CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

In Nepal, the agro and forest based industries dominate the industrial land scope in terms of numbers employment and value added. The number of agro industries has been gradually increasing. To a greater extent, these industries are absorbing local agriculture and forest Products as their raw materials of for value addition activities (Pant, 2004:42).

Modern liquor industries are a part of agro and forest based industries. These industries are contributing significantly to the production of agro-based products to meet internal as well as external demand. Therefore, the promotion of liquor industries should be a critical element of the growth strategy in Nepal. It contributes about 20% to government revenue (Business age, 2004:35).

In Nepal context, manufacturing organizations are facing so many problems. There are need for a large of good managers and good managerial decisions. Most of organizations are in loss; profit earning is necessary to survive. Achieving objectives of the business organization needs profit. A firm would be able to obtain funds from the capital market if it earns profit.

Profit planning is the process of determining the required amount from each principal unit of business. A profit plan is framework of expected achievement at most efficient operating standards. It is established against which actual accomplishment is regularly compared.

Profit planning is the estimation and predetermination of revenues and expenses that estimate how much income will be generated and how it should be spent in order to meet investment and profit requirement. In the case of institutional operation, it presents a plan spending income in a manner that does not result in a loss (Ninemeirer and Schmidgall, 1984:133). The profit plan tells managers how much money remains to be spent in each expense category. Profit plans are also used to develop new budgets.

Cost-volume profit analysis (CVP) is one of the most important tools in profit planning.

Profit planning or budgeting is forward planning and involve the preparation in advance of the quantitative as well as financial statements to indicate the intention of the management in respect of the various aspects of the business. Profit planning in fact, is a management techniques and a business budget is such a written plan, in which all aspects of business operations with respect to a definite future period are included. It is a formal statement of policy, plan and objectives and goal established by the top management in respect of some future period.

A success of the business depends on the performance of organization which measures in terms of Profit. Profit is the primary measurement and the blood of success in any economy, if firm is not able to earn profit than it fails to hold the capital for long period. When business firm can't hold capital, it can't secure and retain other sources, such as manpower, materials and machine etc. In other words the more profitable firm/enterprises are more attractive to the holders of the available capital. These firms can attract capital, which they need to buy the other resources. Here key is that capital and other resources are scarce they are allocated to the profit makers in roughly descending order of their profit potential.

Usually, profit doesn't just happen. Profit is managed, when a management plans its profit performance that is known as profit planning. Profit planning is a part of overall planning process of an organization. Before we can make an intelligent approach to the managerial process of profit planning, it is important that we understand the management concept of profit. There are several different interpretations of the term 'profit'. According to an economist, profit is the reward for entrepreneurship for risk taking, leader of labor might say that profit is a measure of how efficiently labor has produced and that it provides a base for negotiation a wage increase an investor will view it as a gauge of the return on his/her money. An internal revenue agent might regard it as a base for determining income taxes. An accountant will explain it simply as the excess of firm's revenue over expenditure of producing revenue in a given fiscal year.

Profit is the ultimate goal of every business house. They involve in business for making profit. Profit cannot be achieved easily. It should be managed well with better managerial skill. So, profit is the planned and controlled output of management. By element, profit is the difference of revenue and cost. Profit plan, thus, refers to the planning of revenue (i.e. increase the revenues) and planning of cost (i.e. increase the efficiency of cost).

Planning is the first essence of management and all other functions are performed with in the framework of planning, planning means deciding in advance what is to be done in future? Planning starts from forecasting and predetermination of future event. Planning is the whole concept of any business organization. No firm can achieve its predetermined goal and objectives in the absence of proper plan. Hence, it is life blood of any organization which makes efficiently run towards the competitive environment.

Control can be defined as the process of measuring and evaluating performance of each organizational component of an enterprise and initiating corrective action when necessary to ensure efficient accomplishment of enterprise objectives, goals, policies and standards, planning establishers the goals objectives, policies and standards of an enterprise.

Thus, profit planning and control is an important approach, mainly in profit-oriented enterprises. Profit planning is merely a tool of management. It is not an end of management or substitute of management. It facilitates the managers to accomplish managerial goals in a systematic way.

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

Out of various profit planning tools, C-V-P analysis is the most important tool. The systematic relationship between cost, volume and profit is known as cost-volume-profit analysis. It is an analytical tool for analyzing the relationship among cost, price, profit, sales and production volume. Mainly there are three elements in cost-volume-profit analysis. They are cost, sales or production volume and profit. All these terms are interconnected and depended on one another. For instance, profit per unit of a product depends on its selling price and cost per sales. The selling price to a greater extent will depend upon the cost and cost depends upon the volume of production.

It is highly essential for the management to have the complete knowledge about the interrelationship among the cost, volume and profit. A study concerning this interconnection is under taken through cost-volume –profit analysis. Cost-volume-profit is analysis extremely helpful in profit planning and control management decision, cost control, budgeting etc.

1.2 Focus of the Study

Cost-volume-profit analysis is a systematic method of examining the relationship between changes in activity (i.e. output) and changes in total sales revenue, expenses and net profit. As a model of these relationships CVP analysis simplifies the real-world conditions that a firm will face. C-V-P analysis is a management accounting tool to show the relationship between the elements of profit planning. Profit planning is the function of the selling price of product, demands variable costs, fixed cost, taxes etc. The whole picture of profit planning is associated with cost- volume –profit interrelationships. A popular technique to study cost-volume-profit 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 revenues and total costs will be exactly equal or the net income will be zero. It is a "no profit no loss" situation. This point is a corner-stone of profit planning.

The main focus of the study is to analyze the C-V-P analysis of the multi-product firm. The concept of C-V-P analysis for multi-product firms can be explained below.

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

sales contributed by different products greatly changes the amount of profits. Managers try to achieve that combination, or mix, that will yield the greatest amount of profit. If a company sales more than one product, these may not be equally profitable. So the company's profit will depend upon the ratio of each product's sale to total sales revenues. Profit will be greater if high margin items make up a relatively large proportion of total sales than if sales consist mostly of low margin items. Changes in sales mix can cause great variations in a company's profit. A shift to low-margin items can cause the total profit to decrease even through total sales increase. On the contrary, a shift in the sales mix from low margin items to high margin items can cause the reverse effect-total profit may increase even through total sales decrease. *(Bajracharya, Ojaha, Goet & Sharma: 2004, P 260).*

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

1.3 Brief Overview of Unilever Nepal Ltd. and Dabar Nepal private Ltd.

Unilever Nepal Ltd.

Nepal lever limited is one of the biggest manufacturing industries in Nepal. It was established in 1994 as joint venture company between Hindustan Lever Limited. India and Nepali promoters under the company act 2021. The factory's registered office is situated at Basamadi Village Development Committee-5 of Makwanpur district, which is about six kilometer far from Hetauda Municipality and its corporate office is situated at Heritage Plaza, Kamaladi, Kathmandu. Few months ago, a notice was issued dated on 18th Februarey, 2005 (2061/11/07) in the "Kathmandu Post" to inform all concerned about the change in the name of the company from Nepal Lever Limited, to Unilever general meeting held on 13th Dec. 2004 (2061/08/28) under the special resolution. The change in name has been approved by the company register office/HMG of Nepal with effect from 9th Feb. 2005 {2061/10/27) binding Unilever Nepal Ltd. to bear assume all the tax and other payable liabilities towards all the movable and immovable assets existing in the company's former name.

Ownership

Unilever Nepal Ltd. is the first subsidiary company of Hindustan Lever Limited Outside of India with holding 80% ownership and has invested Rs. 73.7 million in equity authorized capital of the company is Rs. 30,00,00,000 divided in to 30,00,000 an ordinary share of Rs.100 each and paid up capital is Rs. 920,70,000 divided in to 9,20,700 of Rs.100 each. The same holdings is as follows:

Name of shareholders	No. of share	% of share
Hindustan Lever Limited	7,36,500	80%
Sibkrim Land & Industrial (Pvt.) Ltd	46,035	5%
Public shareholders	1,38,105	15%

Products:

The main products of the company are Soap, Detergents, Cosmetics, Creams, Toothpaste and Toilet soaps. Fair and Lovely, Close-up, Sunsilk, Lux, Liril, Pepsodent, Wheet Rin, Red leve tea, Lifeboy, Vim, Clinic plus are some of its famous products

Dabur Nepal Pvt. Ltd:-

Dabur Nepal Pvt.Ltd.(DNPL) was established in 1989 as joint venture Company with Dabur India Ltd. for the production of ayurvedic-based personal care, health care, and food products and started manufacturing Dabur products in 1992. The Company's factory & registered office in Rampur, kakani at Bara District, and the Corporate Office is in TNT building at Tinkune, Kathmandu.

The company is the first of its kind in the country to harness ecological resources and manufacture commercially viable and value added top of line products locally, to be sold at prevalent rates for domestic use and export to India, Bangladesh, and other neighboring countries. In the span of fifteen years, there has been vertical growth in all spheres of business and operations in addition to lateral expansion in the area of research and development. In order to enable effective utilization of resources, company has set up 'plant for life' 90 million rupees green house projects at Banepa in 1996. The application of

this project has spurred a steady supply of rare, endangered medicinal herb saplings in a state of the art green house equipped with modern climate controls. The saplings are sold at cost to farmers in remote areas to grow and harvest with 'buy bulki' guarantee. Steps have been taken to subsidize the cost of saplings in order to enable broader participation of the local people.

The company's various community initiatives, generations of employment and additional income from the local people have resulted in improved socio-economic condition. Besides, it has earned several auolades including the highest Export Award from the Ministry of Commerce, FNCCI Award for Excellence, and CIP Award for outstanding contribution to the country.

Dabur Nepal Pvt. Ltd. is a leading manufacturing company operating on a private sector of Nepal. It produces various types of product that are related to health and personal care. Today Dabur Nepal Pvt. Ltd. Produces and sales following types of products:

1. Lal dant manjan
2. Binaca hair oil
3. Vatika hair oil
4. Vatika shampoo
5. Amla hair oil
6. Anmol product
7. Special hair oil
8. Baby olive oil
9. Hajmola tablet
10. Hajmola candy
11. Real fruit juice
12. Glucose Product
13. Real juice
14. Babool tooth past
15. Dantmukta
16. Plastic Containers/ panchan Churan
17. Taxin resin
18. Honey
19. Kshudhavardhak churan/ panchan churan
20. Chywanprash parkshep/ dcp

1.4 Statement of the Problem

Nepal is predominantly an agrarian economy where more than 65 %(as per census 2058 B.S) of the economically active population is estimated to be involved in agriculture and this sector’s contribution is still significant in GDP. Economic growth of the country has not improved substantially over time to overtake population growth. As the current population growth is the 2.25% per annum, the gain achieved by development activities have been over shadowed by growing population. Contribution of non-agricultural activities is gradually increasing in GDP.

Industrialization is an effective means of achieving economic development. It is the major hope, which can raise the living standards and provide better quality of life in the country. In the absence of industrialization, Nepal's problems like poverty, insecurity and overpopulation cannot be solved *(Pradhan, 1984; 14).* The center problem of economic development of the background countries is industrialization. It is one of the major tools with the aid of which the vicious circle of background and poverty can be broken *(cuker, 1974; 9).* It's also a major instrument of progress, modernization and social change in developing countries *(UNDP, 1974; 1).*

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

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

Both the ULN and DNPL are the biggest industries in the country. Being a large-scale industry large amount is invested from various sectors; therefore, the successful operation of the industry is very much important. The success of the industry will not only attract the foreign investment in the country but also increases the private sector within the country. But the financial performance of the industry is not satisfactory and it is bearing a heavy loss every year since the time of its operation.

How the business is being operated largely depends on how the business operation is planned. Poor performance is the outcome of poor planning, controlling and decision-making. The key motive of every business enterprise is to make and maximize profit. Profit just doesn't happen by chance, it is to be managed. Cost-volume-profit analysis is a supplementary tool of planning for profit. CVP analysis is immensely helpful for developing alternative strategies in sales planning and cost estimation.

This study is basically designed to solve the following problems by taking into account the budget's role in planning the profit:

1. What sales volume is needed to achieve break even?
2. What should be the sales volume to earn a desired profit?
3. What will be the profit or loss to the specified level of sales?
4. What will be the relationship between cost, volume and profit?
5. How will profit be affected when sales mix is changed?
6. What will be the effect of planned expansion on C-V-P relationship?
7. Which product or product mix is profitable?
8. Which product or operation of a plant should be discontinued?
9. Should the firm be shutdown the unprofitable product line/(s) temporarily or not?

1.5 Objectives of the Study

The general objective of this study is to evaluate the C-V-P analysis of multi products of manufacturing company. The specific objectives of this study are as follows:

- To evaluate the impact of profit of UNL and DNPL.
- To show the relationship of cost, volume and profit between multi products.
- To study and analyze different components of cost as per cost behavior.
- To evaluate the break even point of overall firm as well as individual product.
- To provide suggest and recommend on the basis of major findings of the study.

1.6 Significance of the Study

This study will be significant in the following ways:

- It provides information on the application of the tool under profit planning in different circumstances.
- It provides information on the application of the tool under profit planning in different circumstances.
- It examines the application of cost-volume-profit analysis in the company
- It finds out the difference in cost, volume and profit and its impact in the break even point.
- It explores the problems and potentialities of manufacturing industry on the basis of selected organizations. It is useful to the potential managers, accountants, policy makers and planners etc.
- It provides literature to the researchers, who want to carry on future research in this field.
- This study is also directed towards providing necessary recommendations to the related departments of the company.

1.7 Limitations of the Study

Each and every research has some limitations. Basically, not availability of required data and information would be the major limitations of the study. The study has been conducted with the following limitations.

- The study would base on primary as well as secondary data.
- Due to limited time and resource constraint, these studies will neither the comprehensive nor extensive.
- Last five fiscal years will be the basis for the study.
- The accuracy of this study would base on the response and the data available from the management of the company.
- This study would only concerned with fulfilling the partial requirement in Master of Business studies (MBS)

1.8 Organization of the study

This study has divided into five parts Viz. introduction, review of literature, research methodology, presentation and analysis of data, conclusion, summary and recommendations.

Chapter 1 - Introduction

This chapter is introduction framework that includes background of the study, focus of the study, profile of the company, statement of the problems, objectives of the study, significance of the study, limitations of the study and organization of the study.

Chapter 2 – Review of the Literature

This chapter will review the existing literature in the relevant area. Mainly, it includes review of theories and journal, review of previous research work and research gap.

Chapter 3 – Research Methodology

This chapter deals with methodology that includes research design, sources of data, data collection techniques, method of analysis and research variable.

Chapter 4 - Presentation and Analysis of Data

This chapter deals with the presentation and analysis of collected data and information. For this purpose various analytical tools will be used.

Chapter 5 - Summary, Conclusion and Recommendations

This chapter will be the final chapter of the study that includes summary of the study, conclusion and recommendations.

The Bibliography appendix will be included in the last of the thesis.

CHAPETR TWO
REVIEW OF LITERATURE

This chapter is basically concerned with review of literature relevant to the topic "A Comparative Analysis of Cost Volume and Profit Analysis of Manufacturing Organization" Every study is very much based on past knowledge. The previous study cannot be ignored because they provide the foundation to the present study. There must be continuity in research. This continuity research is ensured by linking the present study with past research studies. This chapter highlights the literature that is available in concerned subject as to knowledge, research work, and relevant study on this topic, review of journals and articles and review of thesis work performed previously.

2.1 Conceptual Framework of Profit Planning and Control

2.1.1 Concept of Profit

Generally profit is known as the part of income of the firms. Profit is the motivating force in the business. Success of business depends on profit. Profit promises to provide satisfaction to consumer. We can simply define the world 'profit' as the primary measurement of success of management effectiveness in business enterprise. In other words, profit means the excess of total revenue over total cost of production. Usually, profits don't happen they are managed or produce.

Economic theories on profit may be put in three broad categories: the first theory looks upon profit as the reward for bearing risks: the second views profit as the consequence of friction and imperfections in the competitive adjustment of the economy to dynamic changes. The third sees profit as the reward for successful innovation (*Joel, 1982; 6).* Profit is a yardstick of management's ability to co-ordinate, plan act in the interest of the consumer. No business sustains if there is regular loss, profit is essential for each enterprise.

Thus it is quite obvious that profit is obtained by subtracting the cost from the revenues and it is also the reward for tacking risks. Profit plays a vital role, not only in managerial decisions but also in the general life standard of human beings. Therefore management should continuously evaluate efficiency of its company in terms of profit.

2.1.2 Concept of Planning

The word ‘planning’ states thinking and deciding what ought to be done in advance. It is also a process of developing enterprises objectives and selecting future courses of action to accomplish them.

Planning is a hard task because it involves the ability to think to periodic, to analyze, and to come to decide to control the actions of its personnel and to cope with a complex dynamic fluid environment. They bridge the gap between, where they are and where they want to go *(Memoria CB, 1990; 36)*. His statement obviously shows that planning as a complex and hard job and as a tool of developing and getting organizational objectives.

Planning is the process of developing enterprises objectives and selecting future course of action to accomplice them. It includes *(Welsch, Hilton and Gordon, 1992,3)*

- Establishing enterprise objectives.
- Developing premises about the environment in which they are to be accomplished.
- Selecting a course of action for accomplishing the objectives.
- Initiating activities necessary to translate plans in to action.
- Current re-planning to correct current deficiencies.

Planning is essential to accomplish goals. It reduces uncertainty and provides effective direction to the employed by determining the course of action advance.

Thus planning establishes the objectives, goals, strategies, policies and standards of enterprises. Past is the father of present and to a great extent, present is a guide for future. There fore, planning for future needs proper guidance to be taken from past event and adequate acquaintance should be made of present action.

2.1.3 Concept of Control

Once the planning is determined, it must be carried out under control. Controlling shares management actively and for this managers compare actual performance against the planned performance and find out the deviations taking remedial steps to remove the deviations to make an improvement in the performance because promptness is the essence of an effective control.

Controlling means evaluating the firm's activities against the plan and deciding what should be done if the plan is not being followed. *(Lynch & Williamson,1999;18)*

Control is the process of ensuring that actual activities confirm to plan activities. Control helps in correction. Therefore, planning and controlling are the major function of management.

According to Welsch, controlling involves

- Establishing goals and standards.
- Comparing measured performance against the established goals and standards.
- Reinforcing successes and correcting shortcomings.

Control provides timely information that may prompt the revision of goals. The purpose of control is achieved with setting standards, comparing predicted and actual results against these standards and taking corrective actions.

Planning and controlling are interdependent and thus closely related with each other because a manager can not control unless he has planned a course of action for effective and smooth managerial behavior into proper profit and progress on behalf of company, firm or enterprises. Under this condition to be applied, both planning and controlling are mutually inseparable.

2.2 Meaning and Definition of Profit Planning

Profit planning is one of the most important managerial functions, profit planning is merely a tool of management, which is used to plan and control business operation and inter action.

When a management plans, profit for a specific period of time that is known as profit planning. Every firm has to make a plan of profit if it has to survive and grow in the business line or business world in future.

The phrase “comprehensive profit planning and control” is a new term in the language of business but it is not a new concept in the management. Commonly, comprehensive profit planning and control have been identified as ‘a way of managing’. The term “comprehensive” means the application of the board concept of profit planning and control all phases of operations in an enterprises and the application of a total system approach.

Profit planning is the process of determining the required amount of profit from each principle unit of business. A profit plan is an advance decision of expected achievement based on the most efficient operating standards of in prospect of time. It is established against which actual accomplishment is regularly compared.

Profit planning is the estimation and predetermination of revenues and expenses that estimate how much income will be generated and how it should be spent in order to meet investment and profit requirement. In the case of institutional operation, it presents a plan for spending income in a manner that doesn’t result in a loss *(Merrier and Schmeier & Schmidgall,1984; 133*). Explaining the use of profit plans and budget, they further mention that once it is developed, managers know that when actual expenses exceed budget limitations, there may be problems. The profit plan tells managers how much money remains to be spent in each expenses category, Profit plans are also used to develop new budgets.

Profit planning or budgeting is a forward planning and involves the preparation in advance of the quantitative as well as financial statement to include the intention of management in respect of the various aspects of the business. Profit planning, in fact is a managerial technique and it is a written plan in which all aspects of business operation with respect of definite future period are included. It is a formal statement of policy, plan, objective and goal established by the top management in respect of some future period. Profit planning is a predetermined detailed plan of action developed and distributed as a guide to current operations and as a partial basis for the subsequent evaluation of performance. Thus, we can say that profit planning is a tool, which may be used by the management in planning the future course of action and in controlling actual performance *(Gupta, 1997; P 521)*

Profit planning is a systematic and formal means of decision making and attaining organizational objectives and goals at a specific future period of time by the application of diversified managerial tools for utilization of available resources at a reasonable manner,

Profit planning is management's primary tool to accomplish its objectives because it *(Noll & Radetsky, 1985;36)*

- Provides a disciplined approach to the solution of business problems.
- Develops throughout the organization an atmosphere of profit mindedness, encouraging an attitude of the coat consciousness and maximum asset utilization.
- Coordinates the operating plans of the diverse segments of the business into a single, comprehensive plan.
- Encourage a high standard of performance by stimulating competition, providing a sense of urgency and serving as an incentive to perform more effectively.
- Affords the opportunity to appraise systematically every facet of the business as well as examine and restate periodically its basis policies and guiding principles.
- Aids in directing capital and effort into the most profitable channels.
- Provides yardsticks or standards to measure performance and gauge the managerial judgment and ability of the individual executive.

According to Welsch, the three most relevant aspects of PPC concept are:

- PPC requires major planning decision by management.
- PPC entails pervasive management control activities and:
- PPC recognizes many of the critical behavioral implications throughout the organization.

In the opinion of J. Batty, when dealing the question of profit planning it is usual to consider*: (Batty, 1982; 322).*

- The volume of out put in terms of numbers of product or other units.
- The verity to be produced (the product mix).
- The cost to be incurred.
- The prices to be charged

The aim of profit planning should be to ensure an adequate return on capital employed and financial stability. Therefore, profit planning includes a complete financial and operational plan for all phases and facts of the business.

A profit plan is a comprehensive statement of intentions, expressed in financial terms, for the operations of the firm for a short period. It is a plan of the firm's expectations and is used as a basis for measuring and controlling the actual performance of managers and their units (*Panday, 1994; 257).*

Thus profit planning is used for development and acceptance of objectives and goals and moving an organization effectively to achieve those objectives and goals. Profit planning is developed to meet the objective of effective performance of the management process.

Profit planning is an integral part of the management; by the help of it any enterprises should earn realistic profit return on investment. It is financial and narrative expressions of the expected results form the planning decision. By using profit-planning technique, one can easily achieve the desired goals. Profit plan is flexible and depends upon the size and nature of the firms.

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

Cost-volume-profit analysis examines the behavior of total revenues, total costs and operating income as changes occur in the output level, the selling price, the variable cost per unit and / or fixed costs of a product (*Horngreen, Datar & Foster, 1999;256)*

Cost-volume-profit analysis is a systematic method of examining the relationship between change 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 condition that a firm will face. Like most models, which are abstractions from reality, CVP analysis is subject to a number of underlying assumptions and limitations. Never the Less, it is a powerful tool for decision making in certain situations *(Drury, 2000; 287)*

Most of the businesses fail after a few years, some times months, of starting because they tend to do anything for volume without thinking how it's going to affect bottom line. Cost-Volume-Profit analysis is a management accounting tool to show the relationship between the elements of profit planning. Profit planning is the function of the

selling price of the product, demand, variable costs, fixed costs, taxes etc. The whole picture of profit planning is associated with Cost-Volume-Profit interrelationship *(Bajracharya, Ojha, Goet & Sharma, 2004; 225).*

CVP analysis is an important media through which is the management can have an insight into effects on profit on account of variation 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 enterprises is to make and maximize profit. Profit doesn't happen by chance. It is to be managed. CVP is a supplementary tool of planning of profit. It is immensely helpful for developing alternative strategies in sales planning and 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.

Cost-Volume-Profit analysis is a management accounting tool to show the relationship between the ingredients of profit planning. Profit planning is the function of selling price of the product, the variable costs and volume to be sold. The entire scope of profit planning associated with CVP interrelationship. A widely used technique to study 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 costs will be exactly equal (or net income is zero). Thus the 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 ceases and profit begins *(Khan & Jain, 1993; 265)*

Cost-Volume-Profit analysis can be regarded as a sophisticated method or analytical tool used in management. It is extremely useful in profit planning and control, management decision, cost control, budgeting etc.

2.4 Concept of Cost Volume Profit Analysis

CVP analysis is an analytical tool for analyzing the relationship among cost, price, profit, sales and production volume. Mainly, there are three elements in CVP analysis. They are cost, sales or production volume, and profit. All these terms are interconnected

and dependent on one another. For instant, profit per unit of a product depends on its selling pries and cost of sales. The selling price to a greater extent will depend on the cost and costs depend on the volume of production. It is highly essential for the management to have the complete knowledge about the interrelationship among the cost, volume and profit. A study concerning this interconnection is undertaken through cost- volume- profit analysis.

CVP analysis is a supplementary tool of profit planning. It tells many things about the relationship between the business variables. Total variables costs are proportionate to the sales volume; where as the total fixed costs remain unchanged within the relevant range of the output levels. That is why; net incomes are not in proportion to sales. Knowing the relationship, one can assess the profit at forecasted sales volume; likewise, required sales can be ascertained for the minimum level of profit. If a company sales more than one product, called the product mix, each product may not be equally profitable. So the company's profit will depend up on the ratio of each products sale on the total sales revenues. Profit will be greater if high margin items make up a relatively large proportion of total sales than if sales consist mostly of low margin items. Changes in sales mix can cause great variations in a company's profit. A shift to low-margin items can cause the total profit to decrease even though total sales increase. On the contrary, a shift in the sales mix from low-items to high margin items can causes the reverse effect; total profit may increase even though total sales decrease.

Thus, C-V-P analysis is the technique of summarizing the effects of changes in an organizations volume of activity on its cost, revenue and profit. Cost-volume-profit analysis applies marginal or variable costing principles while establishing the effect of the future course of activities on the financial results of the firm. Knowledge of how cost behaves in response to change in volume and how profit beaver in response to change in cost and volume helps management to make numerous short term optimal decisions relating cost control and profit maximization

2.5 Cost and Its Classification

2.5.1 Concept of Cost

Sacrifice or foregoing of resource made for the attainment of specific purpose is known as cost and are measured in monetary terms. Cost are collected, classified, determined, analyzed and controlled keeping in view the very purpose for which it has been incurred. Cost must be paid for production or purchase of goods and services. Usually costs are incurred with a view to obtained more return or resources in future. Immediate effect of cost is that it causes decrease in assets or increase in liabilities.

2.5.2 Classification of Costs

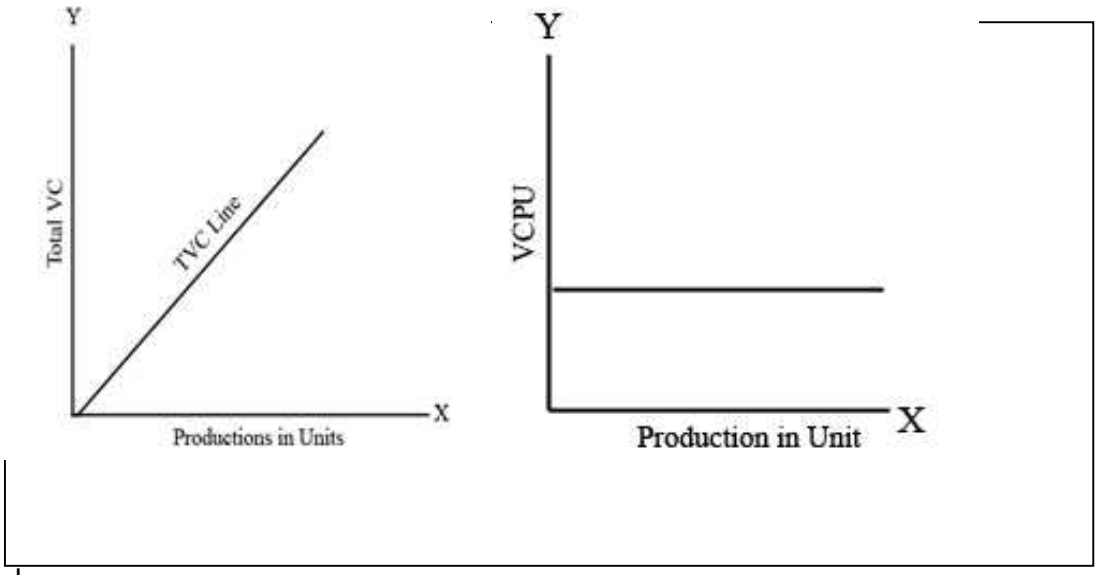
Cost classification is the process of grouping costs according to their characteristic. In other words, it is the placement of like items together by virtue of their common features. Though costs are identified with cost units, cost centers or cost objectives in general, the same figures can be classified differently depending upon the very purpose or specific requirement of the management. Cost classification not only helps management in determining product costs for stock valuation and profit measurement but also helps in decision-making planning and control.

2.5.2.1 Behavior wise Classification of Cost

All costs do not show the same behavior throughout the operation. There exists a relationship between costs and volume of activity. Cost behavior implies the relationship between cost and activity. In most of the organizations, costs can be classified as variables, fixed and mixed as these behave in relation to activity volume.

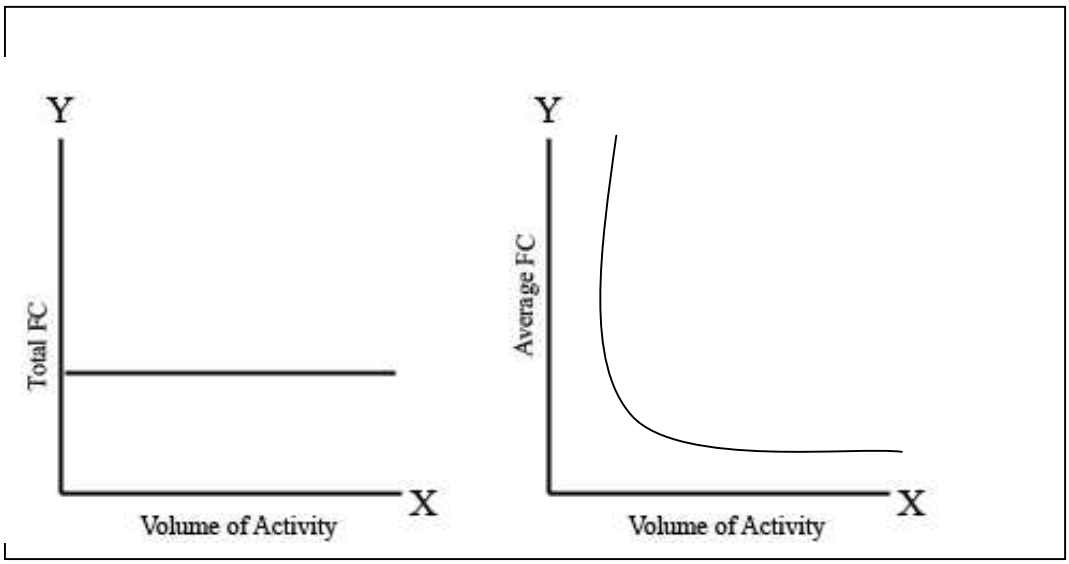
- **Variable Cost:** These costs tend to very in direct proportion to the volume of output. In other words, when volume of output increases, total variable cost also increases and when volume of output decreases, total variable cost also decreases. But the variable cost per unit remains fixed. It includes direct materials, direct wages, power, royalties, normal spoilage, small tools, and commission of salesman, etc. it can be shown in the figure below.

Figure 2.1: Variable Cost



- **Fixed Cost**: These costs remain fixed in "total" amount and do not increase or decrease when the volume of production changes. But the fixed cost per unit increases when volume of production decreases and vice-versa. Fixed cost per unit decreases when the volume of production increases. It includes rent and leaser,municipal tax, managerial salaries, building insurance, salaries and wages of permanent staffs etc. it can be shown in the figure below.

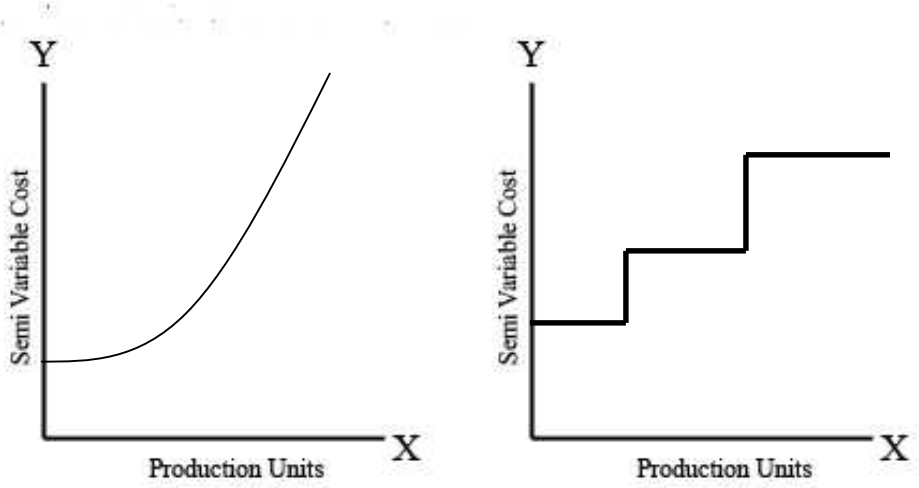
Figure 2.2: Fixed Costs



- **Mixed Costs:** These are partly fixed and partly semi variable costs has often a fixed element below which it will not fall at any level of output. The variable elements in semi variable costs changes either at a constant rate or in lumps. For example, introduction of an additional shift in the factory will require additional

supervisors and certain cost will increase in lumps. In the case of telephone, this is a minimum charge and after a specified number of causes, the charges are made according to the number of calls made. Thus, there is no fixed pattern of behavior of semi variable cost. It includes supervision, light and power, telephone expenses, maintenance and repairs, depreciation, compensation for accidents etc. semi variable cost can be shown in the figure below.

Figure 2.3: Semi- Variable/Mixed Cost



2.5.2.2 Segregation of Semi-Variable Cost:

The semi variable cost can be divided in to two parts –fixed and Variable cost. The division of cost in to fixed and Variable cost is known as segregation of fixed and variable cost is known as segregation of cost. There are many method of separating semi variable cost in to fixed and variable cost. The main two methods are as follows;

a. High- Low Method
b. Least Square Method

a) High-Low Method: This method assumed that the change in semi-variable or semi-fixed or mixed cost is caused by variation in output or activity.

The following steps should be followed for segregation of semi-variable or mixed cost under high-low method.

Step 1 To elect highest and lowest level of activity
Step 2 To take the corresponding cost of highest and lowest level of activity.

Step 3 To find out the different between highest and lowest points and ascertains the variable cost per unit by using following formula.

$$\text{Variable cost per unit (b)} = \frac{\text{High Cost} - \text{Low Cost}}{\text{High Units} - \text{Low Units}}$$

Step 4 To find out the fixed cost by using the following equation:

Fixed cost = Total cost – (Variable cost per unit X Activity Level)

b) Least Square Method: Least square method is a statistical method. It is an accurate and trusted method of segregation fixed and variable cost from mixed cost. In this method, first of all, variable cost per unit is calculated. After this, the fixed cost is calculated. The fixed cost and variable cost can be separated by adopting the stepwise process as shown below.

Step 1 Assume the activity level or production units as 'x' and find out the summation of x i.e∑X.

Step 2 Assume the Mixed cost as 'y' and find out ∑y

Step 3 Multiply X and Y, and sum the product i.e. find out ∑xy

Step 4 Convert x in to x^2 and find out the sum of x^2 i.e. $\sum x^2$

Step 5 Using the following given below, find out unit variable cost (b):

$$b. = \frac{N \quad XY - X. \quad Y}{[N \quad x^2 - (\quad x)^2]}$$

Step 6 using the formula given below find out fixed cost (a):

$$a = \frac{Y - b(\quad X)}{N}$$

Notes

1. N = Number of Observations
2. For finding out the value of 'a' the following formula could be used:

$$a. = \frac{X^2. \quad Y - X. \quad Y}{N \quad X^2 - f \quad X Å}$$

Approaches to Cost – Volume – Profit Analysis

The CVP relationship can be analyzed through different approaches, which are:

i. Contribution Margin Approach
ii. Cost and Revenue equation Approach
iii. The graphic (break even chart) Approach

Contribution Margin Approach:

The profit of a business enterprise is indicated by contribution margin approach. It high lights the relationship among cost, sales and profit. Contribution margin is the excess of sales price of a unit of output over its variable cost. Contribution margin enables to meet fixed costs and add to the profit. The total fixed costs are covered by it and the balance amount is an additional to the net profit. Contribution margin can be represented as:

i. Contribution Margin = Sales – Variable Cost
ii. Contribution Margin = Fixed Cost + Profit
iii. Profit = Contribution Margin – Fixed Cost

Contribution Margin Ratio:

Contribution Margin ratio expresses the relationship pf contribution to sales. It is also termed as profit volume ratio, contribution sales or variable profit ratio. If the contribution margin is divided by sales revenue, the result is profit- volume ratio. Symbolically, it is:

P/V ratio = C/S
Where, c = Contribution Margin and S=sales

Profit volume ratio can be calculated in the following ways too:

i). P/V Ratio = $\frac{\text{Fixed Cost + Profit}}{\text{Sales}}$

ii). P/V Ratio = $\frac{\text{Sales – Variable Cost}}{\text{Sales}}$

iii). P/V Ratio = $1 - \frac{VariableCost}{Sales}$

iv.) P/V Ratio = $\frac{\text{Different in profit of two periods}}{\text{Different in sales of two periods}}$

Uses of Profit – Volume Ratio

Profit volume ratio can be taken as a significant evaluation tool on earning of business enterprises. The earning capacity of enterprises can be measured by the profit – volume ratio. The higher profit volume ratio reflects the firm's ability for increasing profitability.

The profit volume ratio is used to determine the following facts:

i.) Determination of Selling Price: Selling price can be determined with the help of profit volume ratio. In order to fix the selling price, it is essential to know about the fixed cost, variable cost and budgeted profit. Besides production volume is also required to be fixed. The selling price can be determined by using following formula

$$\text{Selling price per unit} = \frac{\text{Contribution Margin}}{\text{P/V ratio x sales unit}}$$

$$\text{Selling Price per unit} = \frac{\text{Variable Cost Per unit}}{1 - \text{P/V Ratio}}$$

ii) Ascertainment of Profit at a Budgeted Sales Volume

The profit can be determined with the help of margin ratio. For this purpose, the following elements should be determined before hand:

1. Sales Amount
2. Variable cost
3. Fixed cost

The following formula used to ascertain the profit:

Profit = (Sales x P/V ratio) – Fixed cost

iii) Ascertainment Profit on Selling Price

Profit volume ratio can be used for finding out the profit on selling price. For this purpose, the following formula is used:

Profit = sales units after Break- even sales X unit selling price X P/V Ratio

iv) Determination of Profit on cost:

Profit can be determined on the basis of variable cost and sales with the help of profit-volume ratio. In order to ascertained the profit, the following formula used:

$$\text{Profit} = \frac{\text{Variable Cost x P/V Ratio}}{\text{Variable Cost Ratio}}$$

Where, variable cost Ratio = 1 – P/V Ratio

The formula ascertained the profit per unit for the sales after break even sales.

Cost and Revenue Equation Approach

The cost and revenue equation approach is based on the income statement concept. It represents the most convenient and accurate approach to cost-volume-profit analysis. The various formulations in CVP are derived from the revenue and cost function. The relationship between cost, volume and profit can be expressed algebraically as:

Profit = Total Revenue – Total Cost

Total revenue and total cost are affected by sales volume. The addition of quality in above equation will provide useful information for knowing the effect of revenue, costs and volume as operating profits. When the quantity is included in the above equation, its algebraic form will be as follows.

Profit = Total Revenue – Total Variable Cost – Fixed Cost

Or,

Profit = (Unit Selling Price x Sales Unit) – (Unit Variable Cost X Sales Units) – Fixed Cost

Or, P = (S x Q) – (V x Q) – FC
Or, P = Q(S-V) – FC

Where,
P = Profits
Q = Sales Units
S = Unit Selling Price
V = Unit Variable Cost
FC = Fixed Cost

2.6.3 Break-even Analysis

The relations among cost, volume and profit can be found out clearly through break-even analysis. Break-even analysis is regarded as a sophisticated method or tool used in management. It is the most widely known form of cost- volume analysis. So these two terms are used interchangeably.

The break-even point used under break-even analysis. Break-even point is the level of activity where total cost is equal to total sales. It is a specific level of activity or volumes of sales, which breaks the revenues and costs evenly. It is point of “no profit, no loss”. If

the sale or production is higher than breakeven Volume, there will be profit. In the same way if the sale is less than break even sales, there will be a loss

2.6.3.1 Computation of Break-even Point

Break- even point can be determined by following method

a) Algebraic or Formula Method

Break even can be determined by the use of formula. It is also termed as algebraic method. According to the definition of breakeven point, it is such a level of sale or activity, where there is neither profit, nor loss. It is that level of sales, where total cost is equal to total sales revenue. It can be presented in equation form in the following way.

Sales Revenue = Total Cost

Or,

Sales Revenue = Fixed Cost + Variable Cost

For finding out sales Revenue, we have,

Sales Revenue = selling price per unit x sales unit

Symbolically,
Sales Revenue = SxQ

For finding out, total Cost, we have

Total Cost = Fixed Cost + (Variable Cost Per Unit x Sales Unit)

Symbolically,

Total Cost = FC + (V+Q)

From the early definition, we have,

Sales Revenue = Total Cost

i.e. S x Q = FC + (V x Q)
or, (S x Q) – (V x Q) = FC
or, Q (S – V) = FC

- Q = FC/(S-V)

Where,

Q = Break – even point in units
FC = Fixed Cost
S = Selling Price Per Unit

V = Variable Cost Per Unit

b) Graphic or Chart Method

A break-even chart is used to graphically depict the relationship among revenues, variable costs, fixed costs and profit (or losses). The no profit, no loss point (the break even point) is located at the point where the total cost and total revenue lines cross. Below this point, the firm losses, and above this point, the firm earns profit. (*Bajarcharya, ojha, Goet & Sharma, 2004; 231 & 232.)*

In the graph given below the fixed costs remain constant without 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. The fixed costs curve parallels the variable cost curve. So the angle '0' equals the angle 'V' it is because total cost = total fixed cost plus total variable costs at volume 'Q'

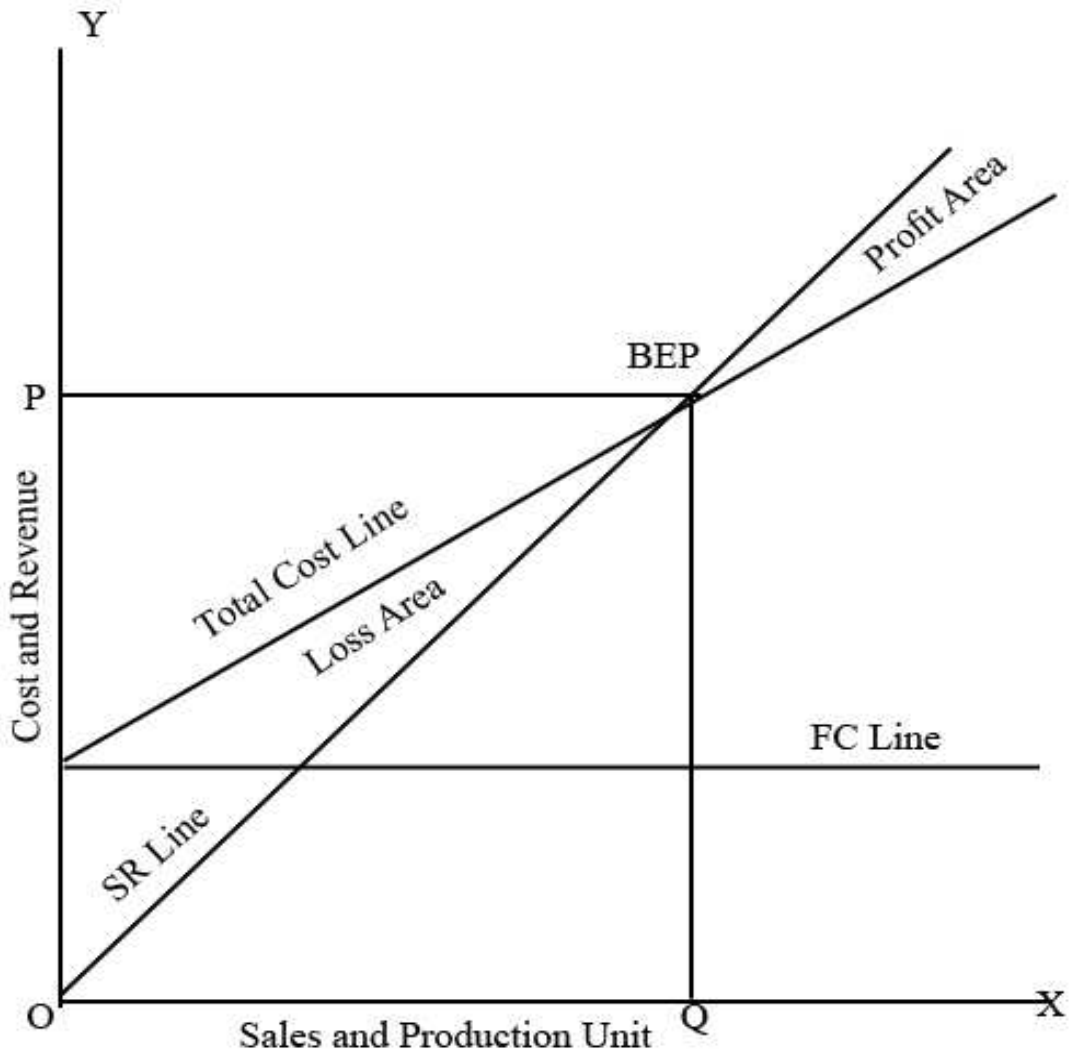
Total costs = TFC + Q X VCPU
At, volume 'Q + N

Total costs = TFC + (Q+n) X VCPU

- Total cost = O+N x VCPU
- Total costs = variable Costs

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

Figure 2.4: Graphic Approach to CVP



The 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 breaks up (intersect) 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 Revenues = Total Costs.

2.6.3.2 Application of Break Even Analysis

Break Even concept can be used to formulate different policies in a business enterprise. Some of these applications are *(Maheshwari, 2000; 182)*

- Determination of profit at different levels of sales and margin of safety.
- To find the level of output to get the desired profit.
- Effect of price reduction on sales volume and changes in sales mix.

- Effect of fixed cost or variable cost changes on sales volume.
- Selection of most profitable alternative, make or buy decisions and drop or add decisions.

2.6.3.3 Assumptions of Break Even Analysis

Contribution analysis and break-even analysis are based on a specific set of assumptions that should be clearly under stood. These underlying assumptions are *(Maheshwari, 2000; c. 182 – c. 183)*

- All cost can be classified into two parts, fixed cost and variable cost. There is no cost other than fixed and variable.
- There is a range of validity (activity) for using the results of the analysis and sales price doesn't change as units of sales change.
- There is only one product or in case of multiple products, the sales mix among the products remain constant.
- Basic management policy about operation will not change materially in short run.
- The general price level (inflation/ deflation) will remain essentially stable in the short run.
- Sales and production levels are synchronized, that is inventory remains essentially constant or zero.
- Efficiency and productivity per person will remains essentially unchanged in the short run.

If any of the above assumptions were changed, revised budget would be needed for a new analysis.

2.6.3.4 Limitations of Break Even Analysis

Break-even analysis in many businesses situations can be used for effective decision-making, but there is many shortcoming or limitations in its analysis and interpretations. Some of these can be listed as (*Maheshwari, 2000; 184)*

- The assumptions of producer's market phenomenon not hold good for all types of commodities.
- The fixed costs may not remain constant as well as the variable costs may not vary in fixed proportions at different levels of output.
- With variation of the prices of the items or services, which also depend on the factors affecting its demand and supply will certainly affect the demand of the commodity. This phenomenon is not covered in Break-even analysis.

- Identification of fixed and variable costs involved in production process is very complicated. A shift in product mix may change the break-even point.
- Customers may be given certain discount on purchase to promote sales. This revenue may not be perfectly variable with level of sales output.

2.6.3.5 Other Use of Break Even Analysis

Break even analysis can be used in a changed situation in different cases and formula are given below.

1. Required sales for desired profit (in units) = $\frac{FC + Desired\ Profit}{CMPU}$
2. Required sales for desired profit (in Rs) = $\frac{FC + Desired\ Profit}{CMRatio}$
3. Required sales in units for DPAT = $\frac{FC + \frac{DPAT}{(1 - T)}}{CMPU}$
4. Required sales in Rs for DPAT = $\frac{FC + \frac{DPAT}{(1 - T)}}{CMRatio}$
5. Required Sales volume for changes on selling price =

Revised BEP in units = $\frac{Fixed\ Cost}{Revised\ Unit\ Contribution\ Margin}$

Revised Break- Even point in Rs.= $\frac{Fixed\ Cost}{Revised\ PV\ Ratio}$

6. Required Sales Volume for changes in selling price:

Revised unit contribution Margin = New unit selling price – Unit variable cost

Revised breakeven point in units = $\frac{Fixed\ Cost}{Revised\ Unit\ Contribution\ Margin}$

7. Required sales volume for changes in fixed cost:

New Break even point = $\frac{\text{Fixed coct present + Additional fixed cost}}{\text{Unit contribution Margin}}$

2.6.3.6 Break- Even Sales Volume in the Presence of Step or Moving Fixed Cost

Determination of breakeven sales volume, so far, was based on the very assumption that the times of fixed costs will remain stable over a broad, relevant range of normal operating volume. But it may not be so. Though some items of fixed cost such as deprecation and rent may remain consent but other items such as supervision, repairs and maintenance may change various items between the capacity volume and relevant range of normal operating volume. Calculation of breakeven volume in the presence of such step or moving fixed cost items requires more homework.

A process of trial and error or resort to specific steps helps to overcome such a problem. The point to note here is, we are concerned with the most earlier breakeven sales volume as there are numerous breakeven volumes increasing each time with every increase in step or moving fixed cost *(Wagle & Dahal,2004; 4.7)*

2.7 Cost – Volume –Profit Analysis for a Multi Product Firm

The relative proportion of sales of product is called the sales mix or the product mix. In the case of a multi-product firm, the contribution for each product can be found out by deduction its variable costs firm sales revenue. The break-even point for each product can be calculated only if the total fixed costs of the firm are distributed and fixed cost for each product for each product is known. The firms overall break-even can be calculated by dividing the total fixed costs by the contribution ratio for the firm. The multi-product firms PV ratio will be the weighted average of the PV ratios for the entire product, the weights being the relative proportion of each product's each product's sales. The PV ratio for the multi-product firms can also be calculated by dividing the total contribution from all products by total sales.

A change in the product mix will not affect the firm's break-even point and profit if each product has the same PV ratio. However a change in the product mix will change the break-even point and profit when products have unequal PV rations *(Maheshwari, 2000; 184)*

2.7.1 Break- Even Point of Multi- Product Company / Firm

In multi-product firm we have to calculate the BEP in aggregate. The sales mix is used to compute a weighted average unit contribution. This is the average of the several product unit contribution margin weighted by the relative sales proportion of each product. Following Procedures are followed to calculate BEP for sales mix or multi-product

- Calculate contribution margin or profit –volume ration for each product.
- Calculate proportion of sales max in units or values as follows.

Sales mix = $\frac{Individual\ \ product's\ sales\ units\ or\ value}{Total\ of\ \ product's\ sales\ units\ or\ value}$

- Calculate weighted average for all products as follows:

  Weighted average = ∑Sales Mix x CMPU

  Weighted CM Ratio=∑ sales mix (value) x P/V ratio

- Calculate break-even point (BEP) :

  Break- even point = $\frac{Fixed\ \cos t}{Weighted\ \ average}$

Some Important Formulas

1. Overall BEP (in units) = $\frac{TotalFixedCost}{WeightedCMPU}$
2. Overall BEP in Rs. = $\frac{TotalFixedCost}{WeightedCMRatio}$
3. Required Sales for desired profit (in units) = $\frac{FC\ \Gamma\ Desired\ \Pr ofit}{WeightedCMPU}$
4. Required sales for DP (in Rs.) = $\frac{FC\ \Gamma\ Desired\ \Pr ofit}{WeightedCMRatio}$
5. Required sales for DP after tax (in Units) = $\frac{FC\ \Gamma \frac{DPAT}{(1\ Z T)}}{WeightedCMPU}$

Required sales for DP after tax (in Rs) = $\frac{FC\ \Gamma \frac{DPAT}{(1\ Z T)}}{WeightedCMRatio}$

2.8 Margin of Safety

Margin of safety is the excess of the budgeted or actual sales over the break even sales volume. In other words, it is the difference between the budgeted or actual sales revenue and the break even sales revenue. It is the position above the break-even point. It gives management a feel for how close projected operations are to be organizations break-even point. Managers often consider the size of the company's margin of safety when making decisions about various business opportunities. The larger is the safety margin, the greater is the chance for the company to earn profit (i.e. larger the margin of safety, Safer the company). A high margin of safety is particularly significant in times of depression when the demand if the company's or firm's product is falling. A low margin of Safety Company's or firms firm which has a low contribution ratio. When both the margin of

safety and the PV ratio are low, management should think of the possibilities of increasing the selling price, provided it does not adversely affect the sales volume or reducing variable costs by bringing improvement in the manufacturing process. Margin of safety can be ascertained by using the following formula. (*Munankarmi, 2003; 127)*

Margin of Safety = (Actual Sales value – Break- even sales value)

$$= \frac{\text{profit}}{\text{profit volume ratio}} \text{ in Amount}$$

$$= \frac{\text{profit}}{\text{unit contribution margin}} \text{ in units}$$

The relation between of safety and actual sales is known as margin of safety ratio, which is determined as follows. (*Munanakarmi, 2003; 127)*

$$\textit{Margin of Safety Ratio} = \frac{\textit{Actual Sales} - \textit{Breakeven sales}}{\textit{Actual Sales}} \textit{ in units}$$

The following steps are needed to rectify margin of safety.

- With increasing selling price.
- With increasing sales volume, if the capacity of fixed cost is not fully utilized.
- With reducing fixed cost if possible.
- With reducing variable cost (with redacting the cost of raw material, wages and other direct cost).
- With substituting product line by more profitable one.

2.9 Costs-Volume Profit Analysis and Limiting Factors

CVP analysis is helpful in profit planning and a company will be able to produce any number of output, numbers of output of its choice (desires). But in real world it is not possible, become of some critical factors like finishing machine or raw material or labor. These critical factors in the CVP analysis are known as constraint.

2.9.1 CVP Analysis with a Single Constraint

Scarce resource should be efficiently allocated in order to maximize the contribution margin. A particular simple and instructive situation arises when there is only ion e constraining resource. This can occur if the firm's products are all produced on a single maintained and outer is imagery hours available on this machine. In the same way, single resource constraint arise, if the firms product are all produced with only one material and output is limited by quantity available for that to have alternative uses, the contribution

per unit should be calculated for each of these uses. Then, the available capacity for such scarce resource should be allocated to the alternative uses on the basis of contribution per scarce resource (*Munankarmi, 2003; 146)*

2.9.2 CVP Analysis with a Multiple Constraints

Where more than one scarce resource exists, the optimum production program can not easily be establisher the simple process applied in single resource constraint. Under the circumstances simple allocation of resource or the basis of contribution margin per unit is neither feasible nor desirable. Contribution margin per unit of scarce resources may be different for different scarce resources may be the ranking of product, because production processes are affected by many constraints factored rather than single constraint. In such situation, linear programming technique may be uses to optimize product mix. The loner progr5amming formulation is required to determine a production plan that maximizes contribution from the product mix. Liner programming is a mathematical technique which shows how to arrive at the optimum results, allocation of available with the problem of allocating limit resource among competitive activities in an optimal manner. It is a technique to optimize the allocation of scarce resources in product mix problems which provides a valuable extension to cost –volume profit analyses. (*Munankarmi, 2003;148)*

2.10 CVP and Leverage

Operating leverage is a measures of the extent to which fixed costs are being used in organization. The relationship is if a company's variable and fixed cost is reflected in its operating leverage. Generally highly labor intensive organization have high variable cost and low fixed cost and this has low operating leverage and a reactively low break even point. Conversely, organizations that are highly capital intensive have a cost structures that includes low variable and high fixed cost which reflects high operating leverage with high break even point. It shows that fixed costs and operating leverage has direct relationship. Higher the amount of fixed cost higher the operating leverage and breaks even point and vice versa. In other words, the firms with relatively high operating leverage ha proportionally high filed expenses; the firms break even point will be relatively high. The operating leverage factor is determined as under. *(Munankarmi, 2003:P145)*

$$\text{Degree of operating leverage} = \frac{\text{Contributin margin}}{\text{Net income}}$$

2.11 Assumptions Underlying CVP Analysis

Break even analysis is the most useful technique of profit planning and control It is a device to explain the relation ship between cost volume and profit. The discussing of the CVP analysis (or break even analysis) so far is based on the following assumptions (*Pandey 1999; P241)*

- **Cost segregation** – the total cost can be separate in to fixed and variable components. Constant fixed cost is the total fixed cost that remains unchanged with changes in sales volume. Constant unit variable cost is the variable cost per unit is constant and total variable cost changes in directive proportion to the sales volume.
- **Constant Selling Price** – the selling price per unit remains the constant; that is it done not change with volume or because of other factors.
- **Constant Sales Mix** – The firm manufactures only one product or if there are multiple precut the sales mix does not change.
- **Synchronized Production and Sales** – Production and sale saner synchronized that is inventories remain the same.

2.12 Limitation of CVP Analysis

Assumption limits the utility and general applicability of the CVP analysis. Therefore, the analysis should recognize these limitations and adjustment data, wherever possible, to get meaningful results. The CVP analysis suffers from the following limitations *(Pandey, 1999; 214)*

- It is difficult to separate costs in to fixed and variable components.
- It is not correct to assume that total fixed cost would remain unchanged over the entire range of volume.
- If is difficult to use the break-even analysis for a multi produced firm.
- The break even analysis is a short run concept and has a limited use in long range planning.
- The break even analysis is a static tool.

2.13 Purpose of CVP Analysis

Cost-Volume-Profit analysis helps management in a number of ways. The following purposes are served by it: *(Dangol &Dangol: 2004; 160)*

- Calculation of profit resulting from a budgeted sales volume.
- Calculation of sales volume to break-even.

- Calculation of sales volume to produce desired profit.
- Effect or changes on price, costs and profits.
- Determinations of new break-even point for changing in cost and selling price.
- Measurement of effect of changes in profit factors.
- Choosing the most profitable alternatives.
- Determining the optimum sales mix.
- Determination of capacity and equipment selection.
- Long-term decision on continuance of products.
- Make or buy decisions on sub- assemble or part.
- To contemplate the increase or decrease in profit due to change in method of production etc

2.14 Sensitivity Analysis

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

Net profit = Total Sales Revenues – Total Cost

= Sales unit x SPPU – Sales unit x VCPU – Fixed cost – Taxes

So that, profit = F (sales volume , selling price, VC, FC, Taxes etc. means, profit are the function, price, VC, FC, taxes and so on.

But none of the factors remain unchanged; sometime the manger can intentionally change the price and cost factors as a part of strategic decisions. But the strategy should focus more one the factor, which is more sensitive or responsive for profit. Therefore, to measures the sensitivity of cost volume profit factors, we can see the impact of certain percentage or a out change in volume price or cost factors on net profit. *(Bajracharya, Ojha, Goet & Sharma; 2004, P245)*

2.15 A Brief Review of Books

"The study of the interrelationship of sales costs and net income is usually called cost- volume profit analysis. CVP analysis examines the response of profit to changes in volume. It relies on linear cost analysis and on linear revenue assumptions. To gain understanding of CVP analysis, the common example of a firm which produces only single product will be used. The analysis will be expanded to cover firms with several products by multiple divisions". *[Fisher & Frank, 2000; 109]*

"C-V-P analysis consists essentially in examining the relationship between changes in volume (output) and changes in profit. The scope of C-V-P analysis ranges from the determination of the optimal output level of a single- product department to the determination of the optimal mix of large multi-product firm. All these decision rely oh the simple relationship between changes in revenues and costs and changes in output levels (mixes). Output should be expanded or the output mix altered if the incremental revenue resulting from the change exceeds the incremental costs of making the change. Thus, all cost, volume and profit analysis is characterized by their emphasis on cost and revenue behavior over various ranges of output levels and mixes". *[Nicholas, Birnberg,Jacob & Demski, 1974; 107]*

"Cost, Volume and Profit analysis includes the related concepts of (a) Contribution analysis and (b) Break even analysis. These concepts entered the mainstream of management accounting starting in the 1930's, with major emphasis in the 1950's. Both concepts rest upon the concept of cost variability (i.e. flexible or variable expenses budgets), Contribution analysis involves a series of analytical techniques to determine and evaluate the effects on profits of changes in sales volume, sales prices. Fixed expenses and variable expenses. Basically, it applies the concept of a contribution margin income statement: Revenues minus variable expenses equals contribution margin, and contribution margin minus fixed expenses equals profit. Break-even analysis focuses on the breakeven point: Fixed expenses divided by the contribution margin equals break even sales volume (the point at which profit is zero because revenue equals total cost). The result of breakeven analysis is usually graphed to show the relationships between revenue (i.e. sales), fixed expenses, and variable expenses, within a relevant range of sales volume". *[Welsh, Hilton & Gordon, 1992; 531]*

"C-V-P analysis is concerned with examining the relationship between changes in volume and changes in total revenue and costs in the short term. Drury has compared the economist's and accountant's models of CVP behavior. The major differences are that the total cost and total revenue functions are curvilinear in the economist's model, whereas the accountant's model assumes linear relationships. However, we have noted that the accountant's model was intended to predict CVP behavior only within the relevant range, where a firm is likely to be operating on constant returns to sale. A comparison of the two models suggested that, within the relevant production range, the total costs and revenue functions are fairly similar**."** *[Drury, 2000;287]*

2.16 Review of the Related Studies.

There are few research paper concerning cost volume profit analysis has been conducted. Most of the researches are in the profit planning and control. Very few dissertations have been submitted related to cost volume profit analysis. Out of the previous research studies only few research are conducted to analyze the cost volume profit of private enterprise and the study is limited by various constraints. Therefore this study is attempted to review the previous research work on profit planning and control as well as management accounting. As CVP is one of the tools of PPC, the previous studies related to PPC are reviewed.

A study done by **Mr. Sagar Sharma (2002)** had conducted a research entitled *"Management Accounting Practices in the Listed Companies of Nepal"*. Mr. Sharma had concerned his study to examine and study the practice of management accounting tools in the listed companies in Nepal.

Mr. Sharma research is based on primary data only. Stratified random sampling with proportionate allocation of percentage is followed draw the sample No secondary data has been used for his study. He selected 9 manufacturing companies for the purpose. In his research, Mr. Sharma has pointed out various finding and recommendations. Some remarkable findings were as follows.

- Lack of information and extra cost burden are the main reason behind not practicing such tools.

- 100% of manufacturing companies were practicing the tools of cost segregation and 89% of companies work practicing break even analysis. Practicing of method of segregation into variable and fixed cost in manufacturing companies in Nepal are 44% practiced analytical method, 22% of the companies use high low method, and average method.
- Management accounting is to help managers in overall managerial activities by providing information and helping in planning, controlling and decision making.
- Practicing of regression method for segregating mixed cost into fixed and variable was nil. The reason behind this was regression method is statistical method which is difficult in application. Besides, it requires expert manpower in statistical methodology. Companies were not ready to hire statistical expert to segregated cost.
- Different types of management accounting tools, which are taught in the colleges, are not found applied by the listed companies in Nepal.
- Nepalese listed companies are in infant stage in practicing of management accounting tools. Such as capital budgeting annual budgeting, cash flow, ratio analysis, zero base budgeting activity based costing, activity costing, target costing and value engineering.
- As Nepal is processing towards globalizing and get membership of WTO, companies are recommended to apply management accounting tools to fit with the global environment.

A study done by **Mr Ishwor Raj Chalise (2004)** entitled with***"****Profit planning in Manufacturing Company (a case study of Nepal Lever Limited)"*.

The primary objective of this research was to highlight the system of profit panning applied and its effectiveness in Nepal Lever Ltd in coordination to these main objectives that was focused to meet the following objectives.

- To evaluate the variances between target and actual of Nepal Lever Ltd.
- To analyze the various functional plans formulated and implemented in Nepal Lever Ltd.
- To examine the practice and effectiveness of profit panning in Nepal Lever Ltd.
- To evaluate the profit planning process applied in Nepal Lever Ltd with conceptual prescriptions.
- To point out feasible suggestion and recommendation to make betterment of Nepalese manufacturing enterprise with special reference on Nepal Lever Ltd.

- To analyze the various functional budgets adopted in this enterprise.

On the basis of different analysis, observation and informal discussion, the following major findings have been drawn;

- The company has no panning division; it has no skilled and expert planners as well.
- The company has no proper practice of cost segregation.
- Yearly budget for income and expenditure prepared by general manger with mutual cooperation of other top level managers and which the board of directors finally approves. The middle and lower level manager and other workers are not participated in preparing the budget.
- The company has been suffering from many internal and external factors in formulating and implementing plans. However, it has no proper practice of environment scanning.
- In Nepal Lever Ltd target is more variable than actual because there is no any proper plan and policy during the operating period of the company.
- In Nepal Lever Ltd there is detail plan of manpower and systematic approach to labour planning. The company plans for direct labor hour and direct labour cost needed to produce the planned quantities of goods.
- The company has not a practice of preparing long range production plan; The Company prepares annual production plans of each product.
- The company has no depth analysis of the company's strength and weakness or opportunity and threats.
- The company has no practice of sales forecasting Sales and production are made on ad- hoc basis.
- The company has not a problem in production labour force and material but suffers from unavailability of market.

Some suggestions have been recommended on the basis of major finding of the study of profit planning in Nepal Lever Ltd.

- Trained and qualified manpower of profit planning should be hired and present manpower should be trained to develop and implement the profit plans effectively.
- The company should improve productivity of its product by providing sufficient technical staff and technical equipment.

- There is a lack of periodical performance reports about the activities of the industry. Therefore system of periodical performance reports should be strictly followed to be considered towards poor performance and to take correct action timely.
- The company should make every effort to run the existing plans and utilize the idle equipment and facilitilies.
- For better performance, company should prepare strategic and tactical profit plans.
- Nepal Lever Ltd should appoint reliable agents and dealers to improve its sales performance.
- Different cost in the company should be diagnosed as controllable and non-controllable within a specific framework of responsibility and time and effective programs should be launched to reduce the controllable expenses.
- Modern strategic management system should be introduced instantly.
- Finally, the company should adopt a systematic approach to profit planning.

A study done by **Mr. Madav Rijal (2005)** had studied on the topic *"Cost Volume Profit Analysis to Measure the Effectiveness of Profit Planning and Control (a case study of Nebico Pvt. Ltd.)"*. The study was based on both primary data as well as secondary data and analysis was based on only five years data.

The main objectives of that research analysis are as follows.

- To study relationship of cost volume and profit as an applicable tools of budgeting.
- To evaluate the stability, financial position and sensitivity of Nebico's activities.
- To analysis the cost volume and profit of the company and its impact in profit planning and
- To provide suggestions and recommendations for improving Nebico's condition etc.

Mr. Rijal had pointed out some major findings in his research although most of his findings were out of objectives of the study. Some major findings are as follows;

- The company's sales trend has fluctuation but not satisfactory trend of increasing.
- The company's variable cost is in high proportion than fixed cost in comparison with total cost. This contributes for lower contribution margin.
- NEBICO had no any plan to reduce cost.
- The profit trend of the company was not satisfactory.
- The company had no effective inventory policy.
- There were not effective sales forecasting techniques.

- NEBICO Pvt. Ltd. had not practice of segregating the cost into fixed variable and controllable or non-controllable.
- Net profit margin profitability ration and other things were not satisfactory.
- The company has not utilized its full capacity.
- CVP relation is not considered while developing sales plan production plan and pricing strategy.

The following suggestions have been recommended on the basis of this research;

- NEBICO should consider BEP analysis while preparing sales plan production plan and setting the price of its products.
- Classification of expenses as variable and fixed or controllable or uncontrollable must be made within a specific framework of responsibility and time.
- Cost control department separately established which is divided the cost by production and control the cost.
- A systematic approach should be made towards comprehensive profit planning. This cans considerably contribute to the increase in profitability of NEBICO Ltd.
- CVP analysis and PPC manuals should be communicated from top to lower levels.
- As company as unable to generate more profit as per investment made in fixed cost, company should put address on effective utilization of fished cost.
- All personnel should be participated on decision making and planning process.

A study done by **Mr. Yam Prasad Gautam(2006)** has studied on the topes of *"An Analytical and Comparative study on Cost Volume Profit Analysis of Unilever Nepal Ltd.Ltd and Dabur Nepal Private Limited"* His research was in partial fulfillment of MBS, submitted to the Nepal commerce campus, TU. His objective of the study was;

- To calculate of profit resulting from a budgeted sales volume.
- To calculate break even point, CM analysis, margin of safety analysis and profit volume analysis.
- To calculate sales volume to produce desire profit
- To contemplate the increase or decrease in profit due to the change in volume of production
- To suggest and recommended with the help of major findings.

- To encourage greater use of CVP approach to manufacturing enterprise in profit planning and control.

Mr. Gautam has pointed out various findings and recommendations based on the analysis of data and information.

Some of the major recommendations are as follows.

- Classification of expenses items as variable and fixed or controllable and non controllable must be made with in specific framework of responsibility and time.
- Separate cost control department should be established for the effective management of cost.
- UNL and DNPL should be consider BEP analysis while preparing sales plan, production plan and selling price of its products.
- Both companies should consider about the product line to improve its profit. Market studies on demand, supply and pricing of product should be carried out and loss oriented cost should be identified and controlled.
- As UNL and DNPL is multi-product company, more emphasis should be provided the product having high contribution so as more have more profit.
- Some porson of profit should be allocated to research and development program so that new technology could be found which provide more competitiveness in the market.
- UNL and DNPL should have proper manpower planning.
- System of periodical performance reports should be strictly followed to be consists about poor performance and take corrective action immediately and timely.
- New market areas should be identifying for the coverage of increased activities of companies.
- A systematic approach should be made towards comprehensive profit. This can considerably contributed to the increase in profitability to UNL and DNPL. Since separate on of cost in to their fixed and variable elements each and the heart of CVP analysis, all decision makers sought to be fully aware of, and understand the cost structure of their operation otherwise CVP analysis will provide meaning less information.

A study done by **Mr. Udya Kumar Dahal(2006)** has studies on the topics of *"Cost Volume Profit Analysis as a tool to measure the Effectiveness of Profit Planning with special reference to Dabur Nepal Ltd."* This was submitted to Nepal commerce Campus, TU in Partial fulfillment of Master's Degree in the year 2006.

The main objective of the research was;

- Examine the variance between target and actual sales and production.
- To show the capacity utilization of Dabur Nepal Ltd.
- To forecast future production and sales.
- To analyze financial performance.
- To analyze the CVP of company and its impact of profit planning.
- To analyze the trend of profit over the time covered by the study.
- To provide recommendations and suggestions for improving the profit planning systems of Dabur Nepal Pvt. Ltd.

To conclusion of the research regarding the present practice of profit planning of Dabur Nepal Pvt Ltd. has given below.

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

The researcher also provides the following recommendations;

- CVP analysis should be considered while formulating profit plan.
- Profit planning manuals should be communicated from top level to lower level.
- The company management should look carefully into the basis of setting target for sales and achieving those targets meaningfully.
- Dabur Nepal Pvt. Ltd should focus on the relationship between expenditure and benefit, expenses planning and controlling is necessary to obtains companies goals.
- To get the idea of future cash requirement and application of the form, it should make cash budget systematically.
- The company should prepare raw material budget and production budget scientifically.

2.17 Research Gap

There is the gap between the present research and the previous researches. Previous researches were mainly conducted on profit planning and control and budgeting practices in the manufacturing companies especially in public enterprise.

The previous researcher did not disclose which of the profit planning and control tools are in practices, which are not and why. But few of the researches were conducted on simple cost volume profit analysis of public and private limited companies. But to fill gap, it examines the multi product cost volume profit analysis as a tool of profit planning and control in the different manufacturing Organizations.

CHAPTER THREE
RESEARCH METHODOLOGY

'Research Methodology is the way to solve systematically about the research problem', it helps to analyze, examine and interpret various aspects of research works such as sales and production planning cost benefit ratio and other aspects of related with profit planning in this research works. The chapter research methodology has been presented with the objective to perform the financial analysis and to draw the result consequences therefrom, so that the proper recommendations may be given to the concerned public enterprises. Thus, this chapter plays vital role to accomplish the study in realistic term with sound empirical analysis. The research methodology consists of research design, population and sample, source of data, collection techniques, tools and limitation of research methodology. A detail explanation of the above points are given below which seems appropriate to understand the research methodology in details.

3.1 Research Design

The research design is an organized approach and not a collection of loose unrelated parts. It is an integrated system that guides the researcher in formatting, implementing and controlling the study. Useful research design can product the answers to the proposed research questions. The research design is thus an integrated frame that guides the researcher in planning and executing the research works.

Data and information are the lifeblood or major portion of any study. This study would be attempted to show the relationship among cost, volume, profit and various functional budgets for their achievement and effective application within the conceptual framework of profit planning for solving the problems that has accrued in Unilever Nepal Ltd. A study design is the arrangement of the conditions for collection and analyze of data in manner that aims to combine relevance to the study purpose with the economy in producer. These studies will an intensive based on analysis of the past financial performance.

To fulfill the objective of the study primary as well as secondary data be used and study design will descriptive as well as analytical.

3.2 Population and Sample

The large group about which the generalization is made is called the population under study, or the universe and small portion on which the study is made is called the sample of the study.

The population of the study would be manufacturing enterprises all over Nepal but for the convenience Dabar Nepal Pvt. Ltd. (DNPL) & Unilever Nepal Ltd.Ltd (UNL) will be selected sample of this research study by using random sampling method..

3.3 Source and Types of Data

Generally this study is based on secondary data. Annual report of the concerned firm, supporting data and information are collected from the office of the concerned firm and another institution. Documents, books, other publishes or unpublished material, thesis, newspapers are the important data and informal quires, with the authorities of the concerned firm is primary source in nature.

Secondary data refer to those for already gathered by other. The sources of secondary data can be divided into two groups. Internal and external. The internal secondary data are found within the collected from published document of the company. Mainly data sources depend upon annual reports, publications as well as website of concerned organization. External secondary data are collected from sources outside the company. Such sources may include books, periodicals, published reports, data services and computer data banks etc.

3.4 Variables of Studies

Variables are characteristics of person, things, groups, objects etc. A variable is thus a symbol to which numerals or values are assigned. In other words, a variable can take on many values. The researcher had used two types of variables, independent variables and dependent variables, which are presented as below:

a.) Independent Variables: A variable is called independent variable if it is not influenced by any other variable under study. The independent variables are those, which are the basis of prediction.

b.) Dependent Variable: A variable is called dependent variable if its values depend upon the other variables. The investigators purpose is to study analyze and predict the variability in the dependent variable. The dependent variable is the variable that is being predicted.

There are three factors (i.e. cost, volume and profit) of C-V-P analysis, which are interconnected and dependent on one another. So these factors are depending variables. But, testing relationship between these variable following criteria are assumed:

Table no. 3.1: Classification of Variables

S.N	Independent Variable	S.N	Dependent Variable
1.	Sales Unit	1 2 3	Sales Rs. Cost (Variable & Fixed) Profit

3.5 Method of Data Collection

Both primary and secondary data were used in the study. The secondary data were collected from the company's annual reports and other related document, company's website and books published reports etc..

The primary data were obtained through general discussion as well as questionnaire method followed in most cases face to face interviews with the concerned person of the company. The profile of the respondents can be shown in the following way.

Table no. 3.2: profiles of Respondents

S.N.	Categories of Respondent	Questionnaires	
		Number	%
1	Top Level	15	60
2	Middle Level	7	28
3	Lower Level	3	12
	Total	**25**	**100**

3.6 Method of Analysis & Presentation

Analysis and presentation of the data is the core of each and every research work. In order to get the concrete results from this research, data are analyzed by using different types of tools. Basically, following two techniques are used to explain the collected data.

3.6.1 Descriptive Techniques:

Descriptive technique is a fact-findings operation searching for adequate information. It is a type of study, which is generally conducted to assess the opinions, behaviors or characteristics of a given population and to describe the situation and events occurring at present. Descriptive technique is a process of a accumulating facts. It does not necessary seek to explain relationships, test hypothesis, make predictions, or get at meanings and implications of a study.

3.6.2 Quantitative Techniques:

Descriptive techniques would not be enough to prepare excellent research report. To fulfill the gap, or make the research report attractive and for better understanding the following profit planning and statistical tools were used:

CVP Analysis Tools

C-V-P Analysis was included the following techniques:

1. Contribution Margin (CM) = Sales – Variable Cost

2. Contribution Margin Ratio = $1 - \frac{VariableCost}{Sales}$

3. Break Even Point (BEP) in units = $\frac{TotalFixedCost}{SPPU - VCPU}$

4. Break Even Point (BEP) in Rs. = $\frac{TotalFixedCost}{CMRatio}$

5. Break Even Point (% of capacity) = $\frac{BEPinUnits/Rs}{TotalCapacityinUnits/Rs}$

6. Cash BEP(in Rs) = $\frac{FixedCost - NonCashOutlay}{1 - \frac{VariableCost}{Sales - NonCashOutlay}}$

7. Required sales for desired profit (in units) = $\frac{FC + Desired\ Profit}{CMPU}$

8. Required sales for desired profit (in Rs) = $\frac{FC + Desired\ Profit}{CMRatio}$

9. Required sales in units for DPAT = $\frac{FC + \frac{DPAT}{(1 - T)}}{CMPU}$

10. Required sales in Rs for DPAT = $\frac{FC + \frac{DPAT}{(1 - T)}}{CMRatio}$

11. Safety margin (in Units) = Actual sales units – BEP in unit

12. Safety margin (in Rs) = Actual sales Rs. – BEP in Rs

13. Margin of safety Ratio = $\frac{Actual/BudgetedSales - BESales}{Actual/BudgetedSales}$

For Multi product Firm

14. Overall BEP (in units) $= \frac{TotalFixedCost}{WeightedCMPU}$

15. Overall BEP in Rs. $= \frac{TotalFixedCost}{WeightedCMRatio}$

16. Required Sales for desired profit (in units) $= \frac{FC \Gamma Desired \Pr ofit}{WeightedCMPU}$

17. Required sales for DP (in Rs.) $= \frac{FC \Gamma Desired \Pr ofit}{WeightedCMRatio}$

18. Required sales for DP after tax (in Units) = $\frac{FC \Gamma \frac{DPAT}{(1 Z T)}}{WeightedCMPU}$

19. Required sales for DP after tax (in Rs) = $\frac{FC \Gamma \frac{DPAT}{(1 Z T)}}{WeightedCMRatio}$

Statistical Tools

The relationship between two or more variables can be measured by using statistical tools. In this study the following statistical tools are used

a.) Bar Diagram:

Bar diagram are one of the easiest and the most commonly used methods of presenting the numerical data. They present the data by means of bars, or rectangles of equal width. The length of the bars represents the given figures and the width may be of any size.

b.) Mean:

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

Mean (X) = $\frac{X}{N}$

Where,

X = the sum of observations

N = no. of observation

c.) Standard Deviation (S.D.):

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

The SD is calculated by the following formula:

$$SD = \sqrt{\frac{X^2}{N} - \left(\frac{X}{N}\right)^2}$$

d.) Coefficient of Variation (CV):

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

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

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

$$CV = \frac{¢}{\bar{X}} \mid 100$$

e.) Time series Analysis (Trend Analysis):

The collection of readings or data regarding to different time period is called time series. There are two variables in this case one most be time and other variables may be population, production, sales, profit etc. a widely and most commonly used method to describe the trend is the method of least square.

The straight line is given by the following formula:

$$Y = a + bx$$

Where,

Y = values of dependent variables
a = y- intercept
b =slope of the trend line
x = values of independent variables (Time)

f.) Correlation Analysis:

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

It can be calculated by using following formula:

$$\text{Co-efficient of correlation (r)} = \frac{N \quad XY - X \cdot Y}{\sqrt{[N \quad x^2 - (\quad x)^2]}\sqrt{[N \quad Y^2 - f \quad Y Å]}}$$

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

g.) Coefficient of determination (r^2):

A meaningful analysis is available from the square of correlation coefficient (r^2), which is called the coefficient of determination and calculated using the following formula:

$$\text{Co-efficient of determination } (r^2) = \frac{[N \quad XY \; Z \quad X. \quad Y]^2}{[N \quad x^2 \; Z(\quad x)^2][N \quad Y^2 \; Z\int \quad Y \text{Å}]}$$

OR

$r^2 = rxr$

$$\text{Probable Error of r (P.E.)} = 0.6745 \mid \frac{1 Z r^2}{\sqrt{N}}$$

h.) Testing Hypothesis:

A quantitative statement about the population parameter is called a hypothesis. In other words, it is an assumption that is made about the population parameter and then its validity is tested. It may or may not be found valid on verification. The act of verification involves testing the validity of such assumption which, when undertaken on the basis of sample evidence, is called statically hypothesis or testing of hypothesis or test of significance.

Generally, two complementary hypotheses are set up at one time. It one of the hypotheses is accepted, then the other hypothesis is rejected and vice versa. The two complementary hypotheses that are set up in the testing of hypothesis are the null hypothesis and the alternative hypothesis.

Null Hypothesis: A statistical hypothesis or assumption made about the population parameter to testing its validity for the purpose of possible acceptance is called null hypothesis. Null hypothesis is also called hypothesis of no difference. We should adopt neutral or null attitude regarding the outcome of the sample while setting up the null hypothesis. The null hypothesis is usually devoted by H_O.

Alternative Hypothesis: A complementary hypothesis to the null hypothesis is called an alternative hypothesis. In other words, a hypothesis, which is set up against the null

hypothesis, is called an alternative hypothesis. An alternative hypothesis is called hypothesis of difference. It is usually denoted by H_1.

To make the research specific, precise and objective, hypothesis has been posed related to the significant or insignificant relation between cost, volume and profit.

$H_{O:}$ $\mu_1 = \mu_2 = \mu_3$ There is no significant difference between average cost, volume and profit.

$H_{1:}$ $\mu_1 \neq \mu_2 \neq \mu_3$ There is significant difference between average cost, volume and profit.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

Business organization establishes profit objectives and builds budget plans so that the objective may be realized. In profit planning, management must know the selling proce of the unit of product, the variable cost to make and sell it, and the difference between the selling price and the unit variable cost, in short management must know what the contribution margin is for each unit of each product line that is handled. Several factors affected profits. They are selling price the number of unit sold (quantity), the unit variable costs, the total fixed costs and the combination in which the various product lines are sold. All the factors must be considered in profit planning.

Cost volume profit analysis, a most important tool of profit planning means of predicting the effect of changes in costs and sales level on the income of business. In its simplest form it involves the determination of sales level at which a company neither earns a profit nor incurs a loss, or in other word the point at which it break even. Often break even analysis is known as CVP analysis. But break even analysis is a special case of CVP. However, CVP analysis techniques is included to find out sales volume to earn a zero profit or desired profit, to affect income of by changes in selling price, to check income if new machine will be installed, to examine operating profit it fixed cost as well as unit variable cost will be changes etc. solving such alternatives CVP analysis is more appropriate than break even analysis.

In this way company may use CVP analysis as planning tool when sales volume, unit selling price and variable and fixed cost are known, then to find out profit, as target profit at certain sales volume. By using CVP analysis tools, the management of the company can control the costs also.

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The C-V-P analysis tool is applied in the Unilever Nepal Ltd.Ltd. and Dabar Nepal Private Limited to find out whether the tool is practicing or not. Unilever Nepal Ltd.Ltd., one of the leading alcoholic manufacturer and Dabar Nepal Private Limited, one of the leading liquor and medicine manufacturer, which are the largest player in Nepalese liquor market and for decades has been synonymous with quality product, had not practicing C-V-P analysis tools, costs are not segregated as fixed costs and variable costs where there are not proper mechanism to segregate semi-variable or semi-fixed costs into fixed and variable cost. To solve the problems regarding C-V-P analysis and not application, some objectives are formulated: cost segregation as fixed and variable cost, unit variable by adopting suitable mechanism and computation of C-V-P analysis by its extension tools. To fulfill the objectives of the study, historical as well as managerial research design is adopted.

Hence, descriptive and quantitative technique are used to analyze and interpretation the data. After it, some finding: major and others are also achieved.

5.2 Conclusion

The following conclusion based on the finding of research study are made:

- Company has no clear-cut boundaries to separate cost into fixed and variable. The classification of cost is not scientific and systematic. So, both companies have not been able to use C-V-P analysis and make the realistic and smart budget.
- Since, not adopting C-V-P analysis tool for profit planning, before and after operation of venture, UNL and DNPL had incurring loss and little bit profit annually respectively.
- Different types of profit planning tools, which are used in the academic field, are not found applied by both companies. It shows the gap between the theory and practice. C-V-P analysis is not applied by both companies as no segregation of cost in to fixed and variable, which is the hardcore of CVP analysis.
- The huge amount had invested into fixed costs. The contribution margin is very low cause of higher unit variable cost. Depreciation and interest on long-term loan is increasing annually. Other controllable cost is also increasing.
- BEP of the UNL is fluctuated whereas DNPL is increased. The MOS of the DNPL is low so the percentage decrease in sales revenue can lead to the company huge

losses, whereas the MOS of UNL is in negative situation. Overall BEP of the both companies are very high as the companies have not provided attention to sell more under these circumstances unless management revised their cost structure as soon as possible.

- Promoter and director, and staff of the company are enjoying by achieving allowance and salary respectively. Other part, general shareholders are not achieving dividend and government couldn't claim for income tax since loss and loss recovery situation.
- Hence, avoiding C-V-P analysis tool and not utilizing full capacity, the companies are bearing loss as well as not attaining satisfactory profit.

5.3 Recommendations

The following recommendations based on the finding of research study are made:

- Separate cost control dependent should be established for the effective management and reduction of cost.
- Expenses planning and controlling should focus on the relationship between expenditure and benefits derived from those expenditure.
- Both companies should consider BEP analysis which preparing sales plan, production plan and selling price of its products.
- Classification of expenses item as variable and fixed or controllable and non-controllable must be made within specific framework of responsibility and time.
- Both companies should consider about the product line to improve its profit. Market studies on demand, supply and pricing of product should be carried out and loss oriented costs should be identified and control.
- Some portion of fund should be allocated to research and development program so that new technology could be found which provide more competitiveness in the market.
- Both companies are multi Product Company; more emphasis should be provided the product having high contribution so as have more profit.
- System of periodical performance reports should be strictly followed to be conscious about poor performance and take corrective action immediately and timely.
- Both companies should have proper manpower planning.
- A systematic approach should be toward comprehensive profit planning. This can considerably contribute to the increase in profitability to companies. Since separate on of costs into their fixed and variable elements is at the heart of C-V-P analysis,

all decision makers sought to be fully aware of, and understand, the cost structure of their operation, otherwise C-V-P analysis will provide meaningless information.

- For overall profitability of the company, the company should analyze other profit planning tool i.e. decision making where department wise, product wise, make or buy, drop or continue, decision are provided. The companies are multiple products producer and there is different kind of material is needed to manage the stock for future. It should be considered. Decision-making tools also can adopt for profit planning purpose
- New market areas should be identified for the coverage of increased activities of companies.

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APPENDIX – I

Assume, actual and budgeted sales be denoted by x and y respectively UNL

Fiscal Year	*X ('000000)*	*Y ('000000)*	*U = X-A*	*V = Y-B*	U^2	V^2	*UV*
206O/61	94.87	646.85	(219.71)	177.54	48,272.45	31,520.45	(39,007.31)
2061/62	203.59	543.15	(110.99)	73.84	12,318.78	5,452.35	(8,195.50)
2062/63	314.58	469.31	-	-	-	-	-
2063/64	453.59	694.43	139.01	225.12	19,323.78	50,679.01	31,293.93
2064/65	529.56	750.34	214.98	281.03	46,216.4	78,977.86	60,415.83
N = 5	*$\sum X = 1596.19$*	*$\sum Y = 3104.08$*	*$\sum U = 23.29$*	*$\sum V = 757.53$*	*$\sum U^2 = 126131.44$*	*$\sum V^2 = 166629.67$*	*$\sum UV = 44506.95$*

Computation of Mean:

For Actual Sales:

$$\text{Mean } (\bar{X}) = \frac{X}{N} = \frac{1596.19}{5} = 319.24$$

For Budgeted Sales:

$$\text{Mean } (\bar{Y}) = \frac{Y}{N} = \frac{3104.08}{5} = 620.82$$

Let,

A = Assumed Mean for X = 314.58

B = Assumed Mean for Y = 469.31

Computation of Standard Deviation $(\pm)$

For Actual sales:

$$\pm x = \sqrt{\frac{U^2}{N} - \left(\frac{U}{N}\right)^2} = \sqrt{\frac{126131.44}{5} - \left(\frac{23.29}{5}\right)^2} = 158.76$$

For,

Budgeted Sales:

$$\pm y = \sqrt{\frac{V^2}{N} - \left(\frac{V}{N}\right)^2} = \sqrt{\frac{166629.67}{5} - \left(\frac{757.53}{5}\right)^2} = 101.84$$

Computation of C.V

For Actual Sales:

$$\text{C.V x} = \frac{\pm x}{X} x100 = \frac{158.76}{319.24} x100 = 49.73\%$$

For Budgeted sales:

$$\text{C.V y} = \frac{\pm y}{Y} x100 = \frac{101.84}{620.82} x100 = 16.40\%$$

Computation of Correlation co-efficient(r)

$$r = \frac{N.\ UV - U.\ V}{\sqrt{N.\ U^2 - (U)^2}\sqrt{N.\ V^2 - (V)^2}}$$

$$= \frac{5x\,44506.95 - 23.29\,x\,757.53}{\sqrt{5x126131.44 - (23.29)^2}\sqrt{5 \mid 166629.67 - (757.53)^2}}$$

$$= \frac{204891.88}{793.7976\,x\,509.2117}$$

$= 0.51$

Computation of Probable Error of r(P.E.)

$$P.E = 0.6745 \text{ x } \frac{1 - r^2}{\sqrt{N}}$$

$$= 0.6745 \text{ x } \frac{1 - (0.51)^2}{\sqrt{5}}$$

$$= 0.6745 \text{ x } \frac{0.7399}{2.23}$$

$= 0.223$

Let, actual and budgeted sales be denoted by x and y respectively of DNPL(in lakhs)

Fiscal Year	*X ('00000)*	*Y ('00000)*	X^2	Y^2	*XY*
206O/61	2.70	2.72	7.398	7.29	7.344
2061/62	3.01	2.83	8.009	9.060	8.518
2062/63	2.73	2.73	7.453	7.453	7.543
2063/64	3.22	3.25	10.562	10.368	10.465
2064/65	3.66	3.85	14.822	13.395	14.091
N = 5	***∑X = 15.38***	***∑Y = 15.32***	***∑ X^2 = 48.244***	***∑ Y^2 = 47.566***	***∑ XY = 47.87***

Computation of Mean:

For Actual Sales:

$$\text{Mean } (\bar{X}) = \frac{X}{N} = \frac{15.38}{5} = 3.067$$

For Budgeted Sales:

$$\text{Mean } (\bar{Y}) = \frac{Y}{N} = \frac{15.32}{5} = 3.076$$

Computation of Standard Deviation $(\pm)$

For Actual sales:

$$\pm x = \sqrt{\frac{X^2}{N} - \left(\frac{X}{N}\right)^2} = \sqrt{\frac{47.567}{5} - \left(\frac{3.067}{5}\right)^2} = 0.3367$$

For,

Budgeted Sales:

$$\pm y = \sqrt{\frac{Y^2}{N} - \left(\frac{Y}{N}\right)^2} = \sqrt{\frac{48.345}{5} - \left(\frac{3.076}{5}\right)^2} = 0.4344$$

Computation of C.V

For Actual Sales:

$$\text{C.V x} = \frac{\pm x}{X} x100 = \frac{3367.49}{30667.57} x100 = 10.98\%$$

For Budgeted sales:

$$\text{C.V y} = \frac{\pm y}{Y} x100 = \frac{4344.46}{30789.89} x100 = 14.11\%$$

Computation of Correlation co-efficient(r)

$$r = \frac{N.\ XYZ\ X.\ Y}{\sqrt{N.\ X^2 Z(\ X)^2}\sqrt{N.\ Y^2 Z(\ Y)^2}}$$

$$= \frac{5x\,47.87\,Z15.38\,x15.32}{\sqrt{5x48.244\,Z(15.38)^2}\sqrt{5\mid 47.566\,Z(15.32)^2}}$$

$$= \frac{3.734}{3.823}$$

= 0.97

Computation of Probable Error of r(P.E.)

$$P.E = 0.6745 \text{ x } \frac{1Z_r^2}{\sqrt{N}}$$

$$= 0.6745 \text{ x } \frac{1Z(0.97)^2}{\sqrt{5}}$$

$$= 0.6745 \text{ x } \frac{0.0591}{2.23}$$

= 0.0179

APPENDIX – II

Computation of variances of UNL (in '000)

Year (X)	*cost*	*Volume*	*Profit (Loss)*	*Row Total (Tr)*
206O/61	1,570.33	948.65	*(621.68)*	*1,897.30*
2061/62	2,477.27	2,035.85	*(441.42)*	*4,071.70*
2062/63	3,357.17	3,145.79	*(211.38)*	*6,291.58*
2063/64	4,672.75	4,535.99	*(136.76)*	*9,071.98*
2064/65	5,399.56	5,295.59	*(103.97)*	*10,591.18*
Column total (Tc)	***17,477.08***	***15,961.87***	***(1,515.21)***	***T_r=31,923.47***

Test Statistic;

Under Null Hypothesis (H_o)

$$Fc = \frac{MSC}{MSE} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

And

$$Fr = \frac{MSR}{MSE} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where,

MSC = Mean sum of square of variation between different cost, volume and profit

MSR = Mean sum of square of variation between different years

MSE = Mean sum of square of variation due to error.

In order to find MSC, MSR and MSE, we need to find SSC, SSR, SST and SSE.

Now, T = grand total = Tc = Tr

N = 5x3 = 15

$$\text{Correction Factor (C.F)} = \frac{T^2}{N} = \frac{(31923.47)^2}{15} = 67940529.12$$

$$\text{Total Row sum of Square (RSS)} = \sum cost^2 + \sum volume^2 + \sum Profit^2$$

$$= 70853234.13 + 63559095.5 + 655532.20$$

$$= 135067861.80$$

$$\text{Total Sum of Square (SST)} = RSS - CF$$

$$= 135067861.80 - 67940529.12$$

= 67127332.68

Sum of square due to column factor (SSC) = $\frac{\phi Tc^2}{Nr}$ -C.F

SSC = $\frac{(17477.08)^2}{5} \Gamma \frac{(15961.87)^2}{5} \Gamma \frac{(Z1515.21)^2}{5}$ Z67940529.12

= 44564567

Sum of square due to row factor (SSR) = $\frac{\phi Tr^2}{Nc}$ - C.F

SSR = $\frac{(1897.3)^2}{3} \Gamma \frac{(4071.43)^2}{3} \Gamma \frac{(6291.58)^2}{3} \Gamma \frac{(9071.98)^2}{3} \Gamma \frac{(10591.18)^2}{3}$ Z67940529.12

= 84744727.78 – 67940529.12

= 16804198.66

Hence,

Sum of square Due to Error (SSE) = SST – SSC – SSR

= 67127332.68 – 44564567 – 16804198.66

= 5758567.02

Two Way ANOVA Table of UNL

Source of Variation	***Sum of Square (S.S)***	***D.F***	***Mean sum of square (MSS)***	***F - Ratio***
Due to column Factor	SSC = 44564567	948.65	*C -1 = 3-1 = 2*	*Fc = 30.96*
Due to Year	SSR = 16804198.66	2,035.85	*r -1 = 5-1 = 4*	*Fr = 5.84*
Due to Error	SSE = 5758567.02	3,145.79	*(c-1) (r-1) = 8*	-

Computation of variances of DNPL (in '000)

Year (X)	***cost***	***Volume***	***Profit (Loss)***	***Row Total (Tr)***
206O/61	25.22	26.99	*1.77*	*53.98*
2061/62	28.14	30.18	*20.33*	*78.65*
2062/63	26.82	27.28	*0.47*	*54.57*
2063/64	32.11	32.27	*0.16*	*64.54*
2064/65	36.55	36.61	*0.06*	*73.22*
Column total (Tc)	***148.84***	***153.33***	***22.79***	***324.96***

Test Statistic;

Under Null Hypothesis (H_o)

$$Fc = \frac{MSC}{MSE} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

And

$$Fr = \frac{MSR}{MSE} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where,

MSC = Mean sum of square of variation between different cost, volume and profit

MSR = Mean sum of square of variation between different years

MSE = Mean sum of square of variation due to error.

In order to find MSC, MSR and MSE, we need to find SSC, SSR, SST and SSE.

Now, T = grand total = Tc = Tr

N = 5x3 = 15

$$\text{Correction Factor (C.F)} = \frac{T^2}{N} = \frac{(324.96)^2}{15} = 7039.933$$

$$\text{Total Row sum of Square (RSS)} = \sum cost^2 + \sum volume^2 + \sum Profit^2$$

$$= 4514.175 + 4765.136 + 416.692$$

$$= 9696$$

$$\text{Total Sum of Square (SST)} = RSS - CF$$

$$= 9696 - 7039.9334$$

$$= 2656.0666$$

$$\text{Sum of square due to column factor (SSC)} = \frac{\phi Tc^2}{Nr} - C.F$$

$$SSC = \frac{(148.84)^2}{5} \Gamma \frac{(153.33)^2}{5} \Gamma \frac{(22.79)^2}{5} Z 7039.9334$$

$$= 2196.6302$$

$$\text{Sum of square due to row factor (SSR)} = \frac{\phi Tr^2}{Nc} - C.F$$

$$SSR = \frac{(53.98)^2}{3} \Gamma \frac{(78.55)^2}{3} \Gamma \frac{(54.57)^2}{3} \Gamma \frac{(64.54)^2}{3} \Gamma \frac{(73.22)^2}{3} Z 7039.9334$$

$$= 7201.3759 - 7039.9334$$

$$= 161.4425$$

Hence,

Sum of square Due to Error (SSE) = SST – SSC – SSR

= 9696 – 2196.63– 161.4425

= 7337.93

Two Way ANOVA Table of DNPL

Source of Variation	***Sum of Square (S.S)***	***D.F***	***Mean sum of square (MSS)***	***F - Ratio***
Due to column Factor	SSC = 2196.63	*C -1 = 3-1 = 2*	*MSC=1098.315*	*Fc = 1.1974*
Due to Year (row)	SSR = 161.4425	*r -1 = 5-1 = 4*	*MSR=40.36*	*Fr = 0.044*
Due to Error	SSE = 7337.93	*(c-1) (r-1) = 8*	*MSE=917.24*	-

Where,

$$\text{MSC} = \frac{SSC}{C\ Z1}$$

$$\text{MSR} = \frac{SSR}{r\ Z1}$$

$$\text{MSE} = \frac{SSE}{(c\ Z1)\,(r\ Z1)}$$

$$\text{FC} = \frac{MSC}{MSE}$$

$$\text{Fr} = \frac{MSR}{MSE}$$