
P/V Ratio (CM/sales)	0.16	0.16	0.16
BEP (FC/PV ratio)	25,540,646.83	27,669,579.31	22,638,746.56

Source: Audited Report of KD

The above table no. 4.16 shows that there is no change in contribution margin and P/V ratio whether there is increase or decrease in fixed costs. P/V ratio is 0.16 and contribution margin is Rs. 4,835,626.06 in both cases. Only BEP is affected by change in fixed cost. If fixed cost is increased by 10%, the BEP is also increased to Rs.27,669,579.31. Similarly, when fixed cost is decreased by 10% the BEP also decreased to Rs.22,638,746.56.

4.7.3 Change in Variable Cost

Change in variable cost mainly concerns with the operating efficiency of the corporation. The variable cost may increase due to increase in output and wastage caused by both controllable and uncontrollable factors. If the firm increases the output level, the firm has to make additional purchase of materials, employ more labors and bear more selling expenses. Secondly, the variable cost increase by wastage due to lack of skilled workers and leaders of workers being not responsible for increase in production overhead. Wastage in raw materials as well as uncontrollable factors such as increase in raw materials and other inputs are directly related to reduce production. The following income statement of 2068/69 shows the result outcomes from the changes in variable cost by 10 percent increases and decreases.

Table 4.17: Income Statement with Change of Variable Cost for the FY 2068/69

(In Amount)

Details	Change of Sales Value		
	Original	**10% Increase**	**10% Decrease**
Sales	29,459,831.71	29,459,831.71	29,459,831.71
Less: Variable cost	24,624,205.65	27,086,626.22	22,161,785.09
Contribution Margin	4,835,626.06	2,373,205.50	7,298,046.63
Less: Fixed cost (net)	4,024,666.08	4,024,666.08	4,024,666.08
Profit/(Loss)	810,959.98	(165,146.58)	3,273,380.55
P/V Ratio (CM/sales)	0.16	0.08	0.25
BEP (FC/PV ratio)	25,540,646.83	49,933,822.33	16,248,147.27

Source: Audited Report of KD

The above table no. 4.17 shows that there are two conditions, first one, increase in variable cost by 10% shows inefficiency or occurrence of more wastage on materials and labor, then it undoubtedly, leads to loss of Rs. (165,146.58) and increase in BEP to Rs.49,933,822.33. Second one, decreased in variable cost by 10% helps to increase profit to Rs. 3,273,380.55 and reduce BEP to Rs.16,248,147.27. The table also clears that when variable cost is increased, P/V ratio is decreased and vice versa.

4.8 Major Findings of the Study

The major findings of this study have been presented corresponding to the objectives of the study.

a. Proper Planning Aspect is virtually ignored in the company KD. The planning is not based upon some scientific base but its surface planning.
b. KD has not practiced cost volume profit analysis tools for profit planning and the company has not any policy for using CVP tools in coming fiscal years.
c. The company has not practiced to apply appropriate and effective sales forecasting techniques like, survey method and statistical method. It uses market studies and experimentation method for sales forecasting.
d. Budgeted sales have not been achieved during the study period as the highest achievement of actual sales on budget sales is only 95.40 percent in FY 2066/67 whereas the lowest one is 90.09 percent in FY 2068/69.
e. The company has not applied any special technique for segregation of costs into fixed and variable costs.
f. There is no separate costing system for allocation of expenses to each product.

g. Variable costs have more portions as compared to fixed costs due to the high portions in variable costs like: cost of raw milk, water and electricity etc.
h. KD has a high level of risk as operating ratio is very high i.e. 0.9680 and degree of operating leverage is also vary high i.e. 4.07, indicating very high expenses incurred for producing low level of profit.
i. The highest BEP of KD has been found Rs. 24540646.6 in FY 2068/69 and lowest BEP is Rs.13337390.52 in FY 2064/65. There is increasing trend in BEP, which increases the more challenges to increase the sales in the company.
j. The company is not considering about margin of safety. KD has low margin of safety, which is not in satisfactory level because actual sales is slightly greater than BEP sales.
k. The company does not seem applying the effective managerial tools “Profit planning and controlled” for controlling its activity.

CHAPTER –FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

CVP is a greater helpful in managerial decision-making, especially cost control and profit planning. It provides attention-decision making and problem solving backgrounds for important planning decisions, such as selecting distribution channels, pricing, special promotion and personnel hiring. “Know your cost” is an essential theme for any managers. And CVP analysis helps to direct managerial attention to important problems and paves.

The study is completely related with the CVP analysis of the KD as a tool of PPC. Kathmandu Dairy aims to be the leading Dairy and food processing industry in country. It has been successfully introducing varieties of dairy products harmonizing with the changing taste of upcoming generation. It is firmly committed to high quality production of world- class standard at most reasonable price and giving consumer’s services of high satisfaction, although, the company has failed to achieve budgeted sales during the study period. The company’s financial (profitability) position is not satisfactory. The company’s BEP position is also not satisfactory. So, the company couldn’t run in a remarkable sales and profit.

5.2 Conclusion

Except the break-even calculation, the CVP analysis helps for answered some additional questions. What sales volume is necessary to earn a desired net income? What net income will be earned if unit-selling price are reduced in order to

increase sales volume? What net income will be earned through reducing the unit labor cost and the installation cost of a new machine? What net income will be earned if the sales mix will be changed? So the CVP analysis keeps a big value in the land of PPC.

For the achievement of the above advantages, the corporation has not applied CVP tools on profit planning and control. Profit planning has been found unsystematic and traditional way. There is no plan and policies like production plan, sales plan and other operating plan. The company has not utilized its full capacity because of the lack of raw material, inefficiency of management and lack of skilled production specialist

KD has not used BEP tools for planning. So the company is not able to earn a large. There is not perfect sales policy or sales planner; as a result the company is not able to meet the largest sales. The top-level management makes the decisions and policies. Target sales are always greater than actual sales. The major problem faced by the company is increase in the variable operating cost because it has adopted neither the cost control system nor the systematic and scientific plan for classification of cost.

5.3 Recommendations

To solve the problem regarding the CVP analysis the following points are recommended. KD must improve its profitability through the improvement of its short-term performance for which some suggestions have been stated as follows:

a. It is suggested to the KD for practicing the CVP analysis as a tool of PPC for improving business performance through acquiring the valuable information about cost, revenue and profit.
b. Cost plan in KD has not been maintained systematically. KD must establish a cost control program for maintaining a remarkable discipline on cost control by controlling wastages of raw materials, milk powder expenses, ice cream, chemicals, printing and stationary, director remunerations etc.
c. The variable cost has been found very large in KD, which increases in BEP amount. So, the company should reduce the variable cost by searching the economic resources of material and using the advance technology in production.
d. The profit margin of the KD is very low, whereas the operating ratio is too high. The management should follow regular supervision, inspection, evaluation and monitoring.
e. KD should follow the new business strategies for exploring the economic, effective and efficient resources and improving the quality of working life of its employees.
f. KD should develop a culture for reviewing its activities to control worthless task and developing the valuable strategies.
g. The company has not depended proper segregation method of cost into variables and fixed cost. It is very important for applying analysis. So, it is recommended to follow the segregation method either high low point or least square method for finding correct variable cost and fixed cost.

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APPENDIX – ONE

Kathmandu Dairy Pvt. Ltd.

Babarmahal, Kathmandu

Balance - Sheet

Equities and Liabilities	2064/65	2065/66	2066/67	2067/68	2068/69
	(Nrs.)	(Nrs.)	(Nrs.)	(Nrs.)	(Nrs.)
Shareholders Fund					
Share Capital	8,000,000.20	8,000,000.20	8,000,000.20	8,000,000.20	8,000,000.20
Profit and Loss	1,372,493.04	1,765,758.04	2,165,544.39	2,643,157.16	2,551,276.30
	9372,493.07	9,765,758.04	10,165,544.39	10,643,157.16	10,551,276.30
Loan fund; Secured					
Loan from NIDC against Collator of Loan	3,000,000.00	1,896,167.00	1,372,536.00	1077,676.00	
Hire Purchase Loan From SCB					2,778,912.21
Sub Total	3,000,000.00	1,896,167.00	1,372,536.00	1,077,676.00	2,778,912.21
Total Source of Funds	12,372,493.07	11,661,925.04	11,538,080.39	11,720,833.16	13,330,188.51

Assets					
Concurrent Assets					
Fixed Assets-Grass	9,817,787.37	11,065,284.14	12,174,104.08	14,372,753.71	18,492,436.91
Depreciation	2,653,016.88	3,748,919.34	4,866,275.83	6,139,268.38	7,623,297.67
	7,164,770.49	7,316,664.80	7,307,828.25	8,233,485.33	10,869,139.23
Current Assts					
Raw Material & other Stocks	1,249,520.07	1,551,515.82	3,850,528.52		
Finished Stock	1,791,233.08	2,252,693.24	2,734,427.15		
Inventories in Hands				6,060,239.05	2,769,712.14
Trade Debtors	1,678,962.23	84,436.34	661,181.52	943,095.64	1,160,094.25
Loans Advance & Debtors	145,734.00	1,084,450.66	754,723.13	595,500.02	595,500.02
Corporate Tax Receivable				7,905.80	
Vat Receivable	31,893.39				65,053.83
Cash & Banking Balance	884,077.05	138,942.56	416,196.14	465,030.42	945,518.77
Pre-paid Expenses					70,455.27
Sub-total	5,781,419.82	5,122,038.62	8,417,056.46	8,071,770.93	5,606,334.28
Less; Current Liabilities					
Sundry Creditors	505,762.45	735,251.40	4,108,326.87	4,419,191.10	2,899,138.98
Income Tax Provision	67,934.79				
Vat Payable		26,287.00	8,160.00	51,836.00	
Accrued Interest but Not due		15,240.00			
Corporate Tax Payble					10,275.02
TDS Payable			3,000.00	300.00	14,775.00
Provision for expenses			67,317.44		
Bonus Provision				63,096.00	81,096.00
Advance from Customers				50,000.00	140,000.00
Sub Total	573,697.24	776,778.35	4,186,804.31	4,584,423.10	3,145,285.00
Net Working capital	5,207,722.58	4,345,260.25	4,230,252.15	3,487,347.83	2,461,049.28
Total Application of funds	12,732,493.07	11,661,925.05	11,538,080.39	11,720,833.16	13,330,188.51

APPENDIX – TWO

Kathmandu Dairy Pvt. Ltd Babarmahal , Kathmandu
Income statement

Details	2064/65	2065/66	2066/67	2067/68	2068/69
Sales	16,475,121.45	18,547,112.77	19,682,040.94	25,657,088.04	29,459,831.71
Less; Cost of raw material consumed	13,394,785.80	14,340,125.70	15,214,844.10	19,872,457.79	20,483,705.62
Production overhead	1,140,218.17	1,331,548.27	1,305,283.52	1,502,324.15	1,947,529.41
Finished Goods Decrease/(Increase)	(420,700.19)	(461,460.16)	(481,733.91)	(112,123.35)	1,555,977.32
	14,114,303.78	15,210,213.81	16,038,393.71	21,262,658.58	23,987,212.35
Gross Profit	2,360,817.67	3,336,898.96	3,643,647.23	4,394,429.46	5,472,619.36
	14.30%				
Less;					
General Administrative Expenses	963,966.82	1,396,865.90	1,757,875.93	2,282,783.25	2,994,844.07
Finance Cost	37,301.00	359,007.00	222,633.00	213,217.45	101690.00
Depreciation	991,388.22	1,095,602.45	1,117,656.49	1,272,992.55	1,484,029.30
Staff Bonus				63,096.00	81,096.00
Sub-total	1,992,656.04	2,851,475.35	3,098,165.42	3,832,089.25	4,661,659.38
Net Operating Profit/(loss) before Tax	398,161.63	485,423.61	545,481.81	630,956.97	810,959.98
Non-operating income	7,901.03	15,550.88		68,616.76	
Profit Before Tax	376,062.66	500,974.49	545,481.81	630,956.97	810,959.98
Tax provision	55,848.91	100,194.90	135,530.66	153,344.20	195,840.82
Special Tax Provision	12,085.88	7,514.62	10,164.80		707,000.00
Net Profit after Tax	308,127.87	393,264.97	399,786.35	477,612.77	91,880.84
Profit From Previous Year	1,064,365.20	1,372,493.07	1,765,758.04	2,165,544.39	2,643,157.14
Net Profit carried to Balance Sheet	1,372,493.07	1,765,758.04	2,165,544.39	2,643,157.16	2,551,276.30

APPENDIX - THREE

Calculation of Mean, Standard Deviations and Co-efficient of Variance

(Amount in Rs. '00000)

Fiscal Year	Budgeted Sales (X)	Actual Sales (Y)	$x=X-\overline{X}$	$y=Y-\overline{Y}$	x^2	y^2	XY
2064/65	178.19	164.75	(33.01)	(28.63)	1,089.66	819.66	945.01
2065/66	196.53	185.47	(15.09)	(7.91)	227.71	62.54	119.33
2066/67	206.31	196.82	(5.31)	3.44	28.20	11.85	(18.28)
2067/68	294.46	256.57	82.84	63.19	6,862.42	3,993.88	5,234.83
2068/69	327.00	294.60	84.41	74.96	7466.69	5,619.00	6,327.37
N = 5	ΣX= 1202.91	ΣY= 1098.21	Σx= [2.02]	Σy= 0.01	Σx^2= 17326.7	Σy2= 11684.07	Σxy= 12608.26

Calculation of mean, standard deviation and coefficient of variation;

4. for the Budgeted Sales

Mean ($\overline{X}$) = $\frac{X}{N}$, = $\frac{1202.91}{5}$, = 240.58

Standard Deviation ($\pm$ x) = $\sqrt{\frac{x^2}{N}}$, = $\sqrt{\frac{17326.78}{5}}$, = 58.87

Coefficient of Variation (CVx) = $\frac{\pm_x}{\overline{X}}$, = $\frac{58.87}{240.58} \mid 100$, = 24.47%

5. For the Actual Sales

Mean ($\overline{Y}$) = $\frac{Y}{N}$, = $\frac{1098.211}{5}$, = 219.64

Standard Deviation ($\pm$ y) = $\sqrt{\frac{y^2}{N}}$, = $\sqrt{\frac{11684.07}{5}}$, = 48.34

Coefficient of Variation (CVy) = $\frac{\pm_y}{\overline{Y}}$, = $\frac{48.34}{219.64} \mid 100$, = 22.00%

Calculation of Correlation of Coefficient:

$r_{xy} = \frac{xy}{\sqrt{x^2 . \quad y^2}}, = \frac{12608.26}{\sqrt{17326.7 \mid 11684.07}}, = 0.88$

Calculation of Probable Error:

P.E. (r) = $0.6745 \mid \frac{1 Z r^2}{\sqrt{n}}, 0.6745 \mid \frac{1 Z (0.88)^2}{\sqrt{5}}, = 0.068$