OROMIA PUBLIC SERVICE COLLEGE

COST AND MANAGEMENT ACCOUNTING-II

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Module Introduction

Dear learner! Welcome to this module of the course Cost and Management Accounting-II. The module starts with basic concepts of Cost and Management Accounting and using these concepts, it will show you how various management accounting tools are used in helping managers make sound decision that is planning and controlling decisions. The module is divided into five chapters. The first chapter concentrates on introductory issues in management accounting and the second chapter deals with cost-volume-profit analysis. The third chapter is about master budget and responsibility accounting and the fourth chapter is about flexible budgets, standard costing and variance analysis in detail. The fifth that is the last chapter is mainly concerned with relevant information and decision making. To help you acquire the required knowledge, skill, and attitude expected of this course, there are activities, check lists, self assessment questions, and Tutor Marked Assignments (TMAs) that you exercise with. Dear learner, you are required to try the activities and self assessment questions before you look at respective feedbacks. The TMAs are, of course, marked by tutors and are part of your final evaluation. The solutions for each question would be available at the end of the module.

After completing this module, you would be able to:

- Understand the basic concepts of cost and management accounting and role of accounting in business decision
- Have good understanding of the cost volume profit analysis
- Distinguish between master budget, responsibility accounting and flexible budget
- Understand flexible budgets, compute and interpret variances in detail
- Distinguish between relevant and irrelevant information and make special decisions and pricing decisions.

Course Introduction

This course: Cost and Management Accounting-II is designed based on the knowledge acquired from part-I of the course Cost and Management Accounting-I. It introduces some new concepts and the use of accounting tools and techniques in the analysis, planning and control of business operations and in management decision making process. Topics covered include: Introduction to Management Accounting, Intensive Review of the Management Decision Making Process and the nature of Management Information, Examination of Concepts and Rationale Underlying Management Accounting Methods, The Budgeting Process and Standard Costing, Investment Decisions and Quantitative methods of evaluating these decisions.

The objective of the course is to enable you develop working knowledge and skills necessary to apply cost and management accounting concepts and techniques in decision making.

Up on successful completion of the course, you would be able to:

- Have understanding of management accounting tools and its role in helping managers make proper decision
- Explain how cost-volume profit analysis (CVP) analysis is used for management decision making
- Demonstrate practical skills on applying relevant information for decision making
- Understand the importance of budgets to business and demonstrate practical skills in budget preparation and using budgets for planning and control
- Have analytical thinking and communication skills necessary for management accounting tasks in organizational context
- Describe the range of information needs of management and differentiate between the accountant’s and manager’s respective roles in decision making

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CHAPTER ONE

INTRODUCTION TO MANAGEMENT ACCOUNTING

Introduction

Dear Learner! Welcome to the first chapter of this module. In this chapter, you will study about the differences between management accounting and

financial accounting in detail, the relationship between management process and the accounting system and management decision.

Accounting in general is concerned with preparation of reports to various users internal or external so that they make sound economic decision. Management accounting is part of accounting whose reports are intended to help managers make planning and controlling decision about the business organization. But financial accounting reports are prepared to help external users make proper and informed decision. The accounting system formalizes management plans by expressing them as budgets and formalizes control through performance reports.

1.1 Strategic Decisions and the Management Accountant

Strategy specifies how an organization matches its own capabilities with the opportunities in the marketplace to accomplish its objectives. In other words, strategy describes how an organization will compete and the opportunities its managers should seek and pursue. Management accountants work closely with managers in formulating strategy by providing information about the sources of competitive advantage—for example, the cost, productivity, or efficiency advantage of their company relative to competitors or the premium prices a company can charge relative to the costs of adding features that make its products or services distinctive. **Strategic cost management** describes cost management that specifically focuses on strategic issues.

- Dear learner, highlighted points in the table will help you catch up the main points you have read, so please take time and read them carefully.

Management accounting information helps managers formulate strategy by answering questions such as the following:

- Who are our most important customers, and how can we be competitive and deliver value to them?
- What substitute products exist in the marketplace, and how do they differ from our product in terms of price and quality?
- What is our most critical capability? Is it technology, production, or marketing? How can we leverage it for new strategic initiatives?
- Will adequate cash be available to fund the strategy, or will additional funds need to be raised?

The best-designed strategies and the best-developed capabilities are useless unless they are effectively executed. In the next section, we

describe how management accountants help managers take actions that create value for their customers.

- **Strategy** specifies how an organization matches its own capabilities with the opportunities in the marketplace to accomplish its objectives. In other words, strategy describes how an organization will compete and the opportunities its managers should seek and pursue



Activity 1: Understanding strategic cost management

*What is **strategic cost management?***

1.2 Value Chain and Supply Chain Analysis and Key Success Factors

Customers demand much more than just a fair price; they expect quality products (goods or services) delivered in a timely way. These multiple factors drive how a customer experiences a product and the value or usefulness a customer derives from the product. How then does a company go about creating this value?

Value-Chain Analysis

Value chain is the sequence of business functions in which customer usefulness is added to products. The following is primary business functions in a typical business organization:

1. **Research and development (R&D)**—Generating and experimenting with ideas related to new products, services, or processes.
2. **Design of products and processes**—Detailed planning, engineering, and testing of products and processes.
3. **Production**—procuring, transporting and storing, coordinating, and assembling resources to produce a product or deliver a service.
4. **Marketing (including sales)**—Promoting and selling products or services to customers or prospective customers.
5. **Distribution**—Processing orders and shipping products or services to customers.
6. **Customer service**—providing after-sales service to customers.

Supply-Chain Analysis

The parts of the value chain associated with producing and delivering a product or service—production and distribution—is referred to as the supply chain. **Supply chain** describes the flow of goods, services, and information from the initial sources of materials and services to the delivery of products to consumers, regardless of whether those activities occur in the same organization or in other organizations.

☞ **Value chain** is the sequence of business functions in which customer usefulness is added to products. The following is primary business functions in a typical business organization:

Key Success Factors

Customers want companies to use the value chain and supply chain to deliver ever improving levels of performance regarding several (or even all) of the following:

- **Cost and efficiency**—Companies face continuous pressure to reduce the cost of the products they sell. To calculate and manage the cost of products, managers must first understand the tasks or activities (such as setting up machines or distributing products) that cause costs to arise. They must also monitor the marketplace to determine prices that customers are willing to pay for products or services. Management accounting information helps managers calculate a target cost for a product by subtracting the operating income per unit of product that the company desires to earn from the "target price." To achieve the target cost, managers eliminate some activities (such as rework) and reduce the costs of performing activities in all value-chain functions—from initial R&D to customer service. Increased global competition places ever-increasing pressure on companies to lower costs.
- **Quality**—Customers expect high levels of quality. Total quality management (TQM) aims to improve operations throughout the value chain and to deliver products and services that exceed customer expectations. Using TQM, companies design products or services to meet the needs and want of customers and make these products with zero (or very few) defects and waste, and minimal inventories. Managers use management accounting information to evaluate the costs and revenue benefits of TQM initiatives.
- **Time**—Time has many dimensions. New-product development time is the time it takes for new products to be created and brought to market. The increasing pace of technological innovation has led to shorter product life cycles and more rapid introduction of new products. To make product and design decisions, managers need to understand the costs and benefits of a product over its life cycle. Customer-response time describes the speed at which an organization responds to customer requests. To increase customer satisfaction, organizations need to reduce delivery time and reliably meet promised delivery dates. The primary cause of delays is bottlenecks that occur when the work to be performed on a machine, for example, exceeds available capacity. To deliver the product on time, managers need to increase the capacity of the machine to produce more output. Management accounting information helps managers quantify the costs and benefits of relieving bottleneck constraints.
- **Innovation**—A constant flow of innovative products or services is the basis for ongoing company success. Managers rely on management

accounting information to evaluate alternative investment and R&D decisions.

Management accountants help managers track performance of competitors on the key success factors. Competitive information serves as a benchmark and alerts managers to market changes. Companies are always seeking to continuously improve their operations. Sometimes, more-fundamental changes in operations, such as redesigning a manufacturing process to reduce costs, may be necessary. However, successful strategy implementation requires more than value-chain and supply-chain analysis and execution of key success factors. It is the decisions that managers make that help them to develop, integrate, and implement their strategies.



Activity 2: Understanding Value chain

What is value chain?

1.3 Decision Making, Planning, and Control: The Five-Step Decision-Making Process

Decisions that managers made usually involve the following five-step procedures:

1. **Identify the problem and uncertainties.**

   The problem at hand should be identified

2. **Obtain information.**
   Gathering information before making a decision helps managers gain a better understanding of the uncertainties
3. **Make predictions about the future.**
   On the basis of this information, managers make predictions about the future.
4. **Make decisions by choosing among alternatives.**
   When making decisions, strategy is a vital guidepost; many individuals in different parts of the organization at different times make decisions. Consistency with strategy binds individuals and timelines together and provides a common purpose for disparate decisions. Aligning decisions with strategy enables an organization to implement its strategy and achieve its goals. Without this alignment, decisions will be uncoordinated, pull the organization in different directions, and produce inconsistent results.

Steps 1 through 4 are collectively referred to as planning. **Planning** comprises selecting organization goals and strategies, predicting results under various alternative ways of achieving those goals, deciding how to attain the desired goals, and communicating the goals and how to achieve them to the entire organization. Management accountants serve as business partners in these planning activities because of their

understanding of what creates value and the key success factors. The most important planning tool when implementing strategy is a budget. A **budget** is the quantitative expression of a proposed plan of action by management and is an aid to coordinating what needs to be done to execute that plan.

5. **Implement the decision, evaluate performance, and learn.**
   Managers take actions to implement their budget. Management accountants collect information to follow through on how actual performance compares to planned or budgeted performance (also referred to as scorekeeping). Information on actual results is different from the pre-decision planning information. The comparison of actual performance to budgeted performance is the control or post-decision role of information. **Control** comprises taking actions that implement the planning decisions, deciding how to evaluate performance, and providing feedback and learning to help future decision making. Measuring actual performance informs managers how well they and their subunits are doing. Linking rewards to performance helps motivate managers. These rewards are both intrinsic (recognition for a job well-done) and extrinsic (salary, bonuses, and promotions linked to performance). A budget serves as much as a control tool as a planning tool. Why? Because a budget is a benchmark against which actual performance can be compared.

Activity 3: Understanding the decision making process

What are the five steps in the decision making process?

1.4 Management process and the accounting system

The following comparison shows the relationship between management process and the accounting system

Example of Management Decision Making	**Management Accounting System**
Planning • Identify the problem and uncertainties • Obtain information • Make prediction about the future • Make decision by choosing among	Budgets

Control Implement the decision	**Accounting system** • Source documents
Evaluate Performance and Learn	**Performance reports** Comparing actual performance with

- It can be seen from the above table that the accounting system formalizes management plans by expressing them as budgets and control through performance reports

Activity 4: Understanding the decision making process

What is the relationship between management process and the accounting system?

- Dear learner, please make sure that you have read the chapter carefully and properly understood activities questions. If you have done that, please read summary and precede to self assessment questions.

Summary

Management accountants contribute to strategic decisions by providing information about the sources of competitive advantage.

Companies add value through R&D; design of products and processes; production; marketing; distribution; and customer service. Customers want companies to deliver performance through cost and efficiency, quality, timeliness, and innovation.

Managers use a five-step decision-making process to implement strategy these are:

- identify the problem and uncertainties
- obtain information
- make predictions about the future
- make decisions by choosing among alternatives and
- implement the decision, evaluate performance, and learn.

The first four steps are the planning decisions, which include deciding on organization goals, predicting results under various alternative ways of achieving those goals, and deciding how to attain the desired goals. Step 5 is the control decision, which includes taking actions to implement the planning decisions and deciding on performance evaluation and feedback that will help future decision making.

Management accounting is part of accounting whose reports are intended to help managers make planning and controlling decision about the business organization. But financial accounting reports are prepared to help external users make proper and informed decision.

Checklist

Dear learner, now you have completed the first chapter, so you need to check whether you have grasped the concepts discussed in this chapter. If your answer to the questions below is No, then you have to go back and read the relevant sub-section again.

Can you:	**Yes**	**No**
1. Define *Value chain*	☐	☐
2. Describe the decision making process	☐	☐
3. Explain the relationship between management proce and the accounting system	☐	☐

Good! If you have understood the above points, proceed to the next exercise.

Self Assessment Questions

Part I: True-False Questions

Write "True" if the statement is correct and "False" if the statement is wrong for the following questions

1. Companies generally follow one of two basic strategies: 1) providing a quality product or service at low prices, or 2) offering a unique product or service often priced higher than competing products.
2. The key to a company's success is creating value for customers while differentiating itself from its competitors.
3. Key success factors include cost, quality, timeliness, and innovation.
4. The last step in the decision-making process is to make decisions by choosing among alternatives.
5. Modern cost accounting takes the perspective that collecting cost information is a function of the management decisions being made.

Part II: Multiple Choice Questions

Choose the letter of the best answer and Write the letter of the correct answer for the questions that follow

1. Modern cost accounting plays a role in:
   A. planning new products
   B. evaluating operational processes
   C. controlling costs
   D. All of these answers are correct.
2. The value chain is the sequence of business functions in which:

   A. value is deducted from the products or services of an organization
   B. value is proportionately added to the products or services of an organization
   C. products and services are evaluated with respect to their value to the supply chain
   D. usefulness is added to the products or services of an organization

3. A report showing the actual financial results for a period compared to the budgeted financial results for that same period would most likely be called a:

   A. strategic plan
   B. management forecast
   C. performance report
   D. revised plan

4. Strategy specifies:
   A. how an organization matches its own capabilities with the opportunities in the marketplace
   B. standard procedures to ensure quality products
   C. incremental changes for improved performance
   D. the demand created for products and services
   E. Answer: A
5. The most important planning tool is a _____.

A. performance evaluation report
B. balanced scorecard
C. goal
D. budget

Part-III: Discussion Questions

Discuss the following question clearly

1. Explain how a budget can help management implement strategy.

Dear learner, now you have completed the chapter successfully. Please go to the next chapter and do what you have done in this chapter.

CHAPTER TWO

COST-VOLUME-PROFIT (CVP) ANALYSIS

Introduction

Dear Learner! Welcome to the second chapter of this module. In this chapter, you will study about an important model that establishes a relationship between cost of production, volume of activity, and the profit thereto. The model helps businesses plan different levels of profit: zero profit, positive profit before tax, and target profit after tax.

Cost - Volume - Profit (CVP) analysis examines the behavior of total revenues, total costs, and operating income as changes occur in the output level, the selling price, the variable cost per unit, and/or the total fixed costs of a product. The managers want to know how such decisions will affect costs and revenues. They realize that many factors, in addition to the volume of output, will affect costs. Yet, a useful starting point in their decision process is to specify the relationships between the volume of output, costs and revenues. Manager uses CVP analysis to compute profits from different possibilities and alternatives. In this way, CVP analysis guides managers' planning.

2.1 The Nature of Costs

“Profitability is just around the corner.” This is a common expression in the business world; you may have heard or said this yourself. But, the reality is that many businesses don’t make it! Business is tough, profits are illusive, and competition has a habit of moving into areas where profits are available. And, sometimes, business owners become frustrated because revenue growth only seems to bring on waves of additional expenses, even to the point of going backwards. How does one realistically assess the viability of a business? This is perhaps the most critical business assessment a manager must make. A good manager must learn to use information to make informed decisions about which business prospects to pursue. Managerial accounting methods provide techniques for evaluating the viability and ability to grow or “scale” a business. These techniques are called cost-volume-profit analysis (CVP).

Before one can begin to understand how a business is going to perform over time and with shifts in volume, it is imperative to first consider the cost structure of the business. This requires drilling down into the specific types of costs that are to be incurred and trying to understand their unique attributes.

2.2 Variable Costs

Variable costs will vary in direct proportion to changes in the level of an activity. For example, direct material, direct labor, sales commissions, fuel

cost for a trucking company, and so on, may be expected to increase with each additional unit of output. Assume that ABC Trading produces portable digital music players. Each unit produced requires a printed circuit board (PCB) that costs Br11. Below is an example of variable costs for ABC Trading Company. For example, Br 1, 650,000 is spent when 150,000 units are produced (150,000 X Br11 = Br1, 650,000). If the number of units produced increase to 200,000 units, total variable cost will increase to Br 2,200,000. This relationship reveals that total variable cost increases in a linear fashion as total production rises. But the variable cost is constant at Br11 per unit. Increases in volume do not change the per unit cost. In summary, every additional unit produced brings another incremental unit of variable cost.

The activity base is the item or event that causes the incurrence of a variable cost. It is easy to think of the activity base in terms of units produced, but it can be more than that. Activity can relate to labor hours worked, units sold, customers processed, or other such “cost drivers.” For instance, a dentist uses a new pair of disposable gloves for each patient seen, no matter how many teeth are being filled. Therefore, disposable gloves are variable and key on patient count. But, the material used for fillings is a variable that is tied to the number of decayed teeth that are repaired. Some patients have none, some have one, and others have many. So, each variable cost must be considered independently and with careful attention to what activity drives the cost.

2.3 Fixed Costs

The opposite of variable costs are fixed costs. Fixed costs do not fluctuate with changes in the level of activity. Assume that ABC Trading leases the manufacturing facility where the portable digital music players are assembled. Assume that rent is Br1, 200,000 no matter the level of production. It the total fixed cost that remains the same with the change in level of production but fixed cost per unit will decline with increases in production. This attribute of fixed costs is important to consider in assessing the scalability of a business proposition. There are numerous types of fixed costs. Examples include administrative salaries, rents, property taxes, security, networking infrastructure support, and so forth.



Activity 1: understanding the difference between fixed and variable costs

Differentiate between fixed and variable costs.

2.4 Cost-Volume-Profit (CVP) Analysis

Cost-volume-profit (CVP) analysis is a powerful tool that helps managers understand the relationships among cost, volume, and profit. CVP analysis focuses on how profits are affected by the following five factors:

- Selling prices.
- Sales volume.
- Unit variable costs.
- Total fixed costs.

Because CVP analysis helps managers understand how profits are affected by these key factors, it is a vital tool in many business decisions. These decisions include what products and services to offer, what prices to charge, what marketing strategy to use, and what cost structure to implement.

☞ Cost-volume-profit (CVP) analysis is a powerful tool that helps managers understand the relationships among cost, volume, and profit. CVP analysis focuses on how profits are affected by Selling prices, Sales volume, Unit variable costs, Total fixed costs.

The Basics of Cost-Volume-Profit (CVP) Analysis

To help understand the role of CVP analysis in business decisions, consider the case of Alpha Concepts, a company founded by Paul Nafi.

Naol Lachine (the accountant of the company) is to help the owner in expanding its operation. Naol will use the contribution income statement that emphasizes the behavior of costs and therefore is extremely helpful to managers in judging the impact on profits of changes in selling price, cost, or volume. Naol will base his analysis on the following contribution income statement he prepared last month:

Alpha Concepts
Contribution Income Statement
For the Month of June

	Total	**Per Unit**
Sales (400 speakers).....	Br 100,000	Br 250
Variable expenses.....	60,000	150
Contribution margin.....	40,000	Br 100
Fixed expenses	35,000	
Net operating income..... Br 5,000		

Notice that sales, variable expenses and contribution margin are expressed on a per unit basis as well as in total on this contribution income statement. The per unit figures will be very helpful to Naol in some of his calculations. Note that this contribution income statement has been prepared for management's use inside the company and would not ordinarily be made available to those outside the company.

Contribution Margin

As it is known, contribution margin is the amount remaining from sales revenue after variable expenses have been deducted. Thus, it is the amount

available to cover fixed expenses and then to provide profits for the period. Notice the sequence here contribution margin is used first to cover the fixed expenses, and then whatever remains goes toward profits. If the contribution margin is not sufficient to cover the fixed expenses, then a loss occurs for the period. To illustrate with an extreme example, assume that Alpha Concepts sells only one speaker during a particular month. The company's income statement would appear as follows:

Contribution Income Statement
Sales of 1 Speaker

	Total Per Unit
Sales (1 speaker).....	Br 250 Br 250
Variable expenses	150 150
Contribution margin.....	100 Br 100
Fixed expenses.....	35,000
Net operating loss..... Br (34,900)	

For each additional speaker the company sells during the month, Br 100 more in contribution margin becomes available to help cover the fixed expenses. If a second speaker is sold, for example, then the total contribution margin will increase by Br 100 (to a total of Br 200) and the company's loss will decrease by Br 100, to Br 34,800 and this computation can be shown as follows:

Contribution Income Statement
Sales of 2 Speakers

	Total Per Unit
Sales (2 speakers)..... Br 500	Br 250
Variable expenses 300	150
Contribution margin..... 200	Br 100
Fixed expenses..... 35,000	
Net operating loss..... Br (34,800)	

If enough speakers can be sold to generate Br 35,000 in contribution margin, then all of the fixed expenses will be covered and the company will break even for the month that is, it will show neither profit nor loss but just cover all of its costs. To reach the breakeven point, the company will have to sell 350 speakers in a month because each speaker sold yields Br 100 in contribution margin as computed as follows:

Contribution Income Statement
Sales of 350 Speakers

	Total Per Unit

Sales (350 speakers).....	Br 87,500	Br 250
Variable expenses.....		52,500 150
Contribution margin.....	35,000	Br 100
Fixed expenses	35,000	
Net operating income..... Br 0		

- Dear learner, it is hoped that you are properly reading the above points. If yes, please note the following.

☞ Contribution margin is the amount remaining from sales revenue after variable expenses have been deducted. Thus, it is the amount available to cover fixed expenses and then to provide profits for the period.

Computation of the break-even point is discussed in detail later in the chapter; for the moment, note that the **break-even point** is the level of sales at which profit is zero. Once the break-even point has been reached, net operating income will increase by the amount of the unit contribution margin for each additional unit sold. For example, if 351 speakers are sold in a month, then the net operating income for the month will be Br 100 because the company will have sold 1 speaker more than the number needed to breakeven as shown below:

Contribution Income Statement
Sales of 351 Speakers

		Total
Per Unit		
Sales (351 speakers)	Br 87,750	Br 250
Variable expenses.....		52,650 150
Contribution margin.....	35,100	Br 100
Fixed expenses.....	35,000	
Net operating income..... Br 100		

If 352 speakers are sold (2 speakers above the break-even point), the net operating income for the month will be Br 200. If 353 speakers are sold (3 speakers above the breakeven point), the net operating income for the month will be Br 300, and so forth. To estimate the profit at any sales volume above the break-even point, simply multiply the number of units sold in excess of the break-even point by the unit contribution margin. The result represents the anticipated profits for the period. Or, to estimate the effect of a planned increase in sales on profits, simply multiply the increase in units sold by the unit contribution margin. The result will be the expected increase in profits. To illustrate, if Alpha Concepts is currently selling 400 speakers per month and plans to increase sales to 425 speakers per month, the anticipated impact on profits can be computed as follows:

Increased number of speakers to be sold..... 25
Contribution margin per speaker .....Br 100
Increase in net operating income .....Br 2,500

These calculations can be verified as follows:

	Sales Volume		
	400	**425**	**Difference**
	Speakers	**Speakers**	
(25 Speakers) Per Unit			
Sales (@ $250 per speaker)	Br 100,000	Br 106,250	Br 6,250 Br 250
Variable expenses (@ $150 per speaker).....60,000		63,750	3,750 150
Contribution margin.....	40,000	42,500	2,500 Br 100
Fixed expenses	35,000	35,000	0
Net operating income..... Br 5,000		**Br 7,500**	**Br 2,500**

To summarize, if sales are zero, the company's loss would equal its fixed expenses. Each unit that is sold reduces the loss by the amount of the unit contribution margin. Once the break-even point has been reached, each additional unit sold increases the company's profit by the amount of the unit contribution margin.

CVP Relationships in Equation Form

The contribution format income statement can be expressed in equation form as follows:

Profit= (Sales- Variable expenses) - Fixed expenses

For brevity, we use the term profit to stand for net operating income in equations. When a company has only a single product, as at Alpha Concepts, we can further refine the equation as follows:

Sales= Selling price per unit*Quantity sold= P* Q

Variable expenses=Variable expenses per unit*Quantity sold=V* Q

Profit= (P* Q- V* Q) - Fixed expenses

We can do all of the calculations of the previous section using this simple equation. For example, in the above example we computed the net

operating income (profit) at sales of 351 speakers as Br 100. We can arrive at the same conclusion using the above equation as follows:

Profit= (*P** *Q*- *V** *Q*) - Fixed expenses

Profit= (Br 250*351 –Br 150 *351) - $35,000

= (Br 250-Br 150)*351-Br 35,000

= (Br 100)* 35-Br 35,000

=Br 35,100-Br 35,000= Br 100

It is often useful to express the simple profit equation in terms of the unit contribution margin (Unit CM) as follows:

Unit CM= Selling price per unit- Variable expenses per unit= P- V

Profit= (P* Q- V* Q) - Fixed expenses

Profit= (P- V)* Q- Fixed expenses

Profit= Unit CM*Q- Fixed expenses

We could also have used this equation to determine the profit at sales of 351 speakers as follows:

Profit= Unit CM**Q*- Fixed expenses

=Br 100*35-Br 35,000

= Br 35,100- Br 35,000=Br 100

For those who are comfortable with algebra, the quickest and easiest approach to solving the problems in this chapter may be to use the simple profit equation in one of its forms.

CVP Relationships in Graphic Form

The relationships among revenue, cost, profit, and volume are illustrated on a **cost-volume-Profit (CVP)** graph**.** A CVP graph highlights CVP relationships over wide ranges of activity. To help explain his analysis to Paul, Naol prepared a CVP graph for Alpha Concepts.

Preparing the CVP Graph:

In a CVP graph (sometimes called a break-even chart), unit volume is represented on the horizontal (X*)* axis and birr on the vertical (Y*)* axis. Preparing a CVP graph involves three steps as shown in the following graph.

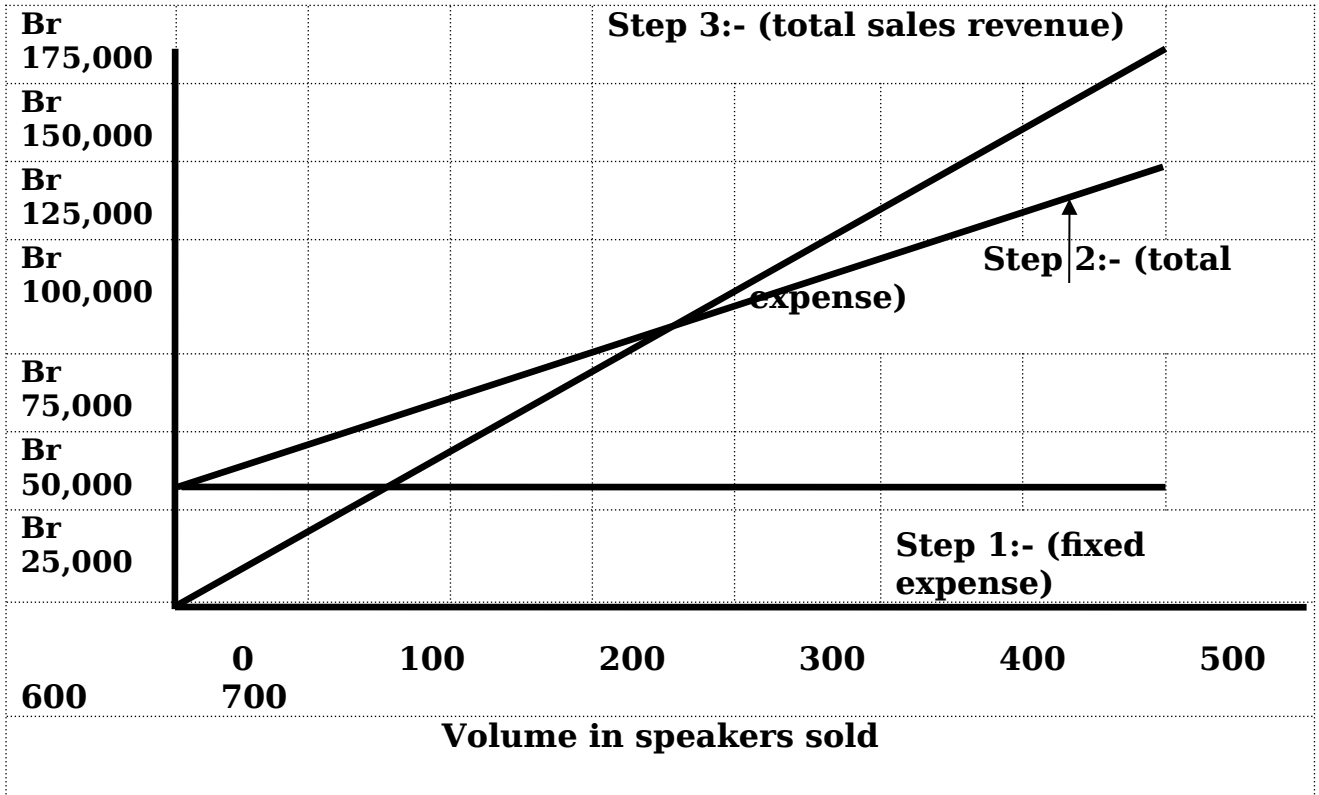
1. Draw a line parallel to the volume axis to represent total fixed expense. For Alpha Concepts, total fixed expenses are Br 35,000.
2. Choose some volume of unit sales and plot the point representing total expense (fixed and variable) at the sales volume you have selected. In this illustration, Naol chose a volume of 600 speakers. As shown in the following graph, total expense at that sales volume is:

Fixed expense .....Br 35,000

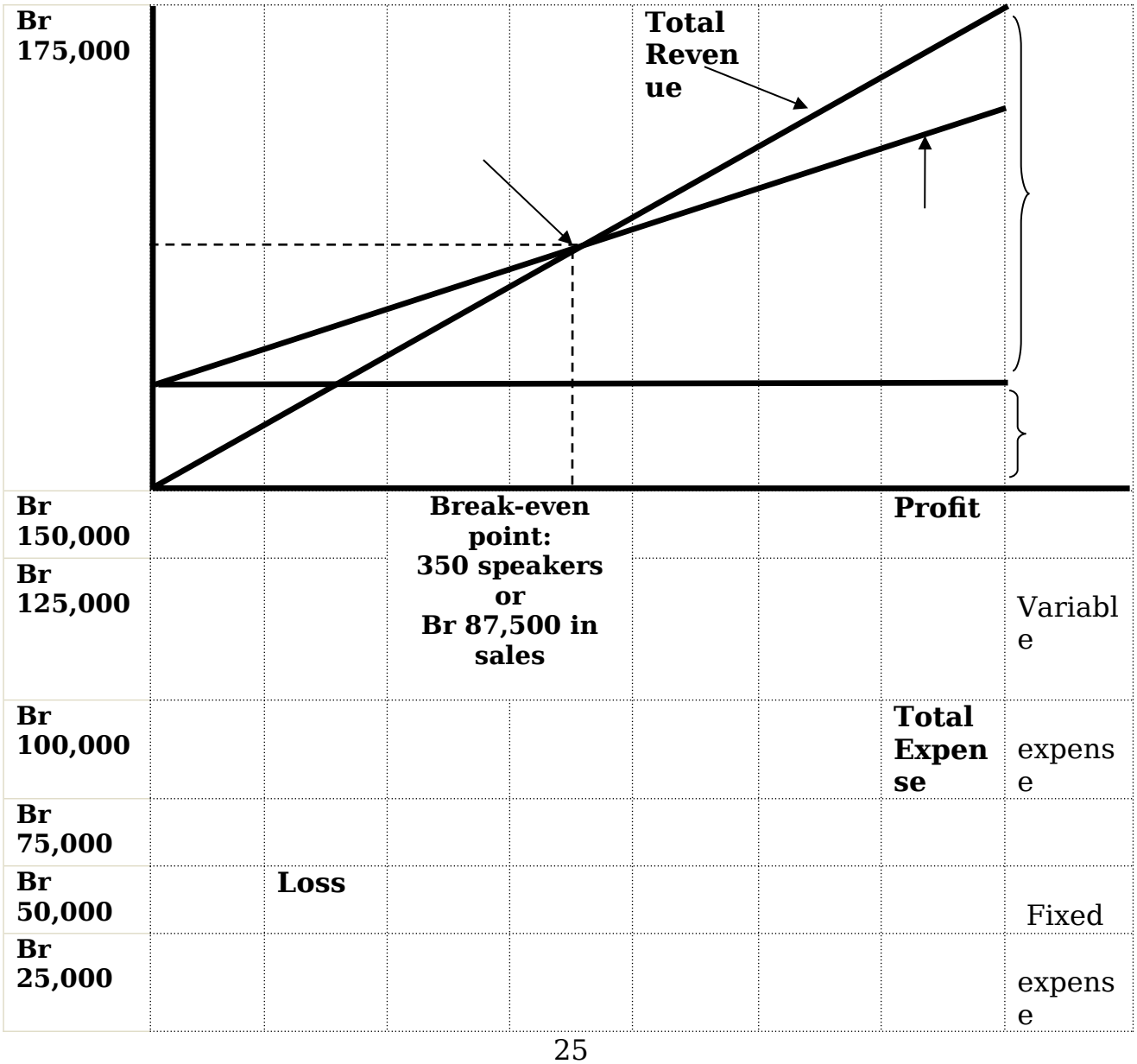
Variable expense (600 speakers*Br 150 per speaker) 90,000

Total expense..... Br 125,000

3. Again choose some sales volume and plot the point representing total sales dollars at the activity level you have selected. In the illustration, Naol again chose a volume of 600 speakers. Sales at that sales volume total Br 150,000 (600 speakers*Br 250 per speaker). Draw a line through this point back to the origin. The interpretation of the completed CVP graph is given in the following graph. The anticipated profit or loss at any given level of sales is measured by the vertical distance between the total revenue line (sales) and the total expense line (variable expense plus fixed expense). The break-even point is where the total revenue and total expense lines cross. The break-even point of 350 speakers in on the graph agrees with the break-even point computed earlier.



As discussed earlier, when sales are below the break-even point- in this case, 350 units, and the company suffers a loss. Note that the loss (represented by the vertical distance between the total expense and total revenue lines) gets bigger as sales decline. When sales are above the break-even point, the company earns a profit and the size of the profit (represented by the vertical distance between the total revenue and total expense lines) increases as sales increase.



0 100 200 300 400 500
600 700 Volume in speakers sold

An even simpler form of the CVP graph, which we call a profit graph, is presented in the following graph. That graph is based on the following equation:

Profit= Unit CM*Q- Fixed expenses

In the case of Alpha Concepts, the equation can be expressed as:

Profit= Br 100* Q-Br 35,000

Contribution Margin Ratio (CM Ratio)

In the previous section, it was explored how cost-volume-profit relationships can be visualized. In this section, as it was shown how the contribution margin ratio can be used in cost- volume-profit calculations. As the first step, a column is added to Alpha Concepts' contribution format income statement in which sales revenues, variable expenses, and contribution margin are expressed as a percentage of sales:

	Total	**Per Unit**
Percent of Sales		
Sales (400 speakers).....	Br 100,000	Br 250
100%		
Variable expenses	60,000	150
60%		
Contribution margin.....	40,000	Br 100
40%		
Fixed expenses.....	35,000	
Net operating income..... Br 5,000		

The contribution margin as a percentage of sales is referred to as the **contribution margin ratio (CM ratio).** This ratio is computed as follows:

CM ratio = Contribution margin
Sales

For Alpha Concepts, the computations are:

CM ratio = Total contribution margin =
Total Sales
Br 40,000 = 40%
Br 100,000

In a company such as Alpha Concepts that has only one product, the CM ratio can also be computed on a per unit basis as follows:

CM ratio = Unit contribution margin

Unit selling price

=Br 100 = 40%

Br 250

The CM ratio shows how the contribution margin will be affected by a change in total sales. Alpha Concepts' CM ratio of 40% means that for each dollar increase in sales, total contribution margin will increase by 40 cents (Br 1 sales*CM ratio of 40%). Net operating income will also increase by 40 cents, assuming that fixed costs are not affected by the increase in sales. As this illustration suggests, the impact on net operating income of any given birr change in total sales can be computed by simply applying the CM ratio to the birr change. For example, if Alpha Concepts plans a Br 30,000 increase in sales during the coming month, the contribution margin should increase by Br 12,000 (Br 30,000 increase in sales*CM ratio of 40%). As noted above, net operating income will also increase by Br 12,000 if fixed costs do not change. This is verified by the following table:

		Sales Volume	**Percent**
	Present	**Expected**	**Increase of Sales**
Sales.....	Br 100,000	Br 130,000	Br 30,000 100%
Variable expenses.....	60,000	78,000*	18,000 60%
Contribution margin	40,000	52,000	12,000 40%
Fixed expenses.....	35,000	35,000	0
Net operating income.....	Br 5,000	Br 17,000	Br 12,000

Br 130,000 expected sales/ Br 250 per unit=520 units. 520 units Br 150 per unit=Br 78,000.

The relation between profit and the CM ratio can also be expressed using the following equation:

Profit=CM ratio*Sales-Fixed expenses

For example, at sales of Br 130,000, the profit is expected to be Br 17,000 as shown below:

Profit=CM ratio*Sales-Fixed expenses

=0.40*Br 130,000- Br 35,000

= Br 52,000-Br 35,000=Br 17,000

Again, if you are comfortable with algebra, this approach will often be quicker and easier than constructing contribution format income statements. The CM ratio is particularly valuable in situations where the

birr sales of one product must be traded off against the birr sales of another product. In this situation, products that yield the greatest amount of contribution margin per birr sales should be emphasized.

- Dear learner, make sure that you are clear with the following.

☞ Breakeven point is sales in units or in birr at which the company covers all its costs: fixed and variable and the point where the profit is zero.



Activity 2: Computing breakeven point

Shoa Custom Jewelry sells a single product. 700 units were sold resulting in Br 7,000 of sales revenue, Br 2,800 of variable costs, and Br 1,200 of fixed costs. What is the breakeven point in units?

2.5 Some Applications of CVP Concepts (Sensitivity Analysis)

Naol, the accountant at Alpha Concepts, wanted to demonstrate to the company's president Pau how the concepts developed on the previously can be used in planning and decision making. Naol gathered the following basic data:

	Per Unit	Per cent of Sales
Selling price	Br 250	100%
Variable expenses	150	60%
Contribution margin	Br 100	40%

Recall that fixed expenses are Br 35,000 per month. Naol will use these data to show the effects of changes in variable costs, fixed costs, sales price, and sales volume on the company's profitability in a variety of situations.

Before proceeding further, however, there is a need to introduce another concept—the variable expense ratio. The variable expense ratio is the ratio of variable expenses to sales. It can be computed by dividing the total variable expenses by the total sales, or in a single product analysis, it can be computed by dividing the variable expenses per unit by the unit selling price. In the case of Alpha Concepts, the variable expense ratio is 0.60; that is, variable expense is 60% of sales.

Change in Fixed Cost and Sales Volume

Alpha Concepts is currently selling 400 speakers per month at Br 250 per speaker for total monthly sales of Br 100,000. The sales manager feels that a Br 10,000 increase in the monthly advertising budget would increase

monthly sales by Br 30,000 to a total of 520 units. Should the advertising budget be increased?

The following table shows the financial impact of the proposed change in the monthly advertising budget:

	Current Sales	Sales with Additional Advertising Budget	Difference	Percent of Sales
Sales	Br 100,000	Br 130,000	Br 30,000	100%
Variable expenses	60,000	78,000*	18,000	60%
Contribution margin	40,000	52,000	12,000	40%
Fixed expenses	35,000	45,000†	10,000	
Net operating income	Br 5,000	Br 7,000	Br 2,000	

**520 units*Br150 per unit=Br 78,000.*

†$35,000+ additional Br 10,000 monthly advertising budget= Br 45,000.

Assuming no other factors need to be considered, the increase in the advertising budget should be approved because it would increase net operating income by Br 2,000

There are two shorter ways to arrive at this solution. The first alternative solution follows:

Alternative Solution 1

Expected total contribution margin:
Br 130,000*40% CM ratio..... Br 52,000
Present total contribution margin:
Br 100,000*40% CM ratio 40,000
Incremental contribution margin 12,000
Change in fixed expenses:
Less incremental advertising expense 10,000
Increased net operating income..... Br 2,000

Because in this case only the fixed costs and the sales volume change, the solution can be presented in an even shorter format, as follows:

Alternative Solution 2

Incremental contribution margin:
Br 30,000*40% CM ratio..... Br 12,000
Less incremental advertising expense..... 10,000

Increased net operating income..... Br 2,000

Notice that this approach does not depend on knowledge of previous sales. Also note that it is unnecessary under either shorter approach to prepare an income statement. Both of the alternative solutions involve an incremental analysis —they consider only those items of revenue, cost, and volume that will change if the new program is implemented. Although in each case a new income statement could have been prepared, the incremental approach is simpler and more direct and focuses attention on the specific changes that would occur as a result of the decision.

Change in Variable Costs and Sales Volume

Refer to the original data. Recall that Acoustic Concepts is currently selling 400 speakers per month. Paul is considering the use of higher-quality components, which would increase variable costs (and thereby reduce the contribution margin) by Br 10 per speaker. However, the sales manager predicts that using higher-quality components would increase sales to 480 speakers per month. Should the higher-quality components be used? The Br 10 increase in variable costs would decrease the unit contribution margin by Br 10—from Br 100 down to Br 90

Solution

Expected total contribution margin with higher-quality components:
480 speakers *Br90 per speaker..... Br 43,200
Present total contribution margin:
400 speakers* Br 100 per speaker 40,000
Increase in total contribution margin .....Br 3,200

According to this analysis, the higher-quality components should be used. Because fixed costs would not change, the Br 3,200 increase in contribution margin shown above should result in a Br 3,200 increase in net operating income.

Change in Fixed Cost, Sales Price, and Sales Volume

Refer to the original data and recall again that Alpha Concepts is currently selling 400 speakers per month. To increase sales, the sales manager would like to cut the selling price by Br 20 per speaker and increase the advertising budget by Br 15,000 per month. The sales manager believes that if these two steps are taken, unit sales will increase by 50% to 600 speakers per month. Should the changes be made? A decrease in the selling price of Br 20 per speaker would decrease the unit contribution margin by Br 20 down to Br 80.

Solution

Expected total contribution margin with lower selling price:
600 speakers*Br 80 per speaker .....Br 48,000
Present total contribution margin:
400 speakers*Br 100 per speaker .....
40,000

Incremental contribution margin..... 8,000
Change in fixed expenses:
Less incremental advertising expense..... 15,000
Reduction in net operating income..... Br (7,000)

According to this analysis, the changes should not be made. The Br 7,000 reduction in net operating income that is shown above can be verified by preparing comparative income statements as follows:

	Present 400 Speakers per Month		**Expected 600 Speakers per Month**	
	Total	**Per Unit**	**Total**	**Per Unit**	**Difference**
Sales.....	Br 100,000	Br 250	Br 138,000	Br 230	Br 38,000
Variable expenses 60,000		150	90,000	150	30,000
Contribution margin..... 40,000		Br 100	48,000	Br 80	8,000
Fixed expenses..... 35,000			50,000*		15,000
Net operating income (loss).... Br 5,000			Br (2,000)		Br (7,000)

**35,000+Additional monthly advertising budget of Br 15,000=Br 50,000.*

Change in Variable Cost, Fixed Cost, and Sales Volume
Refer to Alpha Concepts' original data. As before, the company is currently selling 400 speakers per month. The sales manager would like to pay salespersons a sales commission of Br 15 per speaker sold, rather than the flat salaries that now total Br 6,000 per month. The sales manager is confident that the change would increase monthly sales by 15% to 460 speakers per month. Should the change be made?
Solution
Changing the sales staff's compensation from salaries to commissions would affect both fixed and variable expenses. Fixed expenses would decrease by Br 6,000, from Br 35,000 to Br 29,000. Variable expenses per unit would increase by Br 15, from Br 150 to Br 165, and the unit contribution margin would decrease from Br 100 to Br 85.

Expected total contribution margin with sales staff on commissions:
460 speakers*Br 85 per speaker .....Br 39,100
Present total contribution margin:

400 speakers*Br 100 per speaker..... 40,000
Decrease in total contribution margin..... (900)
Change in fixed expenses:
Add salaries avoided if a commission is paid 6,000
Increase in net operating income..... Br 5,100

According to this analysis, the changes should be made. Again, the same answer can be obtained by preparing comparative income statements:

	Present 400 Speakers per Month		**Expected 460 Speakers per Month**	
	Total	**Per Unit**	**Total**	**Per Unit** **Difference**
Sales.....	Br 100,000	Br 250	Br 115,000	Br 250 Br 15,000
Variable expenses	60,000	150	75,900	165 15,900
Contribution margin.....	40,000	Br 100	39,100	Br 85 900
Fixed expenses.....	35,000		29,000	(6,000)*
Net operating income.....	Br 5,000		Br 10,100	Br 5,100

**Note: A reduction in fixed expenses has the effect of increasing net operating income*

Change in Selling Price

Refer to the original data where Alpha Concepts is currently selling 400 speakers per month. The company has an opportunity to make a bulk sale of 150 speakers to a wholesaler if an acceptable price can be negotiated. This sale would not disturb the company's regular sales and would not affect the company's total fixed expenses. What price per speaker should be quoted to the wholesaler if Alpha Concepts wants to increase its total monthly profits by Br 3,000?

Solution

Variable cost per speaker .....Br 150
Desired profit per speaker:
Br 3,000*150 speakers 20
Quoted price per speaker..... Br 170

Notice that fixed expenses are not included in the computation. This is because fixed expenses are not affected by the bulk sale, so the entire additional contribution margin increases the company's profits.

2.6 Target Profit and Break-Even Analysis

Target profit analysis and break-even analysis are used to answer questions such as how much would we have to sell to make a profit of Br 10,000 per month or how much would we have to sell to avoid incurring a loss?

Target Profit Analysis

One of the key uses of CVP analysis is called target profit analysis. In target profit analysis**,** It will be estimated what sales volume is needed to achieve a specific target profit. For example, suppose that Paul of Alpha Concepts would like to know what sales would have to be to attain a target profit of Br 40,000 per month. To answer this question, it can be preceded using the equation method or the formula method.

The Equation Method

You can use a basic profit equation to find the sales volume required to attain a target profit. In the case of Alpha Concepts, the company has only one product so you can use the contribution margin form of the equation. Remembering that the target profit is Br 40,000, the unit contribution margin is Br 100, and the fixed expense is Br 35,000, you can solve as follows:

Profit=Unit CM* Q- Fixed expense
Br 40,000= Br 100* Q- $35,000
Br100*Q=Br 40,000+ Br 35,000
Q = (Br 40,000+Br 35,000)/$100
Q=750

Thus, the target profit can be achieved by selling 750 speakers per month.

The Formula Method

The formula method is a short-cut version of the equation method. Note that in the next to the last line of the above solution, the sum of the target profit of $40,000 and the fixed expense of $35,000 is divided by the unit contribution margin of $100. In general, in a single-product situation, we can compute the sales volume required to attain a specific target profit using the following formula:

$$\text{Unit sales to attain the target profit} = \frac{\text{Target profit} + \text{Fixed expenses}}{\text{Unit CM}}$$

In the case of Acoustic Concepts, the formula yields the following answer:

$$\frac{\text{Br } 40{,}000 + \text{Br } 35{,}000}{\text{Br } 100} = 750$$

Note that this is the same answer we got when we used the equation method and it always will be. The formula method simply skips a few steps in the equation method.

- Dear learner, here we go again. Take time and see the following to check your understanding of target profit analysis.

☞ Target profit analysis helps you compute the number of units that should be manufactured and sold or the birr sales that should be generated to achieve some target profit.



Activity 3: Understanding Sensitivity Analysis

Martha Manufacturing produces a single product that sells for Br 80. Variable costs per unit equal Br 32. The company expects total fixed costs to be Br 72,000 for the next month at the projected sales level of 2,000 units. In an attempt to improve performance, management is considering a number of alternative actions. Suppose management believes that a Br 16,000 increase in the monthly advertising expense will result in a considerable increase in sales. Sales must increase by how much to justify this additional expenditure?

Target Profit Analysis in Terms of Sales Birr

Instead of unit sales, you may want to know what birr sales are needed to attain the target profit. You can get this answer using several methods. First, you could solve for the unit sales to attain the target profit using the equation method or the formula method and then multiply the result by the selling price. In the case of Alpha Concepts, the required sales volume using this approach would be computed as 750 speakers*Br 250 per speaker or Br 187,500 in total sales. You can also solve for the required sales volume to attain the target profit of Br 40,000 at Alpha Concepts using the basic equation stated in terms of the contribution margin ratio:

Profit= CM ratio*Sales- Fixed expenses
=Br 40,000=0.40*Sales-Br 35,000
= 0.40*Sales= Br 40,000+Br 35,000
Sales= (Br 40,000+Br 35,000)/ 0.40 = Br 187,500

Note that in the next to the last line of the above solution, the sum of the target profit of Br 40,000 and the fixed expense of Br 35,000 is divided by the contribution margin ratio of 0.40. In general, you can compute dollar sales to attain a target profit as follows:

$$\text{Birr sales to attain a target profit} = \frac{\text{Target profit} + \text{Fixed expenses}}{\text{CM ratio}}$$

At Alpha Concepts, the formula yields the following answer:

$$\frac{\text{Target profit} + \text{Fixed expenses}}{}$$

$$\text{Birr sales to attain a target profit} = \frac{\text{Br } 40{,}000 + \text{Br } 35{,}000}{\text{CM ratio}}$$

$$= \frac{\text{Br } 75{,}000}{0.40}$$

$$= \text{Br } 187{,}500$$

Again, you get exactly the same answer whether you use the equation method or just use the formula. In companies with multiple products, sales volume is more conveniently expressed in terms of total sales dollars than in terms of unit sales. The contribution margin ratio approach to target profit analysis is particularly useful for such companies.

Break-Even Analysis

Earlier in the chapter it was defined that the break-even point as the level of sales at which the company's profit is zero. What we call break-even analysis is really just a special case of target profit analysis in which the target profit is zero. You can use either the equation method or the formula method to solve for the break-even point, but for brevity let us illustrate just the formula method. The equation method works exactly like it did in target profit analysis. The only difference is that the target profit is zero in break-even analysis.

Break-Even in Unit Sales

In a single product situation, recall that the formula for the unit sales to attain a specific target profit is:

$$\frac{\text{Target profit} + \text{Fixed expenses}}{\text{Unit CM}}$$

To compute the unit sales to break even, all you have to do is to set the target profit to zero in the above equation as follows:

$$\text{Unit sales to attain the target profit} = \frac{\text{Br } 0 + \text{Fixed expenses}}{\text{Unit CM}}$$

$$\text{Unit sales to break even} = \frac{\text{Fixed expenses}}{\text{Unit CM}}$$

In the case of Acoustic Concepts, the break-even point can be computed as follows:

$$\text{Unit sales to break even} = \frac{\text{Fixed expenses}}{\text{Unit CM}}$$

$$= \frac{\text{Br } 35{,}000}{\text{Br } 100}$$

$$= 350$$

Thus, as we determined earlier in the chapter, Alpha Concepts breaks even at sales of 350 speakers per month.

Break-Even in Sales Birr

You can find the break-even point in sales birr using several methods. First, you could solve for the break-even point in unit sales using the equation

method or the formula method and then multiply the result by the selling price. In the case of Alpha Concepts, the break-even point in sales birr using this approach would be computed as 350 speakers*Br 250 per speaker or Br 87,500 in total sales. You can also solve for the break-even point in sales birr at Alpha Concepts using the basic profit equation stated in terms of the contribution margin ratio or you can use the formula for the target profit. Again, for brevity, let us use the formula.

$$\text{Birr sales to attain a target profit} = \frac{\text{Target profit} + \text{Fixed expenses}}{\text{CM ratio}}$$

$$= \frac{\text{Br 0} + \text{Fixed expenses}}{\text{CM ratio}}$$

The break-even point at Alpha Concepts would be computed as follows:

$$\text{Birr sales to break even} = \frac{\text{Br 35,000}}{0.40}$$

$$= \text{Br 87,500}$$

Activity 4: Understanding target profits

The Marietta Company has fixed costs of Br 40,000 and variable costs are 75% of the selling price. To realize profits of Br 10,000 from sales of 50,000 units, what would be the selling price per unit?

2.7 The Margin of Safety

The margin of safety is the excess of budgeted (or actual) sales birr over the breakeven volume of sales birr. It is the amount by which sales can drop before losses are incurred. The higher the margin of safety; the lower will be the risk of not breaking even and incurring a loss.

The formula for the margin of safety is:

Margin of safety in Birr=Total budgeted (or actual) sales-Break-even sales

The margin of safety can also be expressed in percentage form by dividing the margin of safety in birr by total birr sales:

$$\text{Margin of safety percentage} = \frac{\text{Margin of safety in birr}}{\text{Total budgeted (or actual) sales in birr}}$$

The calculation of the margin of safety for Alpha Concepts is:

Sales (at the current volume of 400 speakers) (a)..... Br 100,000

Break-even sales (at 350 speakers)..... 87,500

Margin of safety in birr (b)..... Br 12,500
Margin of safety percentage, (b)/ (a)..... 12.5%

This margin of safety means that at the current level of sales and with the company's current prices and cost structure, a reduction in sales of Br 12,500, or 12.5%, would result in just breaking even. In a single-product company like Alpha Concepts, the margin of safety can also be expressed in terms of the number of units sold by dividing the margin of safety in birr by the selling price per unit. In this case, the margin of safety is 50 speakers (Br 12,500 ÷Br 250 per speaker=50 speakers).



Activity 5: Understanding margin of safety

If a company's breakeven revenue is Br 1,000 and its budgeted revenue is Br 1,250, then its margin of safety percentage is:

2.8 The Impact of Income Tax on CVP Analysis

Thus far we have ignored income taxes. However, profit-seeking enterprises must pay income taxes on their profits. A firm's net income after tax, the amount of income remaining after subtracting the firm's income- tax expense, is less than its before- tax income. This fact is expressed in the following formula:

NIAT = NIBT (1 – tax rate)
Where: NIAT = net income after taxes
NIBT=net income before taxes

The requirement that companies pay income taxes affects their CVP relationships. To earn a particular after-tax net income will require greater before-tax income than if there were no tax.

Example
Hwa Management Consultants provides consulting services to the city administration offices. The consulting firm's contribution margin ratio is 20%, and its annual fixed expenses are Br. 120, 000. The firm's income-tax rate is 40%.

Required:

A. Calculate the firm's break-even volume of service revenue.
B. How much before-tax income must the firm earn to make an after-tax net income of Br. 48, 000?
C. What level of revenue for consulting services must the firm generate to earn an after-tax income of Br.48, 000?
D. Suppose the firm's income-tax rate rises to 45 percent. What will happen to break-even level of consulting service revenue?

Solutions:

A. Break-even sales= $\frac{\text{Fixed expenses}}{\text{CM-ratio}}$

$= \text{Br.}\frac{120,000}{0.2}$

= Br. 600, 000

B. NIBT = NIAT = Br.80, 000
1- Tax rate

C. Target sales (in birr)= FC + NIBT = Br.120, 000+ Br.80, 000
CM-ratio 0.2

= Br.1, 000, 000

N.B. In the formula that we have seen previously for target sales volume computations, the target profit refers to the before-tax income.

D. Breakeven (in units) = Fixed expenses = FC
Unit CM P - V

Breakeven (in birr) = Fixed expenses = FC
CM-ratio P - V
P

Thus, the change in income-tax rate has no effect on break-even sales.

☞ Dear learner make sure that any change in tax rate does not have any effect on breakeven point because breakeven point is computed on a before tax.

Activity 6: Understanding impact of tax

If planned net income is Br 30,000 and the tax rate is 30%, then planned operating income would be:

2.9 CVP Analysis with Multiple Products

Sales Mix

Before concluding our discussion of CVP concepts, we need to consider the impact of changes in sales mix on a company's profit.

The Definition of Sales Mix

The term sales mix refers to the relative proportions in which a company's products are sold. The idea is to achieve the combination, or mix, that will yield the greatest amount of profits. Most companies have many products, and often these products are not equally profitable. Hence, profits will depend to some extent on the company's sales mix. Profits will be greater if high-margin rather than low-margin items make up a relatively large proportion of total sales. Changes in the sales mix can cause perplexing variations in a company's profits. A shift in the sales mix from high-margin items to low-margin items can cause total profits to decrease even though

total sales may increase. Conversely, a shift in the sales mix from low-margin items to high-margin items can cause the reverse effect total profits may increase even though total sales decrease. It is one thing to achieve a particular sales volume; it is quite another to sell the most profitable mix of products.

Sales Mix and Break-Even Analysis

If a company sells more than one product, break-even analysis is more complex than discussed to this point. The reason is that different products will have different selling prices, different costs, and different contribution margins. Consequently, the break-even point depends on the mix in which the various products are sold.

Using contribution margin approach, the computation of the break-even point (BEP) in multi product firm follows:

$$\text{Breakeven point (in units)} = \frac{\text{Total fixed expenses}}{\text{Weighted average CM}}$$

$$\text{Breakeven point (in birr)} = \frac{\text{Total Fixed Expenses}}{\text{CM – ratio}}$$

Weighted average unit contribution margin is the average of the several products' unit contribution margins, weighted by the relative sales proportion of each product. For a company manufacturing and selling three products (A, B and C), with sales of mix of n1,n2 and n3, respectively, the breakeven point may be given by the following short cut formula:

$$\text{BEP (in units)} = \frac{\text{Total fixed costs}}{\frac{cm1n1 + cm2n2 + cm3n3}{n1 + n2 + n3}}$$

Where cmi = Unit contribution margin for product i.

Similarly, the company's break-even sales in birr would be calculated as:

$$\text{Breakeven point (in birr)} = \frac{\text{Fixed expenses}}{\text{CM – ratio}}$$

$$= \text{Fixed} \frac{\text{expenses}}{\frac{\text{Average CM}}{\text{Average Sales Price}}}$$

$$= \frac{\text{Fixed expenses}}{\frac{Cm1n1 + Cm2n2 + Cm3n3}{n1 + n2 + n3}}$$

$$= \frac{\text{Fixed expenses}}{\frac{P1n1 + P2n2 + P3n3}{n1 + n2 + n3}}$$

☞ The term sales mix refers to the relative proportions in which a company's products are sold. The idea is to achieve the combination, or mix, that will yield the greatest amount of profits.

Example

Top Electronics produces high-quality electronic equipment. One of the company's divisions manufactures three computer accessories, Alpha, Beta and Mega that are widely used by different computer assemblers. Assume the following additional information:

Item	Alpha	Beta	Mega	
Selling price per unit	Br 80	Br 120	Br 150	
Variable cost per unit				
Production	44	54	80.90	
Selling(5% of sales)	4	6	7.5	
Contribution Margin	32	60	61.6	

All sales are made through the company's own retail out lets and the division has the following fixed costs:

Cost	Per Month
Production	Br 240,000
Advertising	200,000
Administrative	100,000
Total	540,000

	Alpha	Beta	Mega
Sales in units	2,000	1,000	5,000

Required

A. Compute the weighted- average unit contribution margin, assuming the above sales mix is maintained.
B. Compute the Division's break-even point in birr for May.

Solution:

A. Weighted average contribution margin

$$\frac{32*2+60*1+61.6*5}{2+1+5}=54$$

B. Breakeven point in units

Method I: Equation method

Sales – variable expenses – fixed expenses = Net income (at Breakeven net income equals zero)

Sales – variable expenses – fixed expenses = zero

As given here above, for every unit of sales of product Beta, we expect 5 units of Mega and 2 units of Alpha. Therefore, let X=number of units of Beta to break-even, the break even sales for Alpha and Mega will be 2X and 5X, respectively.

Sales – variable expenses – fixed expenses = zero
Total contribution margin - fixed expenses= zero
For three products, the formula for the net income would be:
(TCM1 + TCM2 + TCM3) – fixed expenses = zero
Where TCM = total contribution margin
32(2X) + 60(X) + 61.6(5X) – 540,000 = 0
432X =540, 000
X = 540, 000 = 1, 250 units
432

Thus, the breakeven sales for each product line would be:
Alpha =2X=2 x 1, 250= 2, 500 units
Beta = X = 1, 250 units
Mega=5X =5 x 1, 250 = 6, 250 units
The company will breakeven at 10, 000 units, i.e., 2, 500 + 1, 250 +6, 250

Multiply unit sales to break even by the selling price of each product in order to determine break-even sales volume in total birr as follows:

Breakeven point in birr

Alpha	2, 500 x Br. 80	= Br.200, 000
Beta	1, 250 x Br. 120	= Br.150, 000
Mega	6, 250 x Br. 150	= Br.937, 500
Total……		Br.1, 287,500

Method II. Contribution Margin Method

Sales mix, given above, for the three products; Alpha: Beta: Mega = 2: 1: 5

BEP (in units for Topper Sports)= Fixed Costs = Br.540, 000

Cm1n1 + Cm2n2 + Cm3n3

32(2)+60(1)+61.6(5)

n1 + n2 + n3 2 +1+5

=10, 000 units

Breakeven point for each product can be computed as follows:

Breakeven point in units

Alpha	10, 000 x 2/8	= 2, 500 units

Beta	10, 000 x 1/8	= 1, 250 units
Mega	10, 000 x 5/8	= 6, 250 units
Total		**10, 000 units**

After this, it is possible to multiply break-even sales for each product by their corresponding sales price to get break-even sales of Br.1, 287,500 for the company as a whole. Or this breakeven sale can be computed with the following short cut formula:

$$\text{Breakeven point (in birr)} = \frac{\text{Fixed expenses}}{\frac{Cm1n1 + Cm2n2 + Cm3n3}{p1n1 + p2\,n2 + p3n3}}$$

$$= \frac{Br.540,000}{\frac{32(2) + 60(1) + 61.6(5)}{80(2) + 120(1) + 150(5)}}$$

$$= Br.\frac{540,000}{\frac{432}{1,030}}$$

$$= Br.\frac{540,000 \times 515}{432} = Br\ \frac{1,287,500}{}$$

Activity 7: Understanding sales mix

The following information is for Barnett Corporation:

Product X: Revenue	Br 10.00
Variable Cost	Br 2.50
Product Y: Revenue	Br 15.00
Variable Cost	Br 5.00
Total fixed costs	Br 50,000

What is the breakeven point assuming the sales mix consists of two units of Product X and one unit of Product Y?

Assumptions of CVP Analysis

A number of assumptions commonly underlie CVP analysis:

1. Selling price is constant. The price of a product or service will not change as volume changes.
2. Costs are linear and can be accurately divided into variable and fixed elements. The variable element is constant per unit, and the fixed element is constant in total over the entire relevant range.
3. In multiproduct companies, the sales mix is constant.
4. In manufacturing companies, inventories do not change. The number of units produced equals the number of units sold.

While these assumptions may be violated in practice, the results of CVP analysis are often “good enough” to be quite useful. Perhaps the greatest danger lies in relying on simple CVP analysis when a manager is contemplating a large change in volume that lies outside of the relevant range. For example, a manager might contemplate increasing the level of sales far beyond what the company has ever experienced before. However, even in these situations it can be adjusted to take into account anticipated changes in selling prices, fixed costs, and the sales mix that would otherwise violate the assumptions mentioned above.

- Dear learner, please make sure that you have read the chapter carefully and properly understood activities questions. If you have done that, please read summary and precede to self assessment questions.

Summary

CVP analysis is based on a simple model of how profits respond to prices, costs, and volume. This model can be used to answer a variety of critical questions such as what is the company’s break-even volume, what is its margin of safety, and what is likely to happen if specific changes are made in prices, costs, and volume.

A CVP graph depicts the relationships between unit sales on the one hand and fixed expenses, variable expenses, total expenses, total sales, and profits on the other hand. The profit graph is simpler than the CVP graph and shows how profits depend on sales. The CVP and profit graphs are useful for developing intuition about how costs and profits respond to changes in sales.

The contribution margin ratio is the ratio of the total contribution margin to total sales. This ratio can be used to quickly estimate what impact a change in total sales would have on net operating income. The ratio is also useful in break-even analysis. Target profit analysis is used to estimate how much sales would have to be to attain a specified target profit. The unit sales required to attain the target profit can be estimated by dividing the sum of the target profit and fixed expense by the unit contribution margin. Break-even analysis is a special case of target profit analysis that is used to estimate how much sales would have to be to just break even. The unit sales required to break even can be estimated by dividing the fixed expense by the unit contribution margin. The margin of safety is the amount by which the company’s current sales exceed break-even sales.

The degree of operating leverage allows quick estimation of what impact a given percentage change in sales would have on the company’s net operating income. The higher the degree of operating leverage, the greater is the impact on the company’s profits. The degree of operating leverage is not constant it depends on the company’s current level of sales. The profits of a multiproduct company are affected by its sales mix. Changes in the

sales mix can affect the break-even point, margin of safety, and other critical factors

Checklist

Dear learner, now you have completed the second chapter, so you need to check whether you have grasped the concepts discussed in this chapter. If your answer to the questions below is No, then you have to go back and read the relevant sub-section again.

Can you:	**Yes**	**No**
1. Define Variable costs and fixed costs	☐	☐
2. Explain what contribution margin means	☐	☐
3. Compute break-even points using the graphical method	☐	☐
4. Compute break-even points using the equation method	☐	☐
5. Compute contribution margin ratio	☐	☐
6. Compute operating income	☐	☐
7. Explain how cost volume profit analysis is used in profit planning	☐	☐
8. Explain how the break-even point is computed	☐	☐
9. Explain how costs will be grouped into variable and fixed costs	☐	☐
10. Prepare a contribution income statement	☐	☐

Good! If, you have understood the above points, then proceed to the next exercise.

Self Assessment Questions

Part I: True-False Questions

Write "True" if the statement is correct and "False" if the statement is wrong for the following questions

1. To perform cost-volume-profit analysis, a company must be able to separate costs into fixed and variable components.
2. It is assumed in CVP analysis that the unit selling price, unit variable costs, and unit fixed costs are known and constant.

3. In CVP analysis, an assumption is made that the total revenues are linear with respect to output units, but that total costs are non-linear with respect to output units.
4. In the graph method of CVP analysis, the breakeven point is the (X-axis) quantity of units sold for which the total revenues line crosses the total costs line.
5. If variable costs per unit increase, then the breakeven point will decrease.
6. A planned increase in advertising would be considered an increase in fixed costs in CVP analysis.
7. Sensitivity analysis is a "what-if" technique that managers use to examine how a result will change if the originally predicted data are NOT achieved or if an underlying assumption changes.
8. Margin of safety measures the difference between budgeted revenues and breakeven revenues.
9. If a company increases fixed costs, then the breakeven point will be lower.
10. In multiproduct situations when sales mix shifts toward the product with the highest contribution margin, operating income will be higher.

Part II: Multiple Choice Questions

Choose the letter of the best answer and Write the letter of the correct answer for the questions that follow

1. Cost-volume-profit analysis assumes all of the following EXCEPT:

   A. all costs are variable or fixed
   B. units manufactured equal units sold
   C. total variable costs remain the same over the relevant range
   D. total fixed costs remain the same over the relevant range

2. Which of the following is true about the assumptions underlying basic CVP analysis?

   A. Only selling price is known and constant.
   B. Only selling price and variable cost per unit are known and constant.
   C. Only selling price, variable cost per unit, and total fixed costs are known and constant.
   D. Selling price, variable cost per unit, fixed cost per unit, and total fixed costs are known and constant.

3. Kinetic Company sells its only product for Br 9 per unit, variable production costs are Br 3 per unit, and selling and administrative costs are Br 1.50 per unit. Fixed costs for 10,000 units are Br 5,000. The contribution margin is:

   A. Br 6 per unit
   B. Br 4.50 per unit

C. Br 5.50 per unit
D. Br 4 per unit

4. The breakeven point is the activity level where:

A. revenues equal fixed costs
B. revenues equal variable costs
C. contribution margin equals variable costs
D. revenues equal the sum of variable and fixed costs

5. Sales total Br 200,000 when variable costs total Br 150,000 and fixed costs total Br 30,000. The breakeven point in sales dollars is:

A. Br 200,000
B. Br 120,000
C. Br 40,000
D. Br 30,000

6. Which of the following statements about determining the breakeven point is FALSE?

A. Operating income is equal to zero.
B. Contribution margin - fixed costs is equal to zero.
C. Revenues equal fixed costs plus variable costs.
D. Breakeven revenues equal fixed costs divided by the variable cost per unit.

7. What is the breakeven point in units, assuming a product's selling price is Br 100, fixed costs are Br 8,000, unit variable costs are Br 20, and operating income is Br 3,200?

A. 100 units
B. 300 units
C. 400 units
D. 500 units

8. How many units would have to be sold to yield a target operating income of $22,000, assuming variable costs are $15 per unit, total fixed costs are $2,000, and the unit selling price is $20?

A. 4,800 units
B. 4,400 units
C. 4,000 units
D. 3,600 units

Stephanie's Bridal Shoppe sells wedding dresses. The average selling price of each dress is Br 1,000, variable costs are Br 400, and fixed costs are Br 90,000.

9. How many dresses must the Bridal Shoppe sell to yield after-tax net income of Br 18,000, assuming the tax rate is 40%?

   A. 200 dresses
   B. 170 dresses
   C. 150 dresses
   D. 145 dresses

10. The strategy most likely to reduce the breakeven point would be to:

   A. increase both the fixed costs and the contribution margin
   B. decrease both the fixed costs and the contribution margin
   C. decrease the fixed costs and increase the contribution margin
   D. increase the fixed costs and decrease the contribution margin

Part-III: Workout

Workout Each of the Following Questions Clearly

1. Alex Moti Company sells car batteries to service stations for an average of Br 30 each. The variable cost of each battery is Br 20 and monthly fixed manufacturing costs total Br 10,000. Other monthly fixed costs of the company total Br 8,000.

Required:

A. What is the breakeven point in batteries?
B. What is the margin of safety, assuming sales total Br 60,000?
C. What is the breakeven level in batteries, assuming variable costs increase by 20%?
D. What is the breakeven level in batteries, assuming the selling price goes up by 10%, fixed manufacturing costs decline by 10%, and other fixed costs decline by Br 100?

2. Bona Textile Company sells shirts for men and boys. The average selling price and variable cost for each product are as follows:

Men's		**Boys'**	
Selling Price	Br 28.80	Selling Price	Br 24.00
Variable Cost	Br 20.40	Variable Cost	Br 16.80

Fixed costs are Br 38,400.

Required:

A. What is the breakeven point in units for each type of shirt, assuming the sales mix is 2:1 in favor of men's shirts?
B. What is the operating income, assuming the sales mix is 2:1 in favor of men's shirts, and sales total 9,000 shirts?

- Dear learner, now you have completed the chapter successfully. Please go to the next chapter and do what you have done in this chapter.

CHAPTER THREE

MASTER BUDGET AND RESPONSIBILITY ACCOUNTING

Introduction

Dear Learner! Welcome to the third chapter of this module. In this chapter, you will study about the preparation of master budget and will have better understanding of responsibility accounting. In addition, you will study the

types and benefits of budgeting. Budgets are quantitative expression of management plan. Creating a budget will help you make critical decisions, such as how much rent you can afford. You will also use the budget to plan and control your other expenses. Careful budgeting helps both individuals and businesses set goals that help plan for the future. A budgeting system builds on historical (actual) performance and expands to include consideration of future (expected) performance. A budget is a tool that helps managers in both their planning and control functions. Budgets help managers with their control function not only by looking forward but also by looking backward.

3.1 Budget and its Advantage

A budget is a quantitative expression of a plan of action and an aid to the coordination and implementation of this plan. A budget can cover both financial and non financial aspects of the plan and serves as blueprint for the organization to follow in an upcoming period. A budget that covers financial aspects quantifies management's expectations regarding income, cash flows, and financial position. Financial statements can be prepared for past and future periods. The financial statements that are prepared for future periods are commonly termed as pro forma financial statements or financial budgets. Underlying these financial budgets can be non-financial budgets for, say, units manufactured or sold, number of employees in the organization, and number of new products being introduced to the marketplace.

- Dear learner please be clear with what budget is before proceeding

☞ A budget is a quantitative expression of a plan of action and an aid to the coordination and implementation of this plan

Benefits of Budgeting

Budgeting forces managers to plan, promotes coordination and communication, and provides a benchmark for evaluating actual performance. The budget really represents the plan the company has in place to achieve its goals.

Planning

Almost everyone makes plans. Shortly after waking up each morning, most people think about what they will do during the day. This thinking ahead is a form of planning. Likewise, most business managers naturally think ahead about how they will conduct their business. The primary purpose of a budget is to present and describe the financial ramifications of plans for the

future. It quantifies a plan of action. The budget process requires individuals to consider possible future courses of action and the resources needed to accomplish the various activities. Budget formalizes the manager's plan in a document that clearly communicates objectives to both superiors and subordinates.

Coordination, Cooperation and Communication

Planning by individual managers does not ensure an optimum plan for the entire organization. Therefore, any organization to be effective, each manager throughout the organization must be aware of the plans made by other managers. In a nutshell, a good budget process communicates both from the top down and from the bottom up. Top management makes clear the goals and objectives of the organization in its budgetary directives to middle and lower level managers, and also to all employees. Employees and lower level managers inform top-level managers how they can plan to achieve the objectives.

Performance Evaluation or Framework for Judging Performance (Benchmarking)

Budgets are estimates of future events, and as such they serve as estimates of acceptable performance. Comparing actual result against budgeted results helps managers to evaluate the performance of individuals, departments, or entire companies. Budgets are generally a better basis for judging actual results than is past performance. The major drawback of using historical results for judging current performance is that inefficiencies may be concealed in the past performance.

Means of Allocating Resources

Because we live in a world of limited resources, virtually all individuals and organizations must ration their resources. The rationing process is easier for some than for other. Each person and each organization must compare the costs and benefits of each potential project or activity and choose those that result in the most appropriate resource allocation decision.

Generally, organizations resources are limited, and budgets provide one means of allocating resources among competing uses.

Legal and Contractual Requirements

Some organizations are required to budget because of legal requirements. Others commit themselves to budgeting requirement when signing loan agreements or other operating agreements.

Cost Awareness

Accountants and financial managers are concerned daily about the cost implications of decisions and activities, but many other managers are not.

Production managers focus on input, marketing manager's focuses on sales, and so forth. It is easy for people to overlook costs and cost-benefit relationships. At budgeting time, however, all managers with budget responsibility must convert their plans for projects and activities to costs and benefits. This cost awareness provides a common ground for communication among the various functional areas of the organization

- Budgeting forces managers to plan, promotes coordination and communication, and provides a benchmark for evaluating actual performance. The budget really represents the plan the company has in place to achieve its goals.

Budgeting Strategy

A budgetary strategy is the manner in which a company approaches the budgeting process. The strategy adopted by the company impacts who is involved in the budgeting process and how the budget numbers are derived. The four budgeting strategies are:-

Mandated Budgeting: It relies on predetermined standards set by upper level managers for its budget levels. It is also known as top-down budgeting because top management develops the budget and passes them down the organizational hierarchy to various divisions and/or departments without input from lower levels of management and employees.

Participative budgeting: It allows individuals who are affected by the budget to have input into the budgeting process. It also known as bottom-up budgeting because the budgeting process begins at lower levels of the organizational hierarchy and continues up through the organization to top management.

Incremental Budgeting: Is a strategy whereby the company uses the current period's budget as a starting point in preparing the next period's budget.

Zero-Based Budgeting: Is a strategy in which the company begins each budget period with a zero budget requires consideration of every activity undertaken by the department or segment.

Activity 1: understanding budget and its advantage

What are some advantages of budget?

3.2 Types of Budgets

Budgets are classified in different ways:
A. Based on capacity

Based on the capacity, budgets are classified as fixed and flexible budgets.

Fixed Budgets: A fixed budget is one which will remain unchanged immaterial of the level of activity. These budgets are prepared for fixed expenses and their aim is to control cost.

Flexible Budgets: A flexible budget is designed so as to change with the fluctuations in output, turnover and other factors, which are variable. These budgets will change with the change in activity. These budgets are prepared for various level of activity. While preparing flexible budgets the expenses are broadly classified as fixed and variable.
A fixed budget is rigid and does not change with the volume of activity achieved, whereas a flexible budget can be changed to suit the level of activity to be achieved. Flexible budget is not rigid. A fixed budget is prepared for a particular level of activity and for a particular set of conditions. It is prepared under the premise that there will be no change in the outside conditions. Flexible budget is prepared for various levels of activities.

B. Based on Time

Though budgets may cover long periods (called long-range budgets), the most frequently used budget period is one year (short-range budgets) and master budget is one of these budgets. The annual budget is often subdivided by months for the first quarter and by quarters for the remainder of the year.

Companies are increasingly using rolling budgets. A rolling budget is always available for a specified future period by adding a period (month, quarter, or year) in the future as the period just ended is dropped. Rolling budgets are sometimes called revolving budgets or continuous budgets.

Master Budgets

A Master Budget is a consolidated summary of the various functional budgets. It coordinates all the financial projections in the organization's individual budgets in a single organization wide set of budgets for a set time period. It incorporates the impact of both operating decisions and financing decisions. The term "master" in master budget refers to it being a comprehensive, organization-wide set of budgets. **Master budget** consists of:-

1. An **operating budget** that results in a projected income statement, and it consists:
    - Sales budget
    - Purchases budget
    - Cost of goods sold budget
    - Operating expense budget
2. A **financial budget** that results in a projected balance sheet and it consists of:
    - Capital budget
    - Cash budget

- Budgeted balance sheets
- Budgeted statement of cash flows

Preparation of Master Budget (Manufacturing Company)

Gore Company manufactures and sells a product whose peak sales occur in the third quarter. Management is now preparing detailed budgets for 2004-the coming year and has assembled the following information to assist in the budget preparation:

1. The company's product selling price is Br. 20 per unit. The marketing department has estimated sales as follows for the next six quarters.

	2004 Quarters				2005 Quarters	
	Q1	Q2	Q3	Q4	Q1	Q2
Budgeted sales in units	10,000	30,000	40,000	20,000	15,000	15,000

2. Sales are collected in the following pattern: 70% of sales are collected in the quarter in which the sales are made and the remaining 30% are collected in the following quarter. On January1, 2004, the company's balance sheet showed Br.90, 000 in account receivable, all of which will be collected in the first quarter of the year. Bad debts are negligible and can be ignored.
3. The company maintains an ending inventory of finished units equal to 20% of the next quarter's sales. The requirement was met on December 31, 20x3, in that the company had 2, 000 units on hand to start the New Year.
4. Fifteen pounds of raw materials are needed to complete one unit of product. The company requires an ending inventory of raw materials on hand at the end of each quarter equal to 10% of the following quarter's production needs of raw materials. This requirement was met on December 31, 2003 in that the company had 21, 000 pounds of raw materials to start the New Year.
5. The raw material costs Br.0.20 per pound. Raw material purchases are paid for in the following pattern: 50% paid in the quarter the purchases are made, and the remainder is paid in the following quarter. On January 1,2004, the company's balance sheet showed Br.25, 800 in accounts payable for raw material purchases, all of which be paid for in the first quarter of the year.
6. Each unit of Gore's product requires 0.8 hour of labor time. Estimated direct labor cost per hour is Br.7.50.
7. Variable overhead is allocated to production using labor hours as the allocation base as follows:

Indirect materials		Br.0.40
Indirect labor	0.75	
Fringe benefits	0.25	
Payroll taxes	0.10	
Utilities	0.15	

Maintenance 0.35

Fixed overhead for each quarter was budgeted at Br. 60, 600. Of the fixed overhead amount, Br. 15, 000 each quarter is depreciation. Overhead expenses are paid as incurred.

8. The company's quarterly budgeted fixed selling and administrative expenses are as follows:

	2004 Quarters			
	1	2	3	4
Advertising	Br.20, 000	Br.20, 000	Br.20, 000	Br.20, 000
Executive salaries	55, 000	55, 000	55, 000	55, 000
Insurance	-	1, 900	37,750	-
Property taxes	-	-	-	18, 150
Depreciation	10, 000	10, 000	10, 000	10, 000

The only variable selling and administrative expense, sales commission, is budgeted at Br.1.80 per unit of the budgeted sales. All selling and administrative expenses are paid during the quarter, in cash, with exception of depreciation. New equipment purchases will be made during each quarter of the budget year for Br. 50, 000, Br. 40, 000, & Br.20, 000 each for the last two quarter in cash, respectively. The company declares and pays dividends of Br.8, 000 cash each quarter. The company's balance sheet at December 31, 2003 is presented below:

ASSETS

Current assets:

Cash	Br. 42, 500	
Accounts Receivable	90, 000	
Raw Materials Inventory (21, 000 pounds)		4, 200
Finished Goods Inventory (2, 000 units)		26, 000
Total current assets		Br.162, 7 00

Plant and Equipment:

Land	Br.80, 000	
Building and Equipment	700, 000	
Accumulated Depreciation	(292, 000)	
Plant and Equipment, net		488, 000
Total assets		Br.650, 700

Liabilities and Stockholders' Equity

Current liabilities:

Accounts payable (raw materials)	Br.25, 800

Stockholders' equity:

Common stock, no par	Br.175, 000
Retained earnings	449, 900
Total stockholders' equity	624, 900
Total liabilities and stockholders' equity	Br.650, 700

The company can borrow money from its bank at 10% annual interest. All borrowing must be done at the beginning of a quarter, and repayments must be made at the end of a quarter. All borrowings and all repayments are in multiples of Br. 1,000.

The company requires a minimum cash balance of Br.40, 000 at the end of each quarter. Interest is computed and paid on the principal being repaid only at the time of repayment of principal. The company wishes to use any excess cash to pay loans off as rapidly as possible.

Required: Prepare a master budget for the four-quarter period ending December 31. Include the following detailed budget and schedules:

1. a) A sales budget, by quarter and in total

   b) A schedule of budgeted cash collections, by quarter and in total

   c) A production budget

   d) A direct materials purchase budget

   e) A schedule of budgeted cash payments for purchases by quarter and in total

   f) A direct labor budget

   g) A manufacturing overhead budget

   h) Ending finished goods inventory budget

   i) A selling and administrative budget

2. A cash budget, by quarter and in total

3. A budgeted income statement for the four- quarter ending December 31, 2004

4. A budgeted balance sheet as of December 31, 2004.

Preparing Operating Budget

The operating budget is composed of the income statement elements. A manufacturing business budgets both manufacturing and non-manufacturing activities. Below the various elements of the operating budget of a manufacturing firm will be discussed.

A. Sales Budget

The sales budget is the first budget to be prepared. It is usually the most important budget because so many other budgets are directly related to sales and are therefore largely derived from the sales budget. Inventory budgets, purchases budgets, personnel budgets, marketing budgets, administrative budgets, and other budget areas are all affected significantly by the amount of revenue that is expected from sales.

Sales budgets are influenced by a wide variety of factors, including general economic conditions, pricing decisions, competitor actions, industry conditions, and marketing programs. In an effort to develop an accurate sales budget, firms employ many experts to assist in sales forecasting. The sales budget is usually based on a sales forecast. A sales forecast is a prediction of sales under a given conditions. The objective in forecasting sales is to estimate the volume of sales for the period based on all the factors, both internal and external to the business that could potentially affect the level of sales. The projected level of sales is then combined with estimated of selling prices to form the sales budget. Sales forecasts are usually prepared under the direction of the top sales executive. Important factors considered by sales forecasters include:

Past patterns of sales: Past experience combined with detailed past sales by product line, geographical region, and type of customer can help predict future sales.

Estimates made by the sales force: A company's sales force is often the best source of information about the desires and plans of customers.

General economic conditions: Predictions for many economic indicators, such as gross domestic product and industrial production indexes (local and foreign), are published regularly. Knowledge of how sales relate to these indicators can aid sales forecasting.

Competitive actions: Sales depend on the strength and actions of competitors. To forecast sales, a company should consider the likely strategies and reactions of competitors, such as changes in their prices, products, or services.

Changes in the firm's prices: Sales can be increased by decreasing prices and vice versa. Planned changes in prices should consider effects on customer demand.

Changes in product mix: Changing the mix of products often can affect not only sales levels but also overall contribution margin. Identifying the

most profitable products and devising methods to increases sales is a key part of successful management.

Market research studies: Some companies hire market experts to gather information about market conditions and customer preferences. Such information is useful to managers making sales forecasts and product mix decisions.

Advertising and sales promotion plans: Advertising and other promotional costs affect sales levels.

A sales forecast should be based on anticipated effects of promotional activities.

A. Sales Budget

The sales budget for Gore Company can be prepared as per the following schedule:

	Quarter			
	1	2	3	4
Expected sales in units	10, 000	30, 000	40, 000	20, 000
Selling price per unit	x Br. 20	x Br. 20	x Br.20	x Br.20
Total sales	Br.200, 000	Br.600, 000	Br.800, 000	Br.400, 000

B. Cash Collection Budget

This budget shows the total cash that a company will collect from various sources during the accounting period or the budget period.

Schedule of Expected Cash Collections for Gore Company:

	Quarter				
	1	2	3	4	Total
30% of the previous quarter sales	Br. 90, 000	Br.60, 000	Br.180, 000	Br.240, 000	Br.570, 000
70% of the current quarter sales	140, 000	420, 000	560, 000	280, 000	1, 400, 000
Total collections	Br.230, 000	Br.480, 000	Br.740, 000	Br. 520, 000	Br.1, 970, 000

C. Production Budget

This budget shows the total budgeted production for the budgeted period. Production Budget for Gore Company: After the sales budget has been prepared, the production requirements for the forth-coming budget period can be determined and organized in the form of a production budget. Sufficient goods will have to be available to meet sales and provide for the desired ending inventory. A portion of these goods will already exist in the form of a beginning

inventory. The remainder will have to be produced. Therefore, production needs can be determined as follows:

Budgeted sales in units …… xxxx
Add desired ending inventory…… xxxx
Total needs…… xxxx
Less beginning inventory…… xxxx
Required production……xxxx

The schedule given below shows the production budget for Great Company. Note that the desired level of the ending inventory influences production requirements for a quarter. Inventories should be carefully planned. Excessive inventories tie up funds and create storage problems. Insufficient inventories can lead to lost sales or crash production efforts in the following period.

	Quarter				Total
	1	2	3	4	
Expected sales(units)	10, 000	30, 000	40, 000	20, 000	100, 000
Add: Desired Ending Inventory	6, 000	8, 000	4, 000	3, 000	3, 000
Total needs	16, 000	38, 000	44, 000	23, 000	103, 000
Lees: Beginning Inventory	2, 000	6, 000	8, 000	4, 000	2, 000
Units to be produced	14, 000	32,000	36, 000	19, 000	101, 000

D. Direct Materials Budget

It shows the total quantity that a business needs to buy to meet future direct materials need. Returning to Gore Company's budget data, after the production requirements have been computed, a direct materials budget can be prepared. The direct materials budget details the raw materials that must be purchased to fulfill the production budget and to provide for adequate inventories. The required purchases of raw materials are computed as follows:

Raw materials needed to meet the production schedule……xxxx
Add desired ending inventory of raw materials…… ……xxxx

Total raw materials needs…… xxxx

Less beginning inventory of raw materials…… xxxx

Raw materials to be purchased……xxxx

	Quarter				Total
	1	2	3	4	
Production needs(pounds)	210, 000	480, 000	540, 000	285, 000	1, 515, 000
Add: Desired ending inventory	48, 000	54, 000	28, 500	22, 500	22, 500
Total needs	258, 000	534, 000	568, 500	307, 500	1, 537, 500
Less: Beginning inventory	21, 000	48, 000	54, 000	28, 500	21, 000
Raw materials to be purchased(pounds)	237, 000	486, 000	514, 500	279, 000	1, 516,500

Raw Materials to be purchased (in Birr)

	1	2	3	4	Total
Raw materials to be purchased	237, 000	486, 000	514, 500	279, 000	1, 516, 500
Raw materials cost per pound	x Br.0.20	x Br.0.20	x Br.0.20	x Br.0.20	x Br.0.20
Total	Br.47, 400	Br.97, 200	Br.102, 900	Br.55, 800	Br.303, 300

E. Budgeted cash disbursement for direct material purchase

Businesses make cash payments for various purposes. This budget shows cash payments that will be made for only purchase of direct materials. For Gore Company the schedule of expected Cash Disbursements (for Materials Purchase) can be prepared as follows:

	Quarter				Total
	1	2	3	4	
50% of the previous quarter	Br. 25, 800	Br.23, 700	Br.48, 600	Br.51, 450	Br.149, 550
50% of the current quarter	23, 700	48, 600	51, 450	27, 900	151, 650
Total cash disbursement	Br.49, 500	Br.72, 300	Br.101, 050	Br.79, 350	Br.301, 200

F. Direct Labor Budget

The direct labor budget is developed from the production budget. Direct labor requirements must be computed so that the company will know whether sufficient labor time is available to meet production needs. By knowing in advance just what will be needed in the way of labor time throughout the budget year, the company can develop plans to adjust the labor force as the situation may require. Firms that neglect to budget run the risk of facing labor shortage or having to hire and lay off at awkward times. Erratic labor policies lead to insecurity and inefficiencies on the part of employees. To compute direct labor requirements, the number of units of finished product to be produced each produced each period (month, quarter, and so on) is multiplied by the number of direct labor-hours required to produced a single unit. Many different types of labor may be involved. If so, then the computation should be by type of labor needed. The labor requirements can then be translated into expected direct labor costs. How this is done will depend on the labor policy of the firm. In schedule given below, the management of Great Company has assumed that the direct labor force will be adjusted as the work requirement change from quarter to quarter (for example as units produced changes from l4, 000 units in quarter 1 to 32, 000 units in quarter 2 for Great Company, the direct labor work force will be fully adjusted to the workload, i.e., total hours of direct labor time needed). In that case, the total direct labor cost is computed by simply multiplying the direct labor-hour required by the direct labor rate hour as was done in the schedule here under:

	Quarter				Total
	1	2	3	4	
Direct labor time needed	11, 200	25, 600	28, 800	15, 200	80, 800
Direct labor cost per hour	x Br.7.50	x Br.7.50	x Br.7.50	x Br.7.50	x Br.7.50
Total direct labor cost	Br.84, 000	Br.192, 000	Br.216, 000	Br.114, 000	Br.606, 000

G. Manufacturing Overhead (MOH) Budget

The manufacturing overhead budget provides a schedule of all costs of production other than direct materials and direct labor. These costs should be broken down by cost behavior for budgeting purposes and a predetermined overhead rate developed. This rate will be used to apply manufacturing overhead to units of product throughout the budget period.

A computation showing budgeted cash disbursement for manufacturing overhead should be made for use in developing the cash budget. Since some of the overhead costs do not represent cash outflows, the total budgeted manufacturing overhead costs must be adjusted to determine the cash disbursement for manufacturing overhead. At Great Company, the only significant noncash manufacturing overhead cost is depreciation. Any depreciation charges included in manufacturing overhead must be deducted from the total in computing expected cash payments, since depreciation is a noncash charge.

	Quarter				Total
	1	2	3	4	
Variable overhead	Br.22, 400	Br.51, 200	Br.57, 600	Br.30, 400	Br.161,600
Fixed overhead	60, 600	60, 600	60, 600	60, 600	242,400
Total MOH	Br.83, 000	Br.111, 800	Br.118, 200	Br.91, 000	Br.404,000
Less: Depreciation	15, 000	15, 000	15, 000	15, 000	60, 000
Cash disbursements for MOH	Br.68, 000	Br.96, 800	Br.103, 200	Br.76, 000	Br.344, 000

H. Ending Finished Goods Inventory Budget

After completing schedules (a) to (g), the company had all of the data needed to compute unit product costs. This computation was needed for two reasons: first, to know how much to charge as cost of goods sold on the budgeted income statement; and second, to know what amount to put on the balance sheet inventory account for unsold units. The carrying cost of the unsold units is computed on the ending finished goods inventory budget as follows:

Budgeted Finished Goods Inventory	3, 000
Unit product cost	Br.13
Ending Finished Goods Inventory in birr	Br.39, 000

Production cost per unit

	Quantity (unit)	**Cost**	**Total**
Direct materials	15 pounds	Br.0.20 per pound	Br.3
Direct labor	0.8 hours	7.50 per hour	6
Manufacturing overhead	0.8 hours	5.00 per hour	4
Unit product cost			Br.13

$$\text{MOH rate} = \frac{\text{Total MOH}}{\text{Direct labor hours}} = \frac{404,000}{80,800} = \text{Br.5.00}$$

Budgeted cost of goods sold for Gore Company for the budget period is computed as follows:

Cost of goods sold=100,000*13=1,300,000

I. Operating Expense Budget (selling and Administrative Expenses)

The budgeting of operating expenses depends on various factors. Month – to – month fluctuation in sales volume and other cost-drivers activities directly influence many operating expenses. Examples of expenses driven

by sales volume include sales commissions and many delivery expenses. Other expenses are not influenced by sales or other cost-driver activity (such as rent, insurance, depreciation, and salaries) within appropriate relevant ranges and are regarded as fixed. Selling and Administrative Expenses Budget for Gore Company for the budget period is given below:

	Quarter				Total
	1	2	3	4	
Variable selling expenses	Br.18, 000	Br.54, 000	Br.72, 000	Br.36, 000	Br.180, 000
Fixed selling & administrative expenses					
Advertising	20, 000	20, 000	20, 000	20, 000	80, 000
Executive salaries	55, 000	55, 000	55, 000	55, 000	220, 000
Insurance	-	1, 900	37, 750	-	39, 650
Property taxes	-	-	-	18,150	18,150
Depreciation	10, 000	10, 000	10, 000	10, 000	40, 000
Total budgeted selling & administrative expenses	Br.103, 000	Br.140, 900	Br.194, 750	Br.139, 150	Br.577, 800

Disbursement for Selling & Administrative Expenses can also be prepared from the above facts as follows for Gore Company:

	Quarter				Total
	1	2	3	4	
Budgeted Selling & Administrative	Br.103, 000	Br.140, 900	Br.194, 750	Br.139, 150	Br.577, 800
Less: Depreciation	10, 000	10, 000	10, 000	10, 000	40, 000
Total Cash Disbursements	Br.93, 000	Br.130, 900	Br.184, 750	Br.129, 150	Br.537, 800

Budgeted Income Statement

The budgeted income statement is the combination of all of the preceding budgets. This budget shows the expected revenues and expenses from operations during the budget period. A firm may have budgeted non-

operating items such as interest on investments or gain or loss on the sale of fixed assets. Usually they are relatively small, although in large firms the birr amounts can be sizable. If non-operating items are expected, they should be included in the firm's budgeted income statement. Income taxes are levied on actual, not budgeted, net income, but the budget plan should include expected taxes; therefore, the last figure in the budgeted income statement is budgeted after tax net income.

Budgeted Income Statement for Gore Company can be prepared as follows:

Gore Company
Budgeted Income Statement
For the Year Ended December31, 2004

Sales [100, 000units at Br.20 Schedule 1(a)]
Br.2, 000, 000
Cost of Goods Sold [100, 000 units at Br.13 Schedule1 (h)]
1, 300, 000
Gross profit
700, 000
Selling & Administrative Expenses [Schedule 1 (i)]
577, 800
Net Operating Income
122, 200
Interest Expense [Schedule 2(a)]
14, 000
Net Income **Br. 108, 200**

Preparing Financial Budget

The second major part of the master budget is the financial budget, which consists of the capital budget, cash budget, ending balance sheet and the statement of changes in financial position. Although there are some differences in operating budgets of manufacturing, merchandising and service firms, very little difference exists among financial budgets of these entities.

Capital expenditure budget: Capital budgeting is the planning of investments in major resources like plant and equipment, and other types of long-term projects, such as employee education programs. The capital expenditure budget or capital budget describes the capital investment plans for an organization for the budget period. It contains some of the most critical budgeting decisions of the organizations. This capital budget will be illustrated in financial management.

Cash budget: The cash budget is a statement of planned cash receipts and disbursements. The cash budget is composed of four major sections:

1. The receipts section: It consists of a listing of all of the cash inflows, except for financing, expected during the budget period. Generally the major source of receipts will be from sales.
2. The disbursement section: It consists of all cash payments that are planned for the budget period. These payments will include inventory purchases, wages and salary payments and so on. In addition, other cash disbursements such as equipment purchases, dividends, and other cash withdrawals by owners are listed.
3. The cash excess or deficiency section: The cash excess or deficiency section is computed as follows:

Cash balance, beginning	x x x
Add receipts	x x x
Total cash available before financing	x x x
Less disbursements	x x x
Excess (deficiency) of cash available over disbursements	x x x

If there is a cash deficiency during any budget period, the company will need to borrow funds. If there is cash excess during any budget period, funds borrowed previous periods can be repaid or the idle funds can be placed in short-term or other investments.

4. The financing section: This section provides a detail account of the borrowing and repayments projected to take place during the budget period. It also includes a detail of interest payments that will be due on money borrowed.

Cash Budget for Gore Company for the budget period is prepared as follows:

	Quarter				Total
	1	2	3	4	
Cash balance, beginning	Br.42, 500	Br.40, 000	Br.40, 000	Br.40, 500	Br.42, 500
Add : Collection from customers	230, 000	480, 000	740, 000	520, 000	1, 970, 000
Total cash available before financing	**272, 500**	**520, 000**	**780, 000**	**560, 500**	**2, 012, 500**
Less: Disbursements for					
Direct materials	49, 500	72, 300	100,050	79, 350	301,200
Direct labor	84, 000	192, 000	216,000	114, 000	606,000
Manufacturing overhead	68, 000	96, 800	103,200	76, 000	344,000
Selling & Administrative	93, 000	130, 900	184,750	129, 150	537,800
Equipment purchases	50, 000	40, 000	20,000	20,000	130,000

Dividend	8, 000	8, 000	8, 000	8, 000	32,000
Total disbursements	352, 500	540,000	632,000	426,500	1,951,000
Minimum cash balance	40, 000	40, 000	40, 000	40, 000	40, 000
Total need	392, 500	580, 000	672, 000	466, 500	1, 991,000
Excess (deficiency) of cash available over total need	(120, 000)	(60, 000)	108, 000	94, 000	21, 500
Financing:					
Borrowing(at beginning)	120,000	60, 000	-	-	180, 000
Repayments(at ending)	-	-	(100, 000)	(80,000)	(180,000)
Interest(at 10% per annum)	-	-	(7,500)	(6,500)	(14,000)
Total financing	120, 000	60, 000	(107,500)	(86,500)	(14,000)
Cash balance, ending	**Br.40,000**	**Br.40, 000**	**Br.40, 500**	**Br.47, 500**	**Br.47, 500**

Budgeted Balance Sheet: The budgeted balance sheet, sometimes called the budgeted statement of financial position, is derived from the budgeted balance sheet at the beginning of the budget period and the expected changes in the account balance reflected in the operating budget, capital budget, and cash budget.

Gore Company
Budgeted Balance Sheet
December31, 2004

ASSETS

Current assets:

Cash [Schedule 2(a)]		Br. 47, 500
Accounts Receivable		120, 000
Raw Materials Inventory		4, 500
Finished Goods Inventory		39, 000
Total current assets		Br.211, 000
Plant and Equipment:		
Land	Br.80, 000	
Building and Equipment	830, 000	
Accumulated Depreciation	(392, 000)	
Plant and Equipment, net		518, 000
Total assets		Br.729, 000

Liabilities and Stockholders' Equity

Current liabilities:

Accounts payable (raw materials)	Br.27, 900

Stockholders' equity:

Common stock, no par	Br.175, 000
Retained earnings	526, 100
Total stockholders' equity	701, 100
Total liabilities and stockholders' equity	Br.729, 000

Dear learner, please note that master budget for merchandising business (given in self assessment questions) is different in that it includes raw material purchases budget instead of production budget and cost of goods sold which is slightly different from master budget for manufacturing businesses.

Purchases Budget

After sales are budgeted, prepare the purchases budget. The total merchandise needed will be the sum of the desired ending inventory plus the amount needed to fulfill budgeted sales demand. The total need will be partially met by the beginning inventory; the remainder must come from planned purchases.

These purchases are computed as follows:

Budgeted Purchases = Desired Ending inventory + Cost of Goods Sold - Beginning Inventory

Budgeted cost of goods sold

For a manufacturing firm cost of goods sold is the production cost of products that are sold. Consequently, the cost of goods sold budget follows directly from the production budget. However, a merchandising firm has no production budget. The cost of goods sold budget comes directly from merchandise inventory and the merchandise purchases budget.

Activity 2: Understanding Master Budget and its components

Describe master budget and list its elements

- Dear learner, please do not proceed without understanding the most important point of the chapter: Master budget

- A Master Budget is a consolidated summary of the various functional budgets. It coordinates all the financial projections in the organization's individual budgets in a single organization wide set of budgets for a set time period

3.3 Decentralization and Responsibility Accounting

Responsibility Accounting

An organization's structure evolves as its goals, technology, and employees change, and the progression is typically from highly centralized to highly decentralized. When top management retains the major portion of authority, centralization exists. Decentralization refers to top management's downward delegation of decision making authority to subunit managers. This chapter describes the degree to which top managers delegate authority to subordinate managers and the accounting methods—responsibility accounting and transfer pricing—that are appropriate in decentralized organizations.

Decentralization

The degree of centralization can be viewed as a continuum. It reflects a chain of command, authority and responsibility relationships, and decision-making capabilities. In a completely centralized firm, a single individual (usually the company owner or president) performs all major decision making and retains full authority and responsibility for that organization's activities. Alternatively, a purely decentralized organization would have virtually no central authority, and each subunit would act as a totally independent entity. Either extreme of the centralization–decentralization continuum represents a clearly undesirable arrangement.

In the totally centralized company, the single individual may have neither the expertise nor sufficient and timely information to make effective decisions in all areas. In the totally decentralized firm, subunits may act in ways that are inconsistent with the organization's goals. Each organization tends to structure itself in light of the pure centralization versus pure decentralization factors presented in. Most businesses are, to some extent, somewhere in the middle part of the continuum because of practical necessity. The combination of managers' personal characteristics, the nature of decisions required for organizational growth and the nature of organizational activities lead a company to find the appropriate degree of decentralization

Decentralization does not necessarily mean that a unit manager has the authority to make all decisions concerning that unit. Top management selectively determines the types of authority to delegate and the types to withhold.

- Dear learner, are you clear with responsibility accounting and decentralization

☞ ***Responsibility Accounting*:** Responsibility accounting is a system that measures the results of each responsibility center and compares those results with some measure of expected or budgeted outcome and decentralization is the act of delegating decision making authority to lower level managers.

Advantages of Decentralization

Decentralization has many personnel advantages. Decentralized units provide excellent settings for training personnel and for screening aspiring managers for promotion. Managers in decentralized units have the need and occasion to develop their leadership qualities, creative problem-solving abilities, and decision-making skills. Managers can be comparatively judged on their job performance and on the results of their units relative to those headed by other managers; such comparisons can encourage a healthy level of organizational competition. Decentralization also often leads to greater job satisfaction for managers because it provides for job enrichment and gives a feeling of increased importance to the organization.

In addition to the personnel benefits, decentralization is generally more effective than centralization in accomplishing organizational goals and objectives. The decentralized unit manager has more knowledge of the local operating environment, which means:

- a reduction of decision-making time,
- a minimization of difficulties that may result from attempting to communicate problems and instructions through an organizational chain of command, and
- quicker perceptions of environmental changes than is possible for top management.

Thus, the manager of a decentralized unit is both in closest contact with daily operations and charged with making decisions about those operations. A decentralized structure also allows the management by exception principle to be implemented. Top management, when reviewing divisional reports, can address issues that are out of the ordinary rather than dealing with operations that are proceeding according to plans.

Disadvantages of Decentralization

Not all aspects of decentralization are positive. For instance, the authority and responsibility for making decisions may be divided among too many individuals. This division of authority and responsibility may result in a lack of goal congruence among the organizational units. **Goal congruence** exists when the personal goals of the decision maker, the goals of the decision maker's unit, and the goals of the broader organization are mutually supportive and consistent. In a decentralized company, unit managers are essentially competing with each other because results of unit activities are compared. Because of this competition, unit managers may make decisions that positively affect their own units, but are detrimental to other organizational units or to the company. This process results in sub optimization. **Sub optimization** is a situation in which individual managers pursue goals and objectives that are in their own and/or their segments' particular interests rather than in the company's best interests. Because of

their greater degree of flexibility in financial decisions, managers of profit and investment centers (to be discussed later in the chapter) must remember that their operations are integral parts of the entire corporate structure. Therefore, all actions taken should be in the best long-run interest of both the responsibility center and the organization. Unit managers should be aware of and accept the need for goal congruence throughout the entity. To assume awareness of such goal congruence, management may keep certain organizational functions at “headquarters” or recentralize some functions if they have been delegated to unit managers.

A decentralized organization requires that more effective methods of communicating plans, activities, and achievements be established because decision making is removed from the central office. Top management has delegated the authority to make decisions to unit managers, but top management retains the responsibility for the ultimate effects of those decisions. Thus, to determine whether those operations are progressing toward established goals, top management must maintain an awareness of operations at lower levels. In attempts to introduce decentralization policies, some top managers may have difficulty relinquishing the control they previously held over the segments or may be unwilling or unable to delegate effectively. Reasons for this unwillingness or inability include the belief of managers that they can do the job better than anyone else, a lack of confidence in the lower-level managers’ abilities, and a lack of ability to communicate directions and assignments to subordinates. A final disadvantage of decentralization is that it may be extremely costly. In a large company, all subordinate managers are unlikely to have equally good decision- making skills. Thus, companies must often incur a cost to train lower-level managers to make better decisions. Another potential cost is that of poor decisions, because decentralization requires managerial tolerance if and when subordinates make mistakes. The potentially adverse consequences of poor decisions by subordinates cause some top managers to resist a high degree of decentralization. Decentralization also requires that a company develop and maintain a sophisticated planning and reporting system.

In a decentralized organization, top management delegates decision-making authority but retains ultimate responsibility for decision outcomes. Thus, a reporting system must be implemented to provide top management with information about, as well as the ability to measure, the overall accountability of the subunits. This accounting and information reporting system is known as a responsibility accounting system.



Activity 3: Centralization and Decentralization

Differentiate centralization and Decentralization

3.4 Responsibility Accounting Systems responsibility centers

A responsibility accounting system is an important tool in making decentralization work effectively by providing information to top management about the performance of organizational subunits. As companies became more decentralized, responsibility accounting systems evolved from the increased need to communicate operating results through the managerial hierarchy. Responsibility accounting implies subordinate managers' acceptance of communicated authority from top management.

Responsibility accounting is consistent with standard costing and activity-based costing because each is implemented for a common purpose—that of control. Responsibility accounting focuses attention on organizational subunit performance and the effectiveness and efficiency of that unit's manager. A responsibility accounting system produces **responsibility reports** that assist each successively higher level of management in evaluating the performances of its subordinate managers and their respective organizational units. Much of the information communicated in these reports is of a monetary nature, although some nonmonetary data may be included. The reports about unit performance should be tailored to fit the planning, controlling, and decision-making needs of subordinate managers. Top managers review these reports to evaluate the performance of each unit and each unit manager. The number of responsibility reports issued for a decentralized unit depends on the degree of influence that unit's manager has on day-to-day operations and costs. If a manager strongly influences all operations and costs of a unit, one report will suffice for both the manager and the unit because responsibility reports should reflect only the revenues and/or costs under the control of the manager. Responsibility accounting systems help to establish control procedures at the point of cost incidence rather than allocating such costs in a potentially arbitrary manner to all units, managers, and/or products. Managers implement control procedures for three reasons.

First, managers attempt to cause actual operating results to conform to planned results; this conformity is known as *effectiveness*.

Second, managers attempt to cause the standard output to be achieved with minimum possible input costs; this conformity is known as *efficiency.*

Third, managers need to ensure reasonable plant and equipment utilization, which is primarily affected by product or service demand. At higher volumes of activity or utilization, fixed capacity costs can be spread over more units, resulting in a lower unit cost. Reasonable utilization must be tied to demand and thus does not mean producing simply for the sake of lowering fixed cost per unit if sales demand cannot support production.

Responsibility reports for subordinate managers and their immediate supervisors normally compare actual results with flexible budget figures.

These comparisons are more useful for control purposes because both operating results and flexible budget figures are based on achieved levels of activity. In contrast, top management may receive responsibility reports comparing actual performance to the master budget. Such a budget-to-actual comparison yields an overall performance evaluation, because the master budget reflects management's expectations about volume, mix, costs, and prices. This type of comparison is especially useful when accompanied by a supporting detailed variance analysis identifying the effect of sales volume differences on segment performance.

Regardless of the type of comparison provided, responsibility reports reflect the upward flow of information from operational units to company top management and illustrate the broadening scope of responsibility. Managers receive detailed information on the performance of their immediate areas of control and summary information on all organizational units for which they are responsible. Summarizing results causes a pyramiding of information. Variances are the responsibility of the manager under whose direct supervision they occur. Variances are individually itemized in performance reports at the lower levels so that the appropriate manager has the necessary details to take any required corrective action related to significant variances. Under the management by exception principle, major deviations from expectations are highlighted under the subordinate manager's reporting section to assist upper-level managers in making decisions about when to become involved in subordinates' operations. If no significant deviations exist, top management is free to devote its attention to other matters. In addition, such detailed variance analyses alert operating managers to items that may need to be explained to superiors.

In addition to the monetary information, many responsibility accounting systems are now providing information on critical nonmonetary measures of the period's activity. The performance reports of each management layer are reviewed and evaluated by each successively higher management layer. Managers are likely to be more careful and alert in controlling operations if they know that the reports generated by the responsibility accounting system will reveal financial accomplishments and problems. Thus, in addition to providing a means for control, responsibility reports can motivate managers to influence operations in ways that will reflect positive performance. The focus of responsibility accounting is on the manager who is responsible for a particular cost object. In a decentralized company, the cost object is an organizational unit such as a division, department, or geographical region. The cost object under the control of a manager is called a **responsibility center**.

- Dear learner, please remember that:

☞ ***Responsibility Center:*** Is part of an entity whose managers are responsible only for the activities of the center.

Basic Types of Responsibility Centers

Responsibility accounting systems identify, measure, and report on the performance of people controlling the activities of responsibility centers. Responsibility centers are classified according to their manager's scope of authority and type of financial responsibility. Companies may define their organizational units in various ways based on management accountability for one or more income-producing factors—costs, revenues, profits, and/or asset base. The four basic types of responsibility centers are.

A. Cost Centers

In a **cost center**, the manager has the authority only to incur costs and is specifically evaluated on the basis of how well costs are controlled. Theoretically, revenues cannot exist in a cost center because the unit does not engage in revenue producing activity. Cost centers commonly include service and administrative departments. For example, the equipment maintenance center in a hospital may be a cost center because it does not charge for its services, but it does incur costs. In other instances, revenues do exist for a cost center, but they are either not under the manager's control or are not effectively measurable.

B. Revenue Centers

A revenue center is strictly defined as an organizational unit for which a manager is accountable only for the generation of revenues and has no control over setting selling prices or budgeting costs. In many retail stores, the individual sales departments are considered independent units, and managers are evaluated based on the total revenues generated by their departments. Departmental managers, however, may not be given the authority to change selling prices to affect volume, and often they do not participate in the budgeting process. Thus, the departmental managers might have no impact on costs.

In most instances, however, pure revenue centers do not exist. Managers of revenue centers are typically not only responsible for revenues, but also are involved in the planning and control over some (but not necessarily all) costs incurred in the center.

C. Profit Centers

In a profit center, the manager is responsible for generating revenues and planning and controlling expenses related to current activity. (Expenses not under a profit center manager's control are those related to long-term investments in plant assets; such a situation creates a definitive need for separate evaluations of the subunit and the subunit's manager.) A profit center manager's goal is to maximize the center's net income.

Profit centers should be independent organizational units whose managers have the ability to obtain resources at the most economical prices and to sell products at prices that will maximize revenue. If managers do not have complete authority to buy and sell at objectively determined costs and

prices, a meaningful evaluation of the profit center is difficult to make. Profit centers are not always manufacturing divisions or branches of retail stores.

Banks may view each department (checking and savings accounts, loans, and credit cards) as a profit center; trucking companies may view each 18-wheeler as a profit center; and a university may view certain educational divisions as profit centers (undergraduate education, non-degree-seeking night school, and graduate programs).

D. Investment Centers

An investment center is an organizational unit in which the manager is responsible for generating revenues and planning and controlling expenses. In addition, the center's manager has the authority to acquire, use, and dispose of plant assets in a manner that seeks to earn the highest feasible rate of return on the center's asset base. Many investment centers are independent, freestanding divisions or subsidiaries of a firm. This independence gives investment center managers the opportunity to make decisions about all matters affecting their organizational units and to be judged on the outcomes of those decisions.



Activity 4: Understanding Responsibility Accounting

Describe responsibility accounting

- Dear learner, please make sure that you have read the chapter carefully and properly understood activity questions. If you have done that, please read summary and precede to self assessment questions.

Summary

A budget expresses, in quantitative terms, an organization's objectives and possible steps for achieving them. Thus, a budget is a tool that helps managers in both their planning and control functions. The two major parts of a master budget are the operating budget and the financial budget. Advantages of budgets include formalization of planning, providing a framework for judging performance, and aiding managers in coordinating their efforts.

Master budgets typically cover relatively short periods usually one month to one year. The steps involved in preparing the master budget vary across organizations but follow general outline. Invariably, the first step is to forecast sales or service levels. The next step should be to forecast cost-driver activity levels, given expected sales and service. Using these

forecasts and knowledge of cost behavior, collection patterns, and so on, managers can prepare the operating and financial budgets.

The operating budget is the income statement for the budget period. Managers prepare it using the following budgets: sales budget, purchases budget and operating expenses budget. The second major part of the master budget is the financial budget. The financial budget consists of a cash budget, capital expenditure budget, and a budgeted balance sheet. Managers prepare the cash budget from supporting schedules cash collections, disbursements for purchases, and disbursements for operating expenses.

Sales forecasting combines various techniques as well as opinions of sales staff and management. Sales forecasters must consider many factors such as past patterns of sales, economic conditions, and competitor's actions. Sales forecasting is difficult because of its complexity and the rapid changes in the business environment in which most companies operate.

The success of a budget depends heavily on employee reaction to it. Negative attitudes toward budgets usually prevent realization of many of the potential benefits. Such attitudes are usually caused by managers who use budgets to force behavior or to punish employees or who use budgets only to limit spending. Budgets generally are more useful when they are formulated with the willing participation of all affected parties.

The budgetary process compels managers to think and prepare for changing conditions. Budgets are aids in planning, communicating, setting standards of performance, motivating personnel toward goals, measuring results, and directing attention to problem areas that need investigation.

A decentralized organization is composed of operational units led by managers who have some degree of decision-making autonomy. The degree to which a company is decentralized depends on top management philosophy and on the ability of unit managers to perform independently. Decentralization provides managers the opportunity to develop leadership qualities, creative problem-solving abilities, and decision-making skills. It also lets the individual closest to the operational unit make decisions for that unit, thereby reducing the time spent in communicating and making decisions.

Responsibility reports reflect the upward flow of information from each decentralized unit to top management. Managers receive information regarding the activities under their immediate control as well as the control of their direct subordinates. The information is successively aggregated, and the reports allow the application of the management by exception principle.

Checklist

Dear learner, now you have completed the third chapter, so you need to check whether you have grasped the concepts discussed in this chapter. If your answer to the questions below is No, then you have to go back and read the relevant sub-section again.

Can you:	**Yes**	**No**
1. Define budgets	☐	☐
2. List the types of budgets	☐	☐
3. List the benefits of budgeting	☐	☐
4. Prepare operating budgets Prepare financial budge	☐	☐
5. Explain master budget	☐	☐
6. Explain responsibility accounting	☐	☐
7. Explain responsibility centers	☐	☐

Good! If, you have understood the above points, then proceed to the next exercise.

Self Assessment Questions

Part I: True-False Questions

Write "True" if the statement is correct and "False" if the statement is wrong for the following questions.

1. A budget is the quantitative expression of a proposed plan of action by management for a specified period.
2. Budgeting includes only the financial aspects of the plan and NOT any nonfinancial aspects such as the number of physical units manufactured.
3. When administered wisely, budgets promote communication and coordination among the various subunits of the organization.
4. The usual starting point in budgeting is to forecast net income.
5. The financial budget is that part of the master budget that includes the

capital expenditures budget, cash budget, budgeted balance sheet, and the budgeted statement of cash flows.

6. In a cost center, a manager is responsible for investments, revenues, and costs of that center.
7. The fundamental purpose of responsibility accounting is to fix blame when budgets are NOT achieved.
8. When the operating budget is used as a control device, managers are less likely to be motivated to budget higher sales than actually anticipated.
9. Budgeting helps management anticipate and adjust for trouble spots in advance.
10. Budgeted financial statements are also called pro forma statements.

Part II: Multiple Choice Questions

Choose the letter of the best answer and Write the letter of the correct answer for the questions that follow

1. A budget:

   A. is the quantitative expression of a proposed plan of action by management
   B. is an aid to coordinate what needs to be done
   C. generally includes both financial and nonfinancial aspects of the plan
   D. All of the above are correct.

2. A master budget:

   A. includes only financial aspects of a plan and excludes nonfinancial aspects
   B. is an aid to coordinating what needs to be done to implement a plan
   C. includes broad expectations and visionary results
   D. should not be altered after it has been agreed upon

3. Budgeting provides all of the following EXCEPT:

   A. a means to communicate the organization's short-term goals to its members
   B. support for the management functions of planning and coordination
   C. a means to anticipate problems
   D. an ethical framework for decision making

4. A limitation of comparing a company's performance against actual results of last year is that:

   A. it includes adjustments for future conditions
   B. feedback is no longer a possibility
   C. past results can contain inefficiencies of the past year
   D. the budgeting time period is set at one year

5. Beta Company expects to sell 60,000 athletic uniforms for Br 80 each in 2005. Direct materials costs are Br 20, direct manufacturing labor is Br 8, and manufacturing overhead is Br 6 for each uniform. The following inventory levels apply to 2005:

	Beginning inventory	**Ending inventory**
Direct materials	24,000 units	18,000 units
Work-in-process inventory	0 units	0 units
Finished goods inventory	12,000 units	10,000 units

How many uniforms need to be produced in 2005?

A. 52,000 uniforms
B. 68,000 uniforms
C. 60,000 uniforms
D. 58,000 uniforms

6. Responsibility accounting:

A. is a system that measures the plans, budgets, actions, and actual results of a responsibility center
B. is an arrangement of lines of responsibility within the organization
C. explicitly incorporates continuous improvement anticipated during the budget period
D. examines how a result will change if the original plan is not achieved

7. Responsibility centers include all of the following EXCEPT:

A. cost
B. revenue
C. customers
D. investment

8. The regional sales office manager of a national firm is most likely responsible for a(n):

A. revenue center
B. investment center
C. cost center
D. profit center

9. To prepare the cash budget, all of the following budgets are required EXCEPT:

A. capital expenditures budget
B. cost of goods sold budget
C. budgeted balance sheet
D. revenue budget

10. Wilcox Company has budgeted sales volume of 60,000 units and budgeted production of 54,000 units, while 10,000 units are in beginning finished goods inventory. How many units are targeted for ending finished goods inventory?

    A. 10,000 units
    B. 16,000 units
    C. 6,000 units
    D. 4,000 units

Part III: Workout

Workout the following question clearly

Preparation of Master Budget (Merchandising Company)

Awash Company's newly hired accountant has persuaded management to prepare a master budget to aid financial and operating decisions. The planning horizon is only four months, April through July. The following is the closing balance sheet for the fiscal year ending March 31, 2004.

Awash Company Balance Sheet March 31 2004			
Assets:			
Current Assets			
Cash	10,000		
Accounts Receivable	16,000		
Merchandise Inventory	48,000		
Un Expired Insurance	1,800		
Total current assets		**75,800**	
Plant assets			
Equipment and Fixtures	37,500		
Accumulated Depreciation	(12,800)		
Total Plant Assets		**24,200**	
Total Assets			**100,000**
Liabilities and Owner's Equity			
Current Liabilities			
Accounts Payable	16,800		
Accrued Wages and Commissions	4,250		
Total Liabilities		**21,050**	
Owner's Equity		**78,950**	
Total Liabilities and Owner's Equity			**100,000**

Sales in March were 40,000 and monthly sales were forecasted as follows:

- April----------Br 50,000
- May----------80,000
- June----------60,000
- July----------50,000
- August----------40,000

Management expects future sales collection to follow past experience: 60% of sales should be in cash and 40% of sales on credit. All credit accounts are collected in the month following the month of sales. The 16,000 of accounts receivable on March 31 represents credit sales made in March (40% of Br 40,000). Uncollectible and tax are negligible. Because deliveries from suppliers and customers demands are uncertain, at the end of each month, the company wants to have on hand a basic inventory of items valued at Br 20,000 plus 80% of the expected cost of goods sold for the following month. The cost of merchandise sold averages 70% of sales. Therefore the inventory on March 31 is Br 20,000+0.7(0.8*Br 50,000 April sales =20,000+28,000= Br 48,000). The purchase terms available to the company are net 30 days. The company pays for each month's purchase as follows: 50% during that month and 50% during the next month. Therefore the accounts payable balance on March 31 is 50% of March's purchase or Br 33,600*0.5= Br 16,800. The company pays wages and commission semi monthly, half a month after they are earned. They are divided in to two parts; monthly fixed wages of Br 2,500 and commissions equal to 15% of sales which are assumed constant throughout each month. Therefore, the March 31 balance of accrued wages and commissions is (0.5*2,500+0.5(0.15*40,000) =1,250+3,000= Br 4,250. In addition to buying new fixtures for Br 3,000 cash in April; the company's other monthly expenses are as follows;

- Miscellaneous expenses----------5%of sales paid as incurred
- Rent----------2,000 paid as incurred
- Insurance----------200 expiration per month
- Depreciation expense----------500 expiration per month

The company wants a minimum of Br 10,000 as cash balance at the end of each month. To keep this simple, we will assume that the company can borrow or repay loans in a multiple of Br 1,000. Management plans to borrow no more cash than necessary and to repay as promptly as possible. Assume that the borrowing occurs at the beginning and repayment at the end of the month in question. Interest is paid under the terms of this credit arrangement when the related loan is repaid and interest is 18% per annum.

Required

Prepare the Master Budget for the company that contains

A. Sales Budget
B. Cash Collection Budget
C. Purchases Budget and Disbursement Budget
D. Operating Expense Budget
E. Disbursement for Operating Expenses

F. Budgeted Income Statement
G. Cash Budget
H. Budgeted Balance Sheet

- Dear learner, now you have completed the chapter successfully. Please go to the next chapter and do what you have done in this chapter.

CHAPTER FOUR

FLEXIBLE BUDGETS, FIXED BUDGETS, STANDARD COSTING AND VARIANCE ANALYSIS

Introduction

Dear learner, welcome to the fourth chapter of the module! In your previous discussion, it was assumed that master budget is prepared for fixed levels of activity, and therefore prepared for only one level of activity. Evaluating performance using master budget creates the problem of using a budget for one level of activity to evaluate the actual results for another level of activity. In order to overcome this type of problem, you need to prepare flexible budget for actual level of activity.

Flexible budgets are used to evaluate feedback on variances, aiding managers in their control function. Feedback enables managers to compare actual results—what has happened with planned performance—with what should have happened according to plans. Flexible budgets help managers gain insights into why the actual results differ from the planned performance.

Flexible budget is an important tool in evaluating performance in terms of efficiency. When cost driver activities are not the same as expected; the unit selling price, variable costs, and periodic fixed costs are not as expected, actual results of operations might differ from the expected results. Distinguishing between effectiveness and efficiency is a necessary condition for evaluating performance.

In this chapter you will learn flexible budgets, preparation of performance evaluation relationship between master budgets and flexible budgets, computation of flexible budget variance and sales activity variance, and computation and interpretation of variances. The chapter also discusses a traditional standard cost system that provides price and quantity standards for each cost component: direct material (DM), direct labor (DL), and factory overhead (OH). Discussion is provided on how standards are developed, how variances are calculated, and what information can be gained from detailed variance analysis. In addition the computation of sales variance will also be discussed.

4.1 Flexible Budgets and Master Budgets

This chapter illustrates both static budgets and flexible budgets. A **static budget** is a budget that is based on one level of output; it is not adjusted or altered after it is set, regardless of ensuing changes in actual output (or actual revenue and cost drivers). A **flexible budget** is adjusted in accordance with ensuing changes in actual output (or actual revenue and cost drivers). A flexible budget is calculated at the end of the period when the actual output is known. A static budget is developed at the start of the budget period based on the planned output level for the period.

Static Budget is really just another name for master budget. All the master budgets discussed in the previous chapter are static or inflexible, because even though they may be easily revised, they assume fixed level of activity. In other words, a master budget is prepared for only one level of a given type of activity.

After master budget is prepared, the actual results are compared with budgeted amounts to get variances, which are deviation of an actual amount from the expected budget, or amount. This variance is called the master (static) budget variance. The performance report compares actual results with budgeted amount. Performance report is a generic term that is comparison of actual results with budgeted amounts. A helpful performance report will include variances that direct management's attention to significant deviation from expected results allowing management by exception.

- ***Flexible budget*:** Is a budget that is prepared at various levels of activity and adjusted in accordance with ensuing changes in actual output (or actual revenue and cost drivers). A flexible budget is calculated at the end of the period when the actual output is known.

As we shall see, a flexible budget enables managers to calculate a richer set of variances than does a static budget. A **favorable variance** – denoted F is a variance that increases operating income relative to the budgeted amount. An **un favorable variance** – denoted U – is a variance that decreases operating income relative to the budgeted amount. Budgets, both static and flexible, can differ in their level of detail. Many organizations

present budgets with broad summary figures that can be broken down into more detailed figures via computer software programs.

A more helpful benchmark analysis is the flexible budget. A flexible budget (sometimes called variable budget) is a budget that adjusts for changes in sales volume and other cost driver activities. The flexible budget is identical to the master budget in format, but management may prepare it for any level of activity. Assume that Tina Company prepared a master budget for only 9000 units, but actual results turns out to be 7000 units. And when sales turn out to be 7000 instead of 9000 units, managers can use the flexible budget to prepare a new budget based on this new cost – driver level. For performance evaluation the flexible budget would be prepared at the actual levels of activity achieved. In contrast, the master budget is kept fixed or static to serve as the primary benchmark for evaluating performance. It shows revenues and costs at only the originally planned levels of activity.

- ***Favorable variance:*** Is a variance that increases operating income relative to the budgeted amount and ***Un-favorable variance*****:** Is a variance that decreases operating income relative to the budgeted amount

The following table shows performance report for Tina Company for the month Ended June 30, 2004

	Actual	**Master Budget**	**Master Budget Variance**
Units	7,000	9,000	2,000U
Sales	217,000	279,000	62,000U
Variable Costs and Expenses			
Manufacturing Expenses	151,270	189,000	37,730F
Selling Expenses	5,000	5,400	400F
Administrative Expenses	2,000	1,800	200U
Total Variable Expenses	**158,270**	**196,200**	**37,930F**
Contribution Margin	**58,730**	**82,800**	**24,070U**
Fixed Expenses			
Manufacturing Expenses	37,300	37,000	300U
Selling and Administrative Expenses	33,000	33,000	-
Total Fixed Expenses	**70,300**	**70,000**	**300U**
Operating Income (Loss)	**11,500**	**12,800**	**24,370U**

The flexible budget approach says, "give me any activity level you choose, and I will provide a budget tailored to that particular level". The following table shows the flexible budget for the same company.

	Flexible Budget Formula	**Flexible Budgets for Various level of Activity**		
Units		7,000	8,000	9,000
Sales	Br 31	Br 217,000	Br 248,000	Br 279,000
Variable Costs and Expenses				
Manufacturing Expenses	Br 21	Br 147,000	Br 168,000	Br 189,000
Selling Expenses	0.6	4,200	4,800	5,400
Administrative Expenses	0.2	1,400	1,600	1,800
Total Variable Expenses	**Br 21.8**	**Br 152,600**	**Br 174,,400**	**Br 196,200**
Contribution Margin	**Br 9.2**	**Br 64,400**	**73,600**	**Br 82,800**
Fixed Expenses				
Manufacturing Expenses	Br 37,000	Br 37,000	Br 37,000	Br 37,000
Selling and Administrative Expenses	33,000	33,000	33,000	33,000
Total Fixed Expenses	**Br 70,000**	**Br 70,000**	**Br 70,000**	**Br 70,000**
Operating Income (Loss)		**Br (5,600)**	**Br 3,600**	**Br 12,800**

The flexible budget is based on the same assumptions of revenue and cost behavior (within the relevant range), as is the master budget. The flexible budget incorporates effects on each cost and revenue caused by changes in activity. The flexible budget formula in the above illustration is believed to be valid within the relevant range of 7000 to 9000 units.



Activity 1: Understanding the difference between master budget and flexible budget

Describe the difference between master budget and flexible budget

4.2 Evaluation of Financial Performance using Flexible Budgets

Comparing the flexible budget to actual results accomplish an important performance evaluation purpose. There are basically two reasons why actual results might differ from the master budget. One is that sales and other cost driver activities were not the same as originally forecasted. The seconds is that revenues or variable costs per unit of activity and fixed cost per period were not as expected. Though these reasons may not be completely independent, it is useful to separate these effects because different people may be responsible for each and because different

management action may be indicated. Because the flexible budget is prepared at the actual levels of activity, any variances between the flexible budgets and actual results cannot be due to activity levels. These variances between the flexible budget and actual results are called flexible budget variances and must be due to departures of actual costs or revenues from flexible budget formula amounts. In contrast, if there are any differences or variance between the master budget and the flexible budget the differences are due to activity levels, not cost control. These differences are called activity level variances. In other words, the original difference we saw between actual results and original master budget, which we earlier could not explain actually has two components:

- Sales activity variance and
- Flexible budget variance.

The following table summarizes these variances for Tina Company:

	Actual Results at Actual Quantity	Flexible Budget Variance	Flexible Budget for Actual Sales	Sales Activity variance	Master budget
Units	7,000		7,000	2,000U	9,000
Sales	217,000		217,000	62,000U	279,000
Variable costs	158,270	5,670U	152,600	43,600F	196,200
Contribution Margin	58,730	5,670U	64,400	18,400U	82,800
Fixed costs	70,300	300U	70,000	-	70,000
Operating Income(Loss)	(11,570)	5,970	(5,600)	18,400U	12,800

Activity 2: Understanding elements of master budget variance

What are the two elements of master budget variance?

4.3 Isolating the Causes of Variances

Mangers use comparisons between actual results, master budget and flexible budgets to evaluate organizational performance. When evaluating performance, it is useful to distinguish between effectiveness - the degree to which a goal, objective, or target is met and efficiency - the degree to which inputs are used in relation to a given level of output. Performance may be effective, efficient, both or neither.

Flexible Budget Variance

Flexible budget variances measure the efficiency of operations at the actual level of activity. The flexible budget variance in our previous illustration is Br 11,570 – Br 5,600 =Br 5,970 or Br 5,970 unfavorable. It arises from

sales prices received and the variable and fixed costs incurred. Tina Company had not differences between actual sales and the flexible budget sales prices so we must focus on the difference between actual costs and flexible budget costs at the actual 7000-unit level of activity. The flexible budget variances indicates whether operations were efficient or not and may form the basis for periodic performance evaluation.

In the following analysis note most of the costs that had seemingly favorable variances when a master budget was used have in reality unfavorable variance. Do not automatically conclude that favorable flexible budget variances are good and unfavorable flexible budget variances are bad. Instead interpret all variances as signals that actual operations, have not occurred exactly as anticipated when the flexible budget formulas were set.

Sales Activity Variances

Sales activity variances measure how effective managers have been in meeting the planned sales objectives. The previous illustration clearly shows sales activity fell 2000 units short of the planned level. Sales activity variances Br 18,400U are unaffected by any changes in unit prices or variable costs. This is because the same budgeted unit prices and variable costs are used in constructing both the flexible budget and master budgets. The total sales activity variances inform the manager that failing short of the sales target by 2000 units caused operating income to be Br 18400U (a Br 5,600 loss instead of Br 12,800 profit). In summary the shortfall of sales by 2000 units caused the company to incur a total sales activity variance of 2000 units at a contribution margin per unit of Br 9.2.

Sales activity variance = (actual sales unit - master budget sales units) X budgeted contribution margin per unit.

= (9000-7000) X Br 9.20 = Br 18,400U

The marketing managers usually have the primary responsibility for reaching the sales level specified in the static budget.

Activity 3: Evaluation of Financial Performance using Flexible Budgets

What do flexible budget variance and sales activity variance measure?

Dear learner, detailed variance analysis of master and flexible budgets variances will be discussed in detail in subsequent sections while you discus standard costing and variance analysis.

4.4 Development of a Standard Cost system

Although standard cost systems were initiated by manufacturing companies, these systems can also be used by service and not-for-profit

organizations. In a standard cost system, both standard and actual costs are recorded in the accounting records. This dual recording provides an essential element of cost control: having norms against which actual operations can be compared. Standard cost systems make use of **standard costs**, which are the budgeted costs to manufacture a single unit of product or perform a single service. Developing a standard cost involves judgment and practicality in identifying the material and labor types, quantities, and prices as well as understanding the kinds and behaviors of organizational overhead. A primary objective in manufacturing a product is to minimize unit cost while achieving certain quality specifications. Almost all products can be manufactured with a variety of inputs that would generate the same basic output and output quality. The input choices that are made affect the standards that are set.

- ***Standard cost***: A per unit cost set carefully that should be attained under most efficient operating condition

Once management has established the desired output quality and determined the input resources needed to achieve that quality at a reasonable cost, quantity and price standards can be developed. Experts from cost accounting, industrial engineering, personnel, data processing, purchasing, and management are assembled to develop standards. To ensure credibility of the standards and to motivate people to operate as close to the standards as possible, involvement of managers and workers whose performance will be compared to the standards is vital.

Activity 4: Understanding standard costing system

What is standard cost?

4.5 Types of Standards

Standards can be classified by their degree of rigor and, thus, their motivational value from easy to difficult, which parallels the lax, expected, practical, and ideal levels of capacity.

Ideal standard represents perfect operating conditions and therefore can be hard to achieve. It assumes no material wastage, the worker always measures perfectly, and the machines never get out of adjustment. Ideal standards have no slack – that is, no allowance for waste, breaks, or stress reduction. The use of ideal standards creates unfavorable variances, which can have a negative impact on employee morale. Even when attained, ideal standards can cause a high level of tension in the organization. It is for this reason that many researchers argue that some slack in standards is functional. An ideal standard is sometimes called theoretical standard.

A practical standard deliberately builds slack into the standard. It represents estimated cost under tight, but achievable conditions. Practical standards make allowances for normal breakdowns in machinery and for

rest periods for workers. Ideal standards, however, assume that operations are 100% efficient throughout the entire production process. Practical standards are considered to be more realistic than ideal standards. Practical standards can be reached with reasonable effort under existing operating conditions. It may be useful for firms to use both ideal and practical standards for cost management. The former focuses and challenges the organization to continually move the actual results closer to the ideal. The latter ensures that standards do not create unnecessary tension or lower employee morale. Practical standard is sometimes called attainable standard.

Expected Standard: are standards that reflect what is actually expected to occur in a future period

Lax standard: refers to standard that can be achieved with little effort.

☞ Businesses use different types of standards. In this chapter you have to be clear with; Ideal standard, Practical standards, Expected Standards and Lax standards.



Activity 5: Understanding types of standards

What is an ideal standard?

4.6 Standard Costing Steps

There are five major steps in standard costing. Careful application of these steps helps maximize the value of the SCS as a cost management tool and supports its supplemental objectives of inventory valuation and simplifying bookkeeping. The five steps are:

Step 1: Develop standards
Step 2: Accumulate actual information
Step 3: Compute variances
Step 4: Investigate variances
Step 5: Take corrective action

Step 1: Develop Standards

A standard cost represents the predetermined amount of resources necessary to produce a unit of output of a product or service. Therefore, standard costing begins with a good understanding of the input-output relationships in a process. To set standards, we must also decide how difficult they must be, what data to use as a basis for setting standards and who participates in setting standards.

a. Understanding Input-Output Relationships

An analysis of the work activities in the production process is the first step in setting standards. Knowledge of the production process can be translated into the quantity of material, labor, and other resources required for producing a product. When this information is combined with knowledge of market prices, accountants can set standard product costs for the materials, labor and other short-term consumable resources.

b. Data Used for Setting Standards

Setting standards requires data. This data may come from engineering studies, external benchmarks, or past historical experience. **Engineering studies** done by production engineers may help to determine the input-output relationships in a process. This data may be used to define ideal and attainable standards. **External benchmarking** of firms in the same industry or firms in a different industry but with a similar process can also provide data for standards. Such external comparisons have the added advantage of keeping a firm aware of what their competition is doing and help the firm stay competitive. **Past historical data** can be used for standard setting. There are two dangers in using past data. We can institutionalize past inefficiency in the standards, and the past may not be a good guide to the future because of design changes in the product and/or the process.

c. Who Participates In Setting Standards

Standards may be imposed from the top-management or they may be set through a participative process of consultation with employees who are affected by the standard.

An imposed standard, which is set with little or no input from those responsible for meeting the standard, is used when it is desirable to ensure that all actions lead to a uniform strategic target. However, imposed standards do not create a sense of ownership of the part of employees. Motivating employees to achieve these standards, therefore, may be more difficult.

Participative standards use inputs from employee either affected by a standard or who have the best understanding of the process. Participation does not mean those responsible for meeting the standard get to set the standard. It does mean that employees have input in the standard setting process. Normally standards are developed by a group composed of representatives from the following areas: management accounting, product design, industrial engineering, personnel, data processing, purchasing, and production management

Key Point: To set standards we must understand the input-output relationships in a process decide how much slack to allow in standards, select the data to use as a basis for setting standards and determine who should participate in setting standards.

d. Development of Standards

Standards are conventionally established for each component (materials, labor, and overhead) of product cost. A standard cost is an estimated cost to manufacture a single unit of product or perform a single service. The development of a standard cost involves judgment and practicality in identifying the types of material and labor to be used and their related quantities and prices. The development of standards for overhead requires that costs are appropriately classified by cost behavior, valid allocation bases have been chosen, and a reasonable level of activity has been specified.

i. Material standards

The first step in developing material standards is to identify and list the specific direct materials used to manufacture the product. This list is often available on the product specification documents prepared by the engineering department prior to initial production. In the absence of such documentation, material specifications can be determined by observing the production area, querying of production personnel, inspecting material requisitions, and reviewing the cost accounts related to the product. Three things must be known about the material inputs:

- types of inputs,
- quantity of inputs used,
- quality of inputs used.

In making quality decisions, managers should seek the advice of materials experts, engineers, cost accountants, marketing personnel, and suppliers. In most cases, as the material grade rises, so does cost; decisions about material inputs usually attempt to balance the relationships of cost, quality, and projected selling prices with company objectives. The resulting trade-offs affect material mix, material yield, finished product quality and quantity, overall product cost, and product salability. Thus, quantity and cost estimates become direct functions of quality decisions. Given the quality selected for each component, physical quantity estimates of weight, size, volume, or some other measure can be made. These estimates can be based on results of engineering tests, opinions of managers and workers using the material, past material requisitions, and review of the cost accounts. Specifications for materials, including quality and quantity, are compiled on a bill of materials. Even companies without formal standard cost systems develop bills of materials for products simply as guides for production activity. When converting quantities on the bill of materials into costs, allowances are often made for normal waste of components. After the standard quantities are developed, prices for each component must be determined. Prices should reflect desired quality, quantity discounts allowed, and freight and receiving costs. Although not always able to control prices, purchasing agents can influence prices. These individuals are aware of alternative suppliers and attempt to choose suppliers providing the most appropriate material in the most reasonable time at the

most reasonable cost. The purchasing agent also is most likely to have expertise about the company's purchasing habits. Incorporating this information in price standards should allow a more thorough analysis by the purchasing agent at a later time as to the causes of any significant differences between actual and standard prices. When all quantity and price information is available, component quantities are multiplied by unit prices to obtain the total cost of each component.

ii. Labor Standards

Development of labor standards requires the same basic procedures as those used for material. Each production operation performed by either workers (such as bending, reaching, lifting, moving material, and packing) or machinery (such as drilling, cooking, and attaching parts) should be identified. In specifying operations and movements, activities such as cleanup, setup, and rework are considered. All unnecessary movements by workers and of material should be disregarded when time standards are set.

To develop usable standards, quantitative information for each production operation must be obtained. Time and motion studies may be performed by the company; alternatively, times developed from industrial engineering studies for various movements can be used. A third way to set a time standard is to use the average time needed to manufacture a product during the past year. Such information can be calculated from employees' past time sheets. A problem with this method is that historical data may include inefficiencies. To compensate, management and supervisory personnel normally make subjective adjustments to the available data. After all labor tasks are analyzed, an operations flow document can be prepared that lists all operations necessary to make one unit of product (or perform a specific service). When products are manufactured individually, the operations flow document shows the time necessary to produce one unit. In a flow process that produces goods in batches, individual times cannot be specified accurately. Labor rate standards should reflect the employee wages and the related employer costs for fringe benefits, taxes and other deductions.

In the simplest situation, all departmental personnel would be paid the same wage rate as, for example, when wages are job specific or tied to a labor contract.

iii. verhead Standards

Overhead standards are simply the predetermined factory overhead application rates discussed in part-I of the course. To provide the most appropriate costing information, overhead should be assigned to separate cost pools based on the cost drivers, and allocations to products should be made using different activity drivers.

After the bill of materials, operations flow document, and predetermined overhead rates per activity measure have been developed, a standard cost card is prepared.

Considerations in Establishing Standards

Appropriateness and attainability need to be considered when standards are established.

- **Appropriateness**, in relation to a standard, refers to ***the basis*** on which the standards are developed and ***how long*** they are expected to last. Standards are developed from past and current information, and they should reflect technical and environmental factors expected for the period in which the standards are to be applied. Factors such as materials quality, normal ordering quantities, employee wage rates, degree of plant automation, facility layout, and mix of employee skills should be considered. Standards must evolve over the organization's life to reflect its changing methods and processes.
- **Attainability** refers to management's belief about the degree of difficulty or rigor that should be incurred in achieving the standard. Standards can be classified by their degree of rigor and, thus, their motivational value from easy to difficult, which parallels the lax, expected, practical, and ideal levels of capacity. Lax standard refers to standard that can be achieved with little effort. Expected standards are standards that reflect what is actually expected to occur in a future period. Practical standards are a standard that allows for normal, unavoidable time problems or delays, such as machine downtime and worker breaks; can be reached or slightly exceeded approximately sixty to seventy percent of the time with reasonable effort by workers. Ideal standard is a standard that allows for no inefficiency of any type and, therefore, is sometimes also called perfection or an ideal standard.



Activity 6: Consideration in standard setting

What factors should be considered in standard setting?

Step 2: Accumulate Actual Information

Standard cost systems compare actual and standard costs to make sure costs are under control. This means that actual cost information must be collected and reported using the same categories as those used for setting standards. Managers use standards to manage costs by taking corrective actions when the process is out of control. For standard costing to be an effective cost management tool, the data on actual cost performance must be captured and reported in a timely fashion.

The frequency of reporting depends upon how fast corrective action should and can be taken. If reporting is too late and the time for corrective action is over, standard cost and variance reports are not useful for cost

management. Critical information that operating personnel need to actively manage operations is often captured and reporting using other tools. This allows problems to be identified and solved before the standard cost variances are even reported. For example, observation, a control chart, or an hourly quality report may show that more products than normal are flawed. This information leads to immediate corrective action.

Key Point: Actual information for computing and analyzing variances must be collected and reported in the same categories as the standards and the information should be reported in a timely manner for corrective action to be taken quickly. When this is not possible, we must supplement standard costing with other real time tools such as hourly display boards or control charts

Step 3: Compute Variances

Total variance is the difference between total actual costs incurred and total standard cost applied to the output produced during the period. This variance can be computed as follows:

Actual Cost of Actual- Standard Cost of Actual
Production Input Production Output

Total Variance Total variances do not provide useful information for determining why differences cost occurred. To help managers in their control objectives, total variances are subdivided into price and usage components. Since the cost of any item is the sum of the unit price multiplied by the total quantity purchased, mathematically a variance is the result of a deviation in the price paid, the quantity purchased, or both. In a typical organization, the responsibility for purchasing inputs and using those inputs is usually separate. For example, the procurement department negotiates and orders materials while the plant supervisors usually control usage of that material. In a responsibility accounting system, therefore, variances are used to assign responsibility to appropriate people who have control over that element of the cost and to draw their attention to the need for corrective action. Based on this mathematical and organizational logic, most standard cost systems compute and report three major variances. They are material variance, labor variance, and overhead variances.

A price variance reflects the difference between what was paid for inputs and what should have been paid for inputs. A usage variance shows the cost difference between the quantity of actual input and the quantity of standard input allowed for the actual output of the period. The quantity difference is multiplied by a standard price to provide a monetary measure that can be recorded in the accounting records. Usage variances focus on the efficiency of results or the relationship of input to output.

A. **Material Variances**

The standard material cost for any product consists of a standard price of materials times the standard quantity for those materials. Total actual costs may differ from standard because of either a difference in the price paid for those materials and/or the amount of materials used. Hence, we can isolate two variances for materials: materials price variance and materials usage variance. There are two good reasons for breaking the materials variance into these two components: (1) different individuals or departments may be responsible for each component (purchasing manager for price and production manager for quantity), and (2) materials may be purchased in one period and used in another. It would probably be of little use for management to learn that an unfavorable price variance exists some time after the purchase was made.

The materials price variance: It measures how much is paid for material consumed and how much should have been paid. If actual price is higher than standard, an unfavorable variance exists. If the reverse were true, a favorable variance would exist. MPV is computed using the following formula:

MPV = (AP-SP) X AQ, where AP= Actual Price per Unit

SP= Standard Price per Unit

AQ= Actual Material Consumption

The materials quantity (or usage) variance: It measures how much material is consumed and how much should have been consumed. An unfavorable variance results when the actual quantity used exceeds the standard quantity allowed. A favorable variance results when the reverse is true.

MQV is computed as follows:

MQV = (AQ - SQ) X SP, where AQ= Actual Total Material Used

SQ= Standard Total Material Used

SP= Standard Price per Unit

Total Material Variance= MPV+ MQV

Activity 7: Understanding material variances

What is the difference between material price and efficiency variance?

Example

To illustrate variances, assume the following data for item D-4 that Guta Manufacturing Company uses to manufacture 11,000 budgeted quantities.

Units produced (finished products) 10,000 units
Direct materials quantity standard 4 units of direct materials per unit

Direct materials used in production 41,000 units of material
Direct materials purchased 50,000 units
Direct materials standard cost Br. 2.00 each
Actual direct materials cost Br. 2.10 each.

Required: Compute

A. Direct materials quantity variances.
B. Direct materials price variances
C. Direct materials flexible budget variance.

Identify each variance as favorable (F) and unfavorable (U).

Solutions:

A. Direct materials quantity variance

Standard materials allowed (SQ) = Actual x Materials allowed
Out put per unit.
= 10,000 x 4 = 40,000 units

MQV = (AQ – SQ) x SP= (41,000 – 40,000) x 2.00= Br .2, 000U

Un-favorable (U) variance indicates that direct materials quantity used was greater than the standard quantity allowed.

B. Direct materials price variance

MPV = (AP – SP) x AQ= (2.10 – 2.00) x 50,000= Br. 5,000 U

An unfavorable (U) direct materials price variance resulted because the actual unit cost was greater than the standard unit cost.

D. Direct materials flexible budget variance (MFBV)

MFBV = MQV + MPV= Br. 2,000 U + Br. 5,000 U= Br. 7,000 U

- Dear leaner, do not forget to be clear with the following before you proceed to the next

☞ **Materials price variance** measures how much is paid for material consumed and how much should have been paid. M**aterials quantity (or usage) variance** measures how much material is consumed and how much should have been consumed.

B. Labor Variance

The standard labor cost of a product consists of the standard hours allowed to produce the product times the standard rate. It follows that total labor costs may differ from standard for two reasons: a deviation from standard pay rates and/or from standard hours. We can therefore isolate two variances for labor: the labor rate variance and the labor efficiency variance. The labor rate variance indicates what portion of the total difference between actual and standard labor cost is due to a variation in pay rates. The labor efficiency variance shows what portion of the total difference between actual and standard labor cost is due to a deviation in the number of hours worked. It is similar to the usage variance computed for materials.

The labor rate variance: It measures how much is paid and how much should have been paid. If the actual rate is higher than the standard rate, an unfavorable variance exists. If the actual rate is less than the standard rate, a favorable variance exists. LRV is computed as follows:

LRV = (AR - SR) X AH, where AR= Actual Labor Rate per Hour
SR= Standard Labor Rate per Hour
AH= Actual Total Labor Hour Worked

The labor efficiency variance: It measures how much time is used and how much should have been used. If more hours are used to produce a given number of products than are allowed under standard, an unfavorable variance exists. If actual hours are less than standard, a favorable variance exists. LEV is computed as follows:

LEV = (AH - SH) x SR, where SR= Standard Labor Rate per Hour
SH= Standard Total Labor Hour Allowed
AH= Actual Total Labor Hour Worked



Activity 8: Understanding labor variances

What is the difference between labor rate or price and efficiency variance?

Example

Bona Company, a producer of computer accessories for local traders, began production on this month. The company uses standard costs for all of its products. The standard costs and actual costs for the month are given below for one of the company's product lines.

	Standards		
	Standard inputs expected per unit of output	Standard price expected per unit of input	Standard cost expected per unit of output
Direct material	5 pounds	Br. 2	Br. 10
Direct labor	½ hour	16	8

During the month, the company produced 7,000 units of product. However, 9,000 units were scheduled for production. The following activity was recorded relative to the product line during this period:

Direct material: 36,800 pounds of material were purchased and used at an actual unit price of Br. 1.90.

Direct labor: 3,750 hours of labor were used at an actual hourly rate (price) of Br. 16.40.
There was no inventory of materials on hand to start the period.

Required:

A. Compute the direct material price variance for the month.
B. Compute the direct material quantity variance for the month.
C. Compute the direct labor rate variance for the month.
D. Compute the direct labor usage variance for the month

Solutions:

A. Direct material price variances
   MPV = (AP – SP) x AQ= (1.90 – 2) x 36,800= Br 3,680 F
B. Direct material quantity variances
   Standard material allowed (SQ) = Actual Output x Materials allowed per unit of output.
   = 7,000 x 5= 35,000 pounds
   MQV = (AQ – SQ) x SP = (36,800 – 35,000) x 2 = Br. 3,600 U
C. Labor rate variances
   LRV = (AR – SR) x AH= (16.40 – 16) x 3,750= Br. 1500 U
D. Labor efficiency variances
   Standard hours allowed (SH) = Actual Output x hours allowed per unit of output
   = 7,000 x ½ = 3500 hours
   LEV = (AH – SH) x SR= (3,750 – 3,500) x 16= Br. 4,000 U

☞ **Labor rate variance** measures how much is paid and how much should have been paid and **labor efficiency variance** measures how much time is used and how much should have been used.

C. Factory Overhead variances

In a standard cost system, overhead is assigned to production via a predetermined overhead rate just as is done in an actual cost system. This predetermined rate is often based on a flexible overhead budget. The flexible overhead budget shows the amount of overhead that is expected to be incurred at various levels of activity. Overhead will differ (and therefore overhead rates will differ) at various levels due to the variable nature of some overhead costs and the fixed nature of others. Total fixed overhead is the same at various levels of output, which will result in a different rate per unit for the different levels of output. On the other hand, total variable overhead varies according to the activity level chosen since it is a constant amount per unit.

Once an expected volume has been chosen (the standard volume of output), the predetermined overhead rate can be set on estimated overhead for that level. The standard volume of output may be expressed as percent of capacity, number of units or direct labor hours. Overhead is then applied to production based on this predetermined rate. The amount of over- and under-applied overhead resulting from using this rate can be investigated using the two-variance approach, which results in the computation of the

overhead budget variance and the overhead volume variance. The overhead budget variance shows the efficiency of operations and may be considered a combination of the price and usage variance for total overhead. The overhead volume variance results from two factors: (1) the fixed nature of some overhead costs, and (2) operating at a level of output different from that expected. In effect, this variance shows whether the level chosen was appropriate.

Budgeted variable and fixed overhead rates are developed following the following steps:

Developing variable overhead rate

1. Identify the costs to include in the variable overhead cost pool and fixed overhead cost pool
2. Select the cost allocation base for variable FOH and fixed FOH. The cost allocation base may be output, direct labor hour, machine hour, etc.

3. Estimate the budgeted quantity of the selected allocation base(s)

4. Compute the budgeted variable FOH and fixed FOH rate, which are computed by dividing the budgeted overhead cost by estimated allocation base

The **overhead variance** is computed as the difference between total actual overhead costs and budgeted total overhead for the actual output attained. If the budgeted overhead costs exceed the actual overhead, a favorable variance exists. Conversely, if actual overhead costs exceed budgeted overhead, an unfavorable variance exists. At the end of the period, actual overhead costs are compared against amounts shown in the flexible budget. The difference, or variance, is subdivided into two components for variable overhead and two for fixed overhead.

Remember: For the sake of simplicity in the variance formula “budgeted overhead rate” refers to ‘budgeted overhead rate per unit of selected cost allocation base” and “Actual overhead rate” refers to ‘Actual overhead rate per unit of selected cost allocation base”.

Variable Overhead Variance (VFOH)

Variable-overhead variances are conceptually similar to variances for direct material and direct labor. The variances may be divided into spending and efficiency variance.

1. The VFOH spending variance

It is the result of comparing the amount that was spent on variable overhead items at the actual level of activity with the amount that should have been spent at that level. The variance may be expressed algebraically

as follows:

VFOH spending variance=Actual VOH– Budgeted VOH

The spending variance can arise from paying higher/lower prices than expected and consuming larger/smaller quantities than expected (e.g., energy, supplies), so it is not a “pure” price/rate variance.

The VFOH efficiency variance

It is not a direct measure of how efficiently the quantity of overhead was used but instead is a measure of efficiency with the application base (e.g., machine hours, process hours, and so on). The variance may be expressed algebraically as follows:

VFOH Efficiency variance= Budgeted VOH – Applied VOH

Fixed Overhead Variances (FFOH)

Fixed overhead variances are divided into spending and volume variances.

1. FFOH spending variance, also called budget variance

It is the result of comparing total actual fixed-overhead expenditures with lump-sum, budgeted fixed overhead costs. It is calculated as follows:

FFOH Spending variance = Actual fixed overhead - Budgeted fixed overhead

If the budgeted FFOH costs exceed the actual overhead, a favorable variance exists. Conversely, if actual overhead costs exceed budgeted overhead, an unfavorable variance exists. Although it is often difficult to change certain fixed cost expenditures (such as property taxes) in the short run, unfavorable fixed overhead items should be carefully monitored and the information used when making future budgets.

2. Production-Volume variance

The volume variance occurs whenever the actual production differs from the budgeted level used to calculate the budgeted FFOH rate. The production –volume variance is the difference between budgeted FFOH and the FFOH allocated. The FFOH is allocated based on the budgeted FFOH rate times the budgeted quantity of the FFOH allocation base for the actual output units achieved. Production-volume variance sometimes termed as output-level overhead variance and denominator-level variance. It is calculated as follows:

Production-volume variance = Budgeted FFOH - Applied FFOH

Applied FFOH= Standard quantity of FFOH allocation base for Actual Output X Budgeted FFOH Rate

If the applied overhead exceeds the budgeted overhead, a favorable variance exists because a level of production higher than expected was achieved. Conversely, if budgeted overhead exceeds applied overhead, an unfavorable variance exists. The overhead volume variance can also be calculated by subtracting the budgeted hours from the standard hours allowed for actual production and multiplying this figure by the fixed overhead rate.

A common interpretation of a positive volume variance is that a company has underutilized its facility. However, this interpretation is faulty when a reduction in activity levels is in response to an unexpected decrease in demand. In such a situation, the volume variance is a demand prediction error and not the fault of the production manager.

Note

Total FOH Spending Variance = VFOH Spending Variance + FFOH Spending Variance

Total FOH Flexible-Budget Variance = Total FOH Spending Variance + Production-volume Variance

Activity 9: Understanding overhead variances

What are the two elements of fixed overhead variance?

Example

Alem Corporation applies overhead to production using a rate of Br 75 per machine hour (Br 35 variable and Br 40 fixed). The corporation produced 15,000 units and incurred overhead of Br 3,710,000 (of which Br 1,495,000 was variable overhead) while using 43,500 machine hours. The overhead standards assumed each product would use 3 machine hours. The practical capacity of 18,000 units was used as the denominator activity.

Required: Compute

A. Variable Over Head Spending variance
B. Variable Over Head Efficiency variance
C. Fixed Over Head Spending variance
D. Fixed Over Head production Volume variance

Solutions:

A. Variable Over Head Spending variance
=ACTUAL VOH – BUDGETED VOH

Br 1,495,000 – (43,500 × Br 35) = Br 1,495,000 – Br 1,522,500 = Br 27,500 Favorable

B. Variable Over Head Efficiency variance

=Budgeted VOH – Applied VOH
= (43,500 × Br 35) – (15,000 × 3 × Br 35) = Br 1,522,500 – Br 1,575,000 = Br 52,500 F

C. Fixed Over Head Spending variance
=Actual FOH – Budgeted FOH
=Br 2,215,000 – (18,000 × 3 × Br 40) = Br 2,215,000 – Br 2,160,000 = Br 55,000 U

D. Fixed Over Head production Volume variance
=Budgeted FOH – Applied FOH
= Br 2,160,000–(15,000 × 3 × Br. 40) = Br. 2,160,000–Br. 1,800,000 =Br. 60,000 U

☞ The **overhead variance** is computed as the difference between total actual overhead costs and budgeted total overhead for the actual output attained.

Step 4: Investigate Variances

The primary purpose of investigating reported variances is to manage costs. This requires identifying the root causes of variances and assigning responsibility for variances so corrective action may be taken. However, it takes employee time and other costs to investigate variances. The benefits of investigating a variance, therefore, should be greater than the cost of doing the analysis. Only those variances deemed significant should be investigated.

a. Deciding Which Variances to Investigate

Given that investigation is costly, most firms use a management by exception system that focuses on variances that are large in size or show a negative trend. **Management by exception** is a technique in which managers set upper and lower limits of tolerance for deviations and investigate only deviations that fall outside those tolerance ranges. Variances large enough to fall outside the ranges of acceptability are usually indicative of trouble, and the variances themselves do not reveal the cause of the trouble or the person or group responsible. Mangers must investigate problems through observation, inspection, and inquiry to determine the causes of variances.

In addition, it may be useful to randomly select a small percentage of variances to investigate to ensure that cost controls remain adequate. It is also important to investigate both favorable and unfavorable variances. A favorable variance for a particular item may be unfavorable to the firm overall. For example, using less material than required creates a favorable quantity variance, but might make the product unsafe and lead to legal problems.

Size: The absolute or relative size of a variance is an important factor in the investigation decision. Often absolute size or percentage difference criteria are set and all variances that exceed these criteria are investigated.

Trend: If a variance shows a trend, that is, it is getting larger period by period or is always negative or positive, further investigation may be warranted. Even though the size of the variance remains below preset size criteria, the trend may be a warning that a particular part of a process may be deteriorating and may fail if corrective action is not taken.

Key Point: It is important to investigate both favorable and unfavorable variances if they are large, exceed a certain percent of budget or seem to have trend.

b. Identifying Root Causes of Variances

Once accountants identify that a variance needs investigation, operating personnel must apply a systematic process to find out what causes these variances. Many firms use a tool called root cause analysis. Root cause analysis is a method of linking a variance to the underlying cause of the variance. This technique requires that investigators ask “why” until they find the underlying cause of the variance.

Root Cause Analysis Using the 5-Why Method

Most firms find it takes four or five levels of analysis to identify root causes. For one company**,** root cause analysis simply may take the form of asking “five whys”- that is, they recommend asking "why" at least five times to determine the root cause of a problem or a variance.

Step 5: Take Corrective Action

The final step in the standard costing process is to use the information derived from the root cause investigation to take corrective action. However, to select the appropriate corrective action, we must array the root causes by source – that is, where in the organization a root cause originates. A root cause can originate within a unit, from another unit, or from the external environment.

4.7 Sales Variances

The idea of variance analysis can be extended to areas other than production. For example, an analysis can be made on why actual revenue differed from budgeted revenue. If, for example, a company budgeted to sell 20,000 units at Br 100 each but because of market forces had to reduce the price to Br 95 and even so they were only able to sell 22,000 units at this price, a variance occurs. Then:

Actual Sales Revenue = 22,000 x Br 95 = Br 2,090,000
Budgeted Sales Revenue = 20,000 x Br 100 = Br 2,000,000
Sales Variance = Br 2,090,000 – Br 2,000,000 = Br 90,000 F

This variance is positive which means more revenue was obtained than expected and is therefore favorable and marked with F. This variance is

made up of two elements: the company sold more than what is budgeted by 2,000 units and the reduction in selling price of Br 5 per unit. But the increase in quantity more than off sets the decrease in price and hence the variance is favorable. From the above example it can be seen that two items will contribute to sales variance: the **sales-price variance (SPV)** and the **sales-volume variance (SVV).** The sales-price variance arises because a company increased or decreased its sales price when compared with the budgeted sales price. The sales-volume variance arises from an increase or decrease in units sold. Generally, sales variances can be analyzed by splitting the total variance into six variances as shown below:

A. Static budget variance
   - Flexible Budget Variance
   - Sales Volume Variance

B. Sales Volume Variance
   - Sales Mix Variance
   - Sales Quantity Variance

C. Sales Quantity Variance
   - Market Share Variance
   - Market Size Variance



Activity 10: Understanding sales variances

What are the two major causes of sales variance?

Example
Agaro Manufacturing Company produces and sales three different products, **X, Y and Z**. The Company Budgeted to sell 20,000 units of its products. The company's budgeted sales of 20,000 units represent 40% of the market share. The details for the budgeted and actual data for a given year are as follows:

	Budgeted Data				**Actual Data**			
Product	**Selling Price per Unit**	**Quantity**	**Sales Mix**	**Total Revenue**	**Selling Price per Unit**	**Unit Volume**	**Sales Mix**	**Total Revenue**
X	25	2,000	10%	50,000	20	4,000	18.18%	80,000
Y	40	8,000	40	320,000	45	10,000	45.45	450,000
Z	30	10,000	50	300,000	30	8,000	36.37	240,000
		20,000		670,000		22,000		770,000

Required: Compute

A. Static Budget variance (SBV)

Static-budget variance is the difference between an actual result and a budgeted amount in the static budget.

Static-Budget Variance= Actual Result- Budgeted Amount

The Static-budget variance for Agaro Company is computed as follows:

X= 80,000-50,000 = 30,000F

Y= 450,000-320,000 =130,000F

Z= 240,000-300,000 = 60,000U

Total SBV =100,000F

B. Flexible Budget Variance (FBV)

Static-Budget variance can be further split into Flexible-Budget and Sales-Volume variance.

Flexible-budget variance is the difference between the actual revenues and the flexible-budget amount for the actual unit volume of sales. It is computed as: -

FBV=Actual Result- Flexible-budget Amount

The flexible budget variance for Agaro Company is computed as follows:

FBV for X=80,000- (25x 4,000) = 20,000U

Y=450,000-(40x 10,000) =50,000F

Z=240,000-(30 x8, 000) = 0

Total FBV=30,000F

C. Sales-Volume Variance (SVV)

Sales-volume variance shows the effect of the difference between the actual and budgeted quantity of variable used to flex the flexible budget. The sales-volume variance, which arises from an increase or decrease in units sold, is calculated as:

SVV = (Actual Sales Quantity - Budgeted Sales Quantity) x Budgeted Selling Price per Unit

The Sales-volume variance for Agaro Company is computed as follows:

SVV for X= (4,000-2,000) x 25=50,000F

Y= (10,000-8,000) x 40=80,000F

Z= (8,000-10,000) x 30=60,000U

Total SVV= 70,000F

D. Sales Mix Variance (SMV)

Sales-mix variance is difference between (1) budgeted amount for the actual sales mix, and (2) the budgeted amount if the budgeted sales mix had been changed. The formula for computing the sales-mix variance in terms of revenue and the amount for Agaro company is:-

Actual Budgeted Actual Budgeted

SMV	=	Sales Mix Percentage	-	Sales Mix percentage	x	Units Of All Products Sold	x	Selling Price Per Unit

SMV for X= (0.1818-0.10) x 22,000 x 25=44,990F
Y= (0.4545-0.40) x 22,000 x 40=47,960F
Z= (0.3637-0.50) x 22,000 x 30=89,958U
Total SMV=2,992F

E. Sales Quantity Variance (SQV)

Sales-quantity variance is the difference between two amounts: (1) the budgeted amount based on actual quantities sold of all products and the budgeted mix, and (2) the amount in the static budget (which is based on the budgeted quantities to be sold of all products and the budgeted mix). The formula for computing the sales-quantity variance in terms of revenue and the amount for Agaro company is:-

SQV	=	Actual Units Of All Products Sold	-	Budgeted Units Of All Products Sold	x	Budgeted Sales Mix percentage	x	Budgeted Selling Price Per Unit

SQV for X = (22,000 -20,000) x 0.10x 25= 5,000F
Y = (22,000 -20,000) x 0.40x 40= 32,000F
Z = (22,000 -20,000) x 0.50x 30= 30,000F
Total SQV=67,000F

F. Market Share and Market Size Variance

Sales depend on overall market demand as well as the firm's ability to maintain its share of the market. The following table summarizes the budgeted and actual sales units for the industry.

	Budgeted Industry Quantity	Actual Industry Quantity
Product X	5,000	4,000
Product Y	15,000	20,000
Product Z	30,000	36,000
Total	50,000	60,000

Agaro Company can use the industry information to get further insight into the sales quantity variance by dividing this variance into a market-size and market-share variance.

Market- size variance is the difference between two amounts (1) the budgeted amount based on the actual market size in units and the budgeted market share, and (2) the static budget amount based on the budgeted

market-size in units and the budgeted market share. The formula and the amount for Agaro company are: -

MSV= (Actual MSZ - Budgeted MSZ) x Budgeted MSR x Budgeted ASP
Where, MSV= Market Size Variance MSR= Market Share in Units
MSZ= Market Size in Units ASP= Average Selling Price per Unit

MSV for Agaro company is computed as follows:-

MSV= (60,000-50,000) x 0.40x 33.5
= **Br 134,000F**

Market –share variance is the difference between two amounts: (1) the budgeted amount at budgeted mix based on actual market size in units and the actual market share, and (2) the budgeted amount at budgeted mix based on actual market size in units and the budgeted market share. The formula and the amount for Agaro company are: -

Market-share Variance= (Actual MSR- Budgeted MSR) x Actual MSZ x Budgeted ASP

MSV for Agaro company is computed as follows:-

Market-share Variance= (0.367- 0.40) x 60,000x 33.5
=Br 67,000 U

- Dear learner, please make sure that you have read the chapter carefully and properly understood activity questions. If you have done that, please read summary and precede to self assessment questions.

Summary

Directly comparing static planning budget revenues and costs to actual revenues and costs can easily lead to erroneous conclusions. Actual revenues and costs differ from budgeted revenues and costs for a variety of reasons, but one of the biggest is a change in the level of activity. One would expect actual revenues and costs to increase or decrease as the activity level increases or decreases. Flexible budgets enable managers to isolate the various causes of the differences between budgeted and actual costs. A flexible budget is a budget that is adjusted to the actual level of activity. It is the best estimate of what revenues and costs should have been, given the actual level of activity during the period. The flexible budget can be compared to the budget from the beginning of the period or to the actual results.

When the flexible budget is compared to the budget from the beginning of the period, activity variances are the result. An activity variance shows how a revenue or cost should have changed in response to the difference between budgeted and actual activity. When the flexible budget is compared to actual results, flexible budget variances are the result. A

favorable revenue variance indicates that revenue was larger than should have been expected, given the actual level of activity. An unfavorable revenue variance indicates that revenue was less than it should have been, given the actual level of activity. A favorable cost variance indicates that the cost was less than expected, given the actual level of activity. An unfavorable cost variance indicates that the cost was greater than it should have been, given the actual level of activity. A flexible budget performance report combines the activity variances and the flexible budget variances on one report. Common errors in comparing budgeted costs to actual costs are to assume all costs are fixed or to assume all costs are variable. If all costs are assumed to be fixed, the variances for variable and mixed costs will be incorrect. If all costs are assumed to be variable, the variances for fixed and mixed costs will be incorrect. The variance for a cost will only be correct if the actual behavior of the cost is used to develop the flexible budget benchmark.

A standard cost is computed as a standard price multiplied by a standard quantity. In a true standard cost system, standards are derived for prices and quantities of each product component and for each product. A standard cost card provides information about a product’s standards for components, processes, quantities, and costs. The material and labor sections of the standard cost card are derived from the bill of materials and the operations flow document, respectively. A variance is any difference between an actual and a standard cost. A total variance is composed of a price and a usage sub-variance. The material variances are the price and the quantity variances. The material price variance can be computed on either the quantity of material purchased or the quantity of material used in production. This variance is computed as the quantity measure multiplied by the difference between the actual and standard prices. The material quantity variance is the difference between the standard price of the actual quantity of material used and the standard price of the standard quantity of material allowed for the actual output. The two labor variances are the rate and efficiency variances. The labor rate variance indicates the difference between the actual rate paid and the standard rate allowed for the actual hours worked during the period. The labor efficiency variance compares the number of hours actually worked against the standard number of hours allowed for the level of production achieved and multiplies this difference by the standard wage rate.

If separate variable and fixed overhead accounts are kept (or if this information can be generated from the records), two variances can be computed for both the variable and fixed overhead cost categories. The variances for variable overhead are the VOH spending and VOH efficiency variances. The VOH spending variance is the difference between actual variable overhead cost and budgeted variable overhead based on the actual level of input. The VOH efficiency variance is the difference between budgeted variable overhead at the actual activity level and variable overhead applied on the basis of standard input quantity allowed for the production achieved. The fixed overhead variances are the FOH spending and volume variances. The fixed overhead spending variance is equal to

actual fixed overhead minus budgeted fixed overhead. The volume variance compares budgeted fixed overhead to applied fixed overhead. Fixed overhead is applied based on a predetermined rate using a selected measure of capacity. Any output capacity utilization actually achieved (measured in standard input quantity allowed), other than the level selected to determine the standard rate, will cause a volume variance to occur. The idea of variance analysis can be extended to areas other than production. Sales variance results from changes in unit sales prices or quantities (sales volume variance) actually sold as compared with what is budgeted. The sales-price variance arises because a company increased or decreased its sales price when compared with the budgeted sales price. The sales-volume variance arises from an increase or decrease in units sold.

Checklist

Dear learner, now you have completed the fourth chapter, so you need to check whether you have grasped the concepts discussed in this chapter. If your answer to the questions below is No, then you have to go back and read the relevant sub-section again.

Can you:	**Yes**	**No**
1. Define flexible budgets	☐	☐
2. Differentiate between flexible budgets and master budgets	☐	☐
3. Identify elements of master budget variance	☐	☐
4. Differentiate efficiency and effectiveness	☐	☐
5. Perform performance evaluation using flexible budgets	☐	☐
6. Explain favorable and un-favorable variances	☐	☐
7. Explain standard costing system	☐	☐
8. Discuss the types of standards	☐	☐
9. List steps in standard costing	☐	☐
10. Compute material price and quantity variance	☐	☐
11. Compute labor rate and efficiency variance	☐	☐
12. Compute factory overhead variance	☐	☐
13. Discuss about sales variance and its elements	☐	☐

Good! If, you have understood the above points, then proceed to the next exercise.

 **Self Assessment Questions**

Part I: True-False Questions

Write "True" if the statement is correct and "False" if the statement is wrong for the following questions.

1. Information regarding the causes of variances is provided when the master budget is compared with actual results.
2. A variance is the difference between the actual costs for the current and expected (or budgeted) performance.
3. An unfavorable variance may be due to poor planning rather than due to inefficiency.
4. The static-budget variance can be subdivided into the flexible-budget variance and the sales-volume variance.
5. An unfavorable variance is conclusive evidence of poor performance.
6. A favorable variance should be ignored by management.
7. The only difference between the static budget and flexible budget is that the static budget is prepared using planned output.
8. The price variance is the difference between the actual price and the budgeted price of the input, multiplied by the actual quantity of input.
9. For any actual level of output, the efficiency variance is the difference between actual quantity of input used and the budgeted quantity of input allowed to produce actual output, multiplied by the budgeted price.
10. The use of high-quality raw materials is likely to result in a favorable efficiency variance and an unfavorable price variance.
11. The direct manufacturing labor price variance is likely to be unfavorable if lower-skilled workers are put on a job.
12. When using variance for performance evaluation, managers often focus on effectiveness and efficiency as two of the common attributes used in comparing expected results with actual results.
13. The variable-overhead spending variance is the difference between the actual variable overhead and the amount of variable overhead budgeted for the actual level of cost-driver activity.
14. The flexible-budget variance for direct-cost inputs is subdivided into two detailed variances, the efficiency variance and the price variance.
15. A favorable variable overhead spending variance can be the result of paying lower prices than budgeted for variable overhead items such as energy.
16. For fixed overhead costs, the flexible-budget amount is always the same as the static-budget amount.
17. The fixed overhead efficiency variance is the difference between actual fixed overhead costs and fixed overhead costs in the flexible budget.
18. A favorable production-volume variance indicates that the company

has allocated more fixed overhead costs than budgeted.

19. An unfavorable fixed overhead spending variance indicates that the price of fixed overhead items cost more than budgeted.

Part II: Multiple Choice Questions

Choose the letter of the best answer and Write the letter of the correct answer for the questions that follow

1. The flexible budget contains:

   A. budgeted amounts for actual output
   B. budgeted amounts for planned output
   C. actual costs for actual output
   D. actual costs for planned output

2. A flexible budget:

   A. is another name for management by exception
   B. is developed at the end of the period
   C. is based on the budgeted level of output
   D. provides favorable operating results

3. The variance that is best for measuring operating performance is the:

   A. static-budget variance
   B. flexible-budget variance
   C. sales-volume variance
   D. selling-price variance

4. An unfavorable flexible-budget variance for variable costs may be the result of:

   A. using more input quantities than were budgeted
   B. paying higher prices for inputs than were budgeted
   C. selling output at a higher selling price than budgeted
   D. Both A and B are correct.

5. All of the following are needed to prepare a flexible budget EXCEPT determining the:

   A. budgeted variable cost per output unit
   B. budgeted fixed costs
   C. actual selling price per unit
   D. actual quantity of output units

6. A flexible-budget variance is Br 600 favorable for unit-related costs. This indicates that costs were:

   A. Br 600 more than the master budget
   B. Br 600 less than for the planned level of activity
   C. Br 600 more than standard for the achieved level of activity
   D. Br 600 less than standard for the achieved level of activity

7. Standard costs

   A. May show past cost experience.

   B. Help establish expected future costs.

   C. Are the budgeted costs per unit in the present

   D. All of these.

8. If a company is concerned with the potential negative effects of establishing standards, they should

   A. Set loose standards that are easy to fulfill.
   B. Offer wage incentives to those meeting standards.
   C. Not employ any standards.
   D. Set tight standards in order to motivate people.

9. The direct labor quantity standard is sometimes called the direct labor

   A. Volume standard.

   B. Effectiveness standard.

   C. Efficiency standard.

   D. Quality standard.

10. The per-unit standards for direct labor are 2 direct labor hours at Br 12 per hour. If in producing 1,200 units, the actual direct labor cost was Br 25,600 for 2,000 direct labor hours worked, the total direct labor variance is

   A. Br 960 unfavorable.

   B. Br 3,200 favorable.

   C. Br 2,000 unfavorable.

D. Br 3,200 unfavorable.

11. The difference between actual overhead costs and overhead costs applied is the

A. Budget variance.

B. Controllable variance.

C. Total overhead variance.

D. Volume variance.

Based on the following information, answer questions, 12 and 13

Patel Corporation manufactured 1,000 coolers during October. The following variable overhead data pertain to October:

Budgeted variable overhead cost per unit	Br 9.00
Actual variable manufacturing overhead cost	Br 8,400
Flexible-budget amount for variable manufacturing overhead	Br 9,000
Variable manufacturing overhead efficiency variance	Br 180 unfavorable

12. What is the variable overhead flexible-budget variance?

A. Br 600 favorable

B. Br 420 unfavorable

C. Br 780 favorable

D. Br 600 unfavorable

13. What is the variable overhead spending variance?

A. Br 420 unfavorable

B. Br 600 favorable

C. Br 600 unfavorable

D. Br 780 favorable

14. The Charger Company makes tables for which the following standards have been developed:

Standard InputsStandard Price

	Expected for Each Unit of Output	Expected per Unit of Output
Direct materials	10	pounds Br 4per pound
Direct labor	3 hours	Br 16 per hour

Production of 230 tables was expected in July, but 250 tables were actually completed. Direct materials purchased and used were 2,200 pounds at an actual price of Br 4.50 per pound. Direct-labor cost for the month was Br 10,620, and the actual pay per hour was Br 18.00. _____ is the direct-material price variance for July.

E. Br 1,100 unfavorable
F. Br 1,100 favorable

G. Br 800 unfavorable

H. Br 800 favorable

15. Eagle Company had a favorable flexible budget direct material variance. In this case, it would not be possible for the direct material price and quantity variances, respectively, to be _____.

A. Favorable and unfavorable

B. Unfavorable and favorable

C. Unfavorable and unfavorable

D. Favorable and favorable

16. If the direct labor price variance is Br 800 favorable, and the direct labor usage variance is Br 700 unfavorable, then _____ must be true.

A. The total direct labor flexible budget variance is Br 100 favorable

B. Actual total wages paid were Br 800 less than expected

C. Actual labor used was more than planned

D. All of these answers are correct

17. What is the difference between a standard and a budget?

A. Standards are usually expressed in terms of total dollars

B. Standards are usually expressed on a per unit basis.

C. Standards are the difference between what was planned and what was achieved.

D. Standards are based on perfection and budgets are based on more realistic goals

E. Standards and budgets are the same.

18. The variable overhead flexible-budget variance measures the difference between:

A. actual variable overhead costs and the static budget for variable overhead costs

B. actual variable overhead costs and the flexible budget for variable overhead costs

C. the static budget for variable overhead costs and the flexible budget for variable overhead costs

D. None of these answers is correct.

19. When machine-hours are used as an overhead cost-allocation base, the most likely cause of a favorable variable overhead spending variance is:

A. excessive machine breakdowns

B. the production scheduler efficiently scheduled jobs

C. a decline in the cost of energy

D. strengthened demand for the product

20. A favorable variance indicates that:

A. budgeted costs are less than actual costs

B. actual revenues exceed budgeted revenues

C. the actual amount decreased operating income relative to the budgeted amount

D. All of these answers are correct.

21. An unfavorable variance:

A. may suggest investigation is needed

B. is conclusive evidence of poor performance

C. demands that standards be recomputed

D. indicates continuous improvement is needed

22. When standards are used to develop a budget:

A. past inefficiencies are excluded

B. benchmarking must also be used

C. information is available at a low cost

D. flexible-budget amounts are difficult to determine

23. Ideal standards:

A. assume peak operating conditions

B. allow for normal machine breakdowns

C. greatly improve employee motivation and performance

D. All of these answers are correct..

24. If manufacturing machines are breaking down more than expected, this will contribute to a(n):

A. favorable direct manufacturing labor price variance

B. unfavorable direct manufacturing labor price variance

C. favorable direct manufacturing labor efficiency variance

D. unfavorable direct manufacturing labor efficiency variance

E. to punish employees that do not meet standards

F. to encourage employees to focus on meeting standards

Part III: Workout

Workout the following question clearly

Preparation of Master Budget (Merchandising Company)

1. Nicholas Company manufacturers TVs. Some of the company's data was misplaced. Use the following information to replace the lost data:

Analysis	**Actual**	**Flexible Varianc**	**Flexible Budget**	**Sales-Volume**	**Static Budget**

	Results	es		Variances	
Units Sold	112,500		112,500		103,125
Revenues	Br 42,080	Br 1,000 F	(A)	Br 1,400 U	(B)
Variable Costs	(C)	Br 200 U	Br 15,860	Br 2,340 F	Br 18,200
Fixed Costs	Br 8,280	Br 860 F	Br 9,140		Br 9,140
Operating Income	Br 17,740	(D)	Br 16,080	(E)	Br 15,140

Required:

A. What are the respective flexible-budget revenues (A)?
B. What are the static-budget revenues (B)?
C. What are the actual variable costs (C)?
D. What is the total flexible-budget variance (D)?
E. What is the total sales-volume variance (E)?
F. What is the total static-budget variance?

2. Hector's Camera Shop has prepared the following flexible budget for September and is in the process of interpreting the variances. **F** denotes a favorable variance and **U** denotes an unfavorable variance.

	Flexible Budget	Variances	
		Price	Efficiency
Material A	Br 20,000	Br 1,000**U**	Br 1,200**F**
Material B	30,000	500**F**	800**U**
Material C	40,000	1,400**U**	1,000**F**

Required:

A. Compute the actual amount spent for Material A
B. Compute the actual amount spent for Material B
C. The explanation that lower-quality materials were purchased is most likely applied for which Material?

3. The following data for the Alma Company pertain to the production of 1,000 urns during August.

Direct Materials (all materials purchased were used):
Standard cost: Br 6.00 per pound of urn.
Total actual cost: Br 5,600.
Standard cost allowed for units produced was Br 6,000.
Materials efficiency variance was Br 120 unfavorable.

Direct Manufacturing Labor:
Standard cost is 2 urns per hour at Br 24.00 per hour.
Actual cost per hour was Br 24.50.
Labor efficiency variance was Br 336 favorable.

Required:

A. What is standard direct material amount per urn?
B. What is the direct material price variance?
C. What is the total actual cost of direct manufacturing labor?
D. What is the labor price variance for direct manufacturing labor?

- Dear learner, now you have completed the chapter successfully. Please go to the next chapter and do what you have done in this chapter.

CHAPTER FIVE

RELEVANCE, PRICING AND THE DECISOIN PROCESS

Introduction

Dear learner! Welcome to the fifth chapter of the module. In this chapter, you are going to discuss the use of relevant information in making production and marketing decisions. In today's complex business environment, the need for good accounting information is critical to the success of any business organization. Without accurate and timely accounting information, decision making is poor at best. The accountants are responsible for selecting the appropriate information for the decision making.

Decision making essentially involves choosing among several courses of action. Using relevant information for decision making enables managers give due considerations and increase the likelihood of better decisions. It is accounting systems that provides information to managers who make decisions. In this unit you will learn how to identify and analyze relevant information for marketing and production decisions. In addition, you will also discuss various pricing decisions that firms are using.

5.1 Information and the Decision Process

Managers usually follow a *decision model* for choosing among different courses of action. A **decision model** is a formal method of making a choice that often involves both quantitative and qualitative analyses. Management accountants analyze and present relevant data to guide managers' decisions. The following is steps that should be followed in the decision model.

Step 1: Define the Problem

The first step is to recognize and define a specific problem. For example, the members of a given company's management team all recognized the need for additional space for warehousing, offices, and the production of plastic moldings. The amount of space needed, the reasons for the need, and how the additional space would be used are all important dimensions of the problem. However, the central question is how to acquire the additional space.

Step 2: Identify the Alternatives

Step 2 is to list and consider possible solutions. The company has to identify possible solutions and alternatives of solving the problem at hand

Step 3: Identify the Costs and Benefits Associated with Each Feasible Alternative

In Step 3, the costs and benefits associated with each feasible alternative are identified. At this point, clearly irrelevant costs can be eliminated from consideration. The management accountant is responsible for gathering necessary data.

Step 4: Total the Relevant Costs and Benefits for Each Feasible Alternative

To choose the best alternative, we should have the total costs and benefits of each alternative.

Step 5: Assess the Qualitative Factors

While the costs and revenues associated with the alternatives are important, they do not tell the whole story. Qualitative factors can significantly affect the manager's decision. Qualitative factors are simply those factors that are hard to put a number on. For example, the reliability of supply sources, the expected stability of prices over the next several years, labor relations, community image, and so on.

Step 6: Make the Decision

Once all relevant costs and benefits for each alternative have been assessed and the qualitative factors weighed, a decision can be made.

Much of this chapter focuses on the concepts of relevant costs and relevant revenues when choosing among alternatives.

- Dear learner, it is important to note the following:

☞ Managers usually follow a *decision model* for choosing among different courses of action. A **decision model** is a formal method of making a choice that often involves both quantitative and qualitative analyses.

Relevant Costs and Relevant Revenues

Relevant costs are *expected future costs,* and **relevant revenues** are *expected future revenues* that differ among the alternative courses of action being considered. Revenues and costs that are *not relevant* are said to be *irrelevant*. It is important to recognize that to be relevant costs and relevant revenues they *must*:

Occur in the future—every decision deals with selecting a course of action based on its expected future results.

Differ among the alternative courses of action—costs and revenues that do not differ will not matter and, hence, will have no bearing on the decision being made.

The question is always, “What difference will an action make?” By confining the analysis to only the relevant data, managers can clear away the clutter of potentially confusing irrelevant data. Focusing on the relevant data is especially helpful when all the information needed to prepare a detailed income statement is unavailable. Understanding which costs are relevant and which are irrelevant helps the decision maker concentrate on obtaining only the pertinent data and is more efficient.

☞ For making a sound decision, managers need relevant information. Relevant information a future cost or revenue information that varies among alternatives

Please note the following Key Features of Relevant Information

- Past (historical) costs may be helpful as a basis for making predictions. However, past costs themselves are always irrelevant when making decisions.
- Different alternatives can be compared by examining differences in expected total future revenues and expected total future costs.
- Not all expected future revenues and expected future costs are relevant. Expected future revenues and expected future costs that do not differ among alternatives are irrelevant and, hence, can be eliminated from the analysis. The key question is always, “What difference will an action make?”

- Appropriate weight must be given to qualitative factors and quantitative nonfinancial factors.



Activity 1: Decision model

What are the five steps in the decision model?

5.2 Qualitative and Quantitative Relevant Information

Managers divide the outcomes of decisions into two broad categories: quantitative and qualitative. Quantitative factors are outcomes that are measured in numerical terms. Some quantitative factors are financial; they can be expressed in monetary terms. Examples include the cost of direct materials, direct manufacturing labor, and marketing.

Other quantitative factors are nonfinancial; they can be measured numerically, but they are not expressed in monetary terms. Reduction in new product-development time and the percentage of on-time flight arrivals are examples of quantitative nonfinancial factors. Qualitative factors are outcomes that are difficult to measure accurately in numerical terms. Employee morale is an example. Relevant-cost analysis generally emphasizes quantitative factors that can be expressed in financial terms. But just because qualitative factors and quantitative nonfinancial factors cannot be measured easily in financial terms does not make them unimportant. In fact, managers must wisely weigh these factors.

Managers make a number of decisions using relevant information. In this chapter the following decision making alternatives will be illustrated:

- Special sales order
- Deletion or Addition of Products or Departments
- Optimal Use of Limited Resources
- Make or buy decisions
- Sell or further process decisions
- Equipment replacement decisions

A. Special sales order

A special order is a one-time order that is not considered part of the company’s normal or on-going business. For example, one or more of a company’s customers may offer additional purchases from the company but at less than the regular selling price. The problem at hand here is whether this special order be accepted or rejected. In making such decision many factors should be taken in to account. Some of the factors that we should consider in accepting or rejecting a special order may include:

- Whether that special order affects our regular business or not
- Whether the company has excess capacity or not(opportunity cost)

The decision criteria are that the special order should be accepted if the incremental revenue from the special order exceeds the incremental costs of the order. The incremental revenue in this decision will be the price per unit offered by the potential customer times the number of units to be purchased. The incremental costs will be the amount of the expected cost increase if the offer is accepted. The incremental cost usually includes variable manufacturing costs of producing the units. Since the units being sold in the special order are not being sold through the firm normal distribution channel, the firm may or may not incur variable selling and administrative expenses in conjunction with the special order.

The incremental costs usually do not include fixed manufacturing costs. Although the fixed costs must be incurred to permit production, the amount of fixed costs incurred by the firm usually will not increase if the special order offer is accepted. For the same reason, other fixed expenses, such as fixed selling and administrative expenses, are usually not relevant in the special order price.

However, management must also be assured that it has sufficient capacity to produce the special order without affecting normal sales. When there is no excess capacity, the opportunity cost of using the firm's facilities for the special order are also relevant to the decision. The opportunity cost would be the contribution margin forgone on regular sales that have to be reduced to accommodate the special order. The relevant costs to accept the special order, therefore, would include a forgone contribution margin on regular sales that could not be made in addition to the incremental costs associated with the special order that have already been discussed.



Activity 2: Understanding Special sales order

Describe special sales order and the decision criteria in special sales order

Example

Geda Company manufactures and sells 10,000 staplers per year. The total manufacturing cost of these staplers is Br 400,000. Suppose that kiya Trading, a local merchandiser has offered Geda Company Br 38 per stapler for 1,000 staplers special order that:

- Would not affect the regular business in any way
- Would not affect fixed costs
- Would not require any additional variable selling and administrative expenses
- Would use some other wise idle manufacturing capacity

Additional Information:

The income statement of Geda Company for the most recent period is given below:

Sales----------500,000

Variable costs

- Manufacturing----------360,000
- Selling and administrative ----------30,000
- Total Variable costs----------390,000

Contribution margin----------110,000

Fixed costs

- Manufacturing----------40,000
- Selling and administrative----------50,000
- Total Fixed cost----------90,000

Operating income---------- 20,000

Required:

Should Geda Company accept the special order?

Solution:

If relevant and irrelevant information are not isolated and used properly, decision makers will be miss leaded. Let see first the analysis without isolating relevant information.

1. Incorrect analysis

The following analysis included fixed manufacturing costs in the cost of making the special order and it seems that the order price Br38 is less than the production cost of Br40. As a result decision makers may reject the special order because accepting the order seems will reduce the operating income from Br20, 000 to Br18, 000 but if only relevant information is used in making the decision, it is better for the company to accept the order because that will increase the operating income of the company from Br20, 000 to Br22, 000 as shown in the second analysis (correct analysis).

	Without special order	Incorrect effect	With special order
Sales	500,000	38,000	538,000
Cost of goods sold	400,000	40,000	440,000
Gross profit	100,000	(2,000)	98,000
Selling & admin	80,000		80,000
Operating income	20,000	(2,000)	18,000

2. Correct analysis

	Without special order	Effect of special order	With special order
Sales	500,000	38,000	538,000

Variable costs			
Manufacturing	360,000	36,000	396,000
Selling &admin	30,000		30,000
Total variable cost	390,000		426,000
Contribution margin	110,000	2,000	112,000
Fixed costs			
Manufacturing	40,000		40,000
Selling &admin	50,000		50,000
Total fixed cost	90,000		90,000
Operating income	20,000	2,000	22,000

Potential Problems in Relevant-Cost Analysis

Managers should avoid two potential problems in relevant-cost analysis. First, they must watch for incorrect general assumptions, such as all variable costs are relevant and all fixed costs are irrelevant.

Second, unit-cost data can potentially mislead decision makers**.** Generally, managers use total costs rather than unit costs because total costs are easier to work with and reduce the chance for erroneous conclusions. Then, if desired, the total costs can be unitized. The best way for managers to avoid these two potential problems is to keep focusing on

- total revenues and total costs (rather than unit revenue and unit cost) and
- the relevance concept. Managers should always require all items included in an analysis to be expected total future revenues and expected total future costs that differ among the alternatives

B. Deletion or Addition of Products or Departments

Managers often must decide whether to add or drop a product line or close a business unit. Product lines that were formerly profitable may be losing market share to newer products.

Avoidable and Unavoidable Costs

In making the above decisions, it is necessary clearly understand the two classification of fixed costs and expenses; avoidable and unavoidable. Avoidable costs are costs that will not continue if an ongoing operation is changed or deleted. Therefore, avoidable costs are relevant costs. Avoidable costs include department salaries and other costs that could be eliminated by not operating the specific department. Unavoidable costs are costs that will continue even if an operation is halted. Unavoidable costs are not relevant. In the example above the unavoidable costs are not affected by a decision to delete the grocery department. Unavoidable costs

include many common costs. Common costs are those costs of facilities and services that are shared by users. For example, store depreciation, heating, air conditioning, and general management expenses are costs of shared resources used by all departments.

Example

Assume that Jk Company sells film processing (prints), cameras, and frames. Jemal Kedir the owner the company is deciding whether to drop processing because the volume of their sales has declined. The following table shows the financial statements prepared by the company's accountant.

	Total	Prints	Cameras	Frames
Sales revenue	Br 80,000	Br 10,000	Br 50,000	Br 20,000
Cost of sales (all variable).	53,000	8,000	30,000	15,000
Contribution margin	Br 27,000	Br 2,000	Br 20,000	Br 5,000
Less fixed costs:				
Rent	4,000	1,000	2,000	1,000
Salaries	5,000	1,000	2,500	1,500
Marketing and administrative.....	3,000	500	1,500	1,000
Operating profit (loss)	Br 15,000	Br (500)	Br 14,000	Br 1,500

Although the economics of dropping the prints appeared favorable, the manager asked the accountant to investigate which costs were differential (that is, avoidable in this case) if the prints were dropped. The accountant reported the following:

- All variable costs of goods sold for that line could be avoided.
- All salaries presently charged to prints, Br 1,000, could be avoided.
- None of the rent could be avoided.
- Marketing and administrative costs of Br 250 could be saved.

And the accountant prepared the differential cost and revenue analysis as shown in the following table indicating the effects of the decision.

	Alternative-1 Keep Prints	Alternative-2 Drop Prints	Difference
Sales revenue	Br 80,000	Br 70,000	Br 10,000 decrease

Cost of sales (all variable)	53,000	45,000
8,000 decrease		
Contribution margin	Br 27,000	Br 25,000
Br 2,000 decrease		
Less fixed costs:		
Rent	4,000	4,000
–0–		
Salaries	5,000	4,000
1,000 decrease		
Marketing and administrative	3,000	2,750
250 decrease		
Operating profit (loss)	Br 15,000	Br 14,250
Br 750 decrease		

From the above analysis one can note the following points:

- Assuming that the sales of the other product lines would be unaffected, sales would decrease by Br 10,000 from dropping the prints.
- Variable cost of goods sold of Br 8,000 would be saved by dropping the product line.
- Fixed costs of Br 1,250 (Br 1,000 in salaries and Br 250 in marketing and administrative expenses) would be saved.
- In total, the lost revenue of Br 10,000 exceeds the total differential cost saving by Br 750.

Thus, the net income of the company for the period would have been Br 750 lower if prints had been dropped. Therefore printers should not be dropped.

The discrepancy between what is shown on the product line financial statements and the differential analysis stems from the assumptions about differential or incremental cost. The financial statement presented above was designed to calculate department profits, not to identify the differential costs for this decision. Thus, managers relying on operating profit calculated after all cost allocations, including some that are not differential to this decision, would incorrectly conclude that the product line should be dropped. Financial statements prepared in accordance with generally accepted accounting principles do not routinely provide differential cost information. Differential cost estimates depend on unique information that usually requires separate analysis.

The financial statement that was prepared on a contribution margin basis clearly reveals the revenues and variable costs that are differential to this decision. A separate analysis was required, however, to determine which fixed costs were differential. It is possible, of course, to prepare reports that reflect each division’s contribution to companywide costs and profits. This segment margin would include division revenues less all direct costs of the division and would exclude allocated costs.

- In making decision as to whether a department or a product added or deleted managers consider the effect of that decision on profit. For example if the profit of the company increases after a given department is closed, the alternative should be selected or otherwise.

C. In sourcing-versus-Outsourcing (Make-versus-Buy Decisions)

We now apply the concept of relevance to another strategic decision: whether a company should make a component part or buy it from a supplier. Let us assume idle capacity.

Outsourcing and Idle Facilities

Outsourcing is purchasing goods and services from outside vendors rather than producing the same goods or providing the same services within the organization, which is **in sourcing**. For example, Holland Car prefers to manufacture some of parts that are used in assembling its cars (in sourcing) but may acquire these parts from other manufacturers (outsourcing). Decisions about whether a producer of goods or services will in source or outsource are also called **make-or-buy decisions**. Surveys of companies indicate that managers consider quality, dependability of suppliers, and costs as the most important factors in the make-or-buy decision. Sometimes, however, qualitative factors dominate management's make-or-buy decision.

In make or buy decisions, the appropriate means of analysis is to compare the relevant cost of buying the part with the relevant cost of making the part. Here relevant cost of buying the component is typically the amount paid to supplier. It may also include transportation costs incurred to get the component to the company's plant and costs incurred to process the part upon receipt.

The relevant cost of making the component is often the variable costs incurred to produce the component. In some cases, however, the company will need to acquire special equipment to produce the product or will hire additional supervisory personnel to assist with making the product. These incremental fixed costs will be part of the relevant cost of making the part. The alternative chosen make or buy, is typically the one with the lowest cost.

In the final decision regarding make or buy qualitative factors, besides the quantitative data, should be considered as part of the decision.

In make or buy decision, the following qualitative factors, besides the quantitative considerations may favor the decision to "buy":

- Advantage of long-term relationship with suppliers.
- Possibility of shortage of material or labor for making the component.
- Uninterrupted supply of requisite quality from reliable suppliers.

- The internal demand for the product under consideration is small and, as such, it is no use to set up manufacturing facilities for it and so forth.

On the contrary, the following qualitative factors may favor the decision "to make":

- The quality of the product is decided to be controlled.
- If the purchase price is likely to rise due to increased demand in the market, it becomes uneconomical to buy.
- Where the technical know-how is to be kept secret and not to be passed on to the suppliers and so on.



Activity 3: Make or buy decisions

What is the decision criterion in make or buy decisions?

Example-1

Assume that the following cost data relate to Meta Company, a car assembler that it incurs currently to make 10,000 units of its product used in the assembly.

	Total cost
Unit costs	
Direct material----------40,000	4
Direct labor----------160,000	16
FOH-Variable----------80,000	8
FOH-Variable----------160,000	16
Total----------440,000	**44**

Metu Company, another manufacture of the same product offered to sell Meta Company the part for Br40 per unit. Assume that Br 40,000 of the fixed cost will be eliminated if the parts are bought instead of made and released facilities will be left idle.

Required:

Should Meta Company make or buy the part?

Solution

It seems that Br 40 (cost to buy) is less than Br 44(cost of making the part) and by just looking at a glance we may suggest that the part be bought. Let see the analysis using only relevant information and suggest the best alternative.

	Make		**Buy**	
	Total	**unit**	**Total**	**Unit**
Purchase cost			400,000	40
Direct material	40,000	4		
Direct labor	160,000	16		

FOH-variable	80,000	8		
FOH-Fixed	40,000	4		
Total	320,000	32	400,000	40

From the above analysis, it can be seen that it is better to make the part because the company will save a total cost Br 80,000(Br 8 per unit)

Example-2
Assume the previous example but now the released facilities can be used for the following purposes:

- In another activity that will generate a contribution to profit of Br110, 000
- Renting the released facilities for Br70,000

Required:
Should Meta Company make or buy the part?

Solution
Again let see the analysis using only the relevant information and the cost of each alternative.

	Make	Buy and leave facilities idle	Buy and rent out facilities	Buy and use facilities for other purpose
Rent revenue			70,000	
Contribution to profit				110,000
Obtaining parts	(320,000)	(400,000)	(400,000)	(400,000)
Net relevant cost	(320,000)	(400,000)	(330,000)	(290,000)

From the above analysis, it can be seen that the fourth alternative is the best alternative because it requires less cost than other alternatives.

D. Decisions to Sell or Process Further

Joint products have common processes and costs of production up to a split-off point. At that point, they become distinguishable. For example, certain minerals such as copper and gold may both be found in a given ore. The ore must be mined, crushed, and treated before the copper and gold are separated. The point of separation is called the **split-off point**. The costs of mining, crushing, and treatment are common to both products. Often, joint products are sold at the split-off point. Sometimes, it is more profitable to process a joint product further, beyond the split-off point, prior to selling it. Determining whether to **sell or process further** is an important decision that a manager must make. To illustrate, consider Horra Corporation. Horra Corporation is a large corporate farm that specializes in

growing apples. Each plot produces approximately one ton of apples. The trees in each plot must be sprayed, fertilized, watered, and pruned.

When the apples are ripened, workers are hired to pick them. The apples are then transported to a warehouse, where they are washed and sorted. The approximate cost of all these activities (including processing) is Br 300 per ton per year. Apples are sorted into three grades (A, B, and C) determined by size and blemishes. Large apples without blemishes (bruises, cuts, wormholes, and so on) are sorted into one bin and classified as Grade A. Small apples without blemishes are sorted into a second bin and classified as Grade B. All remaining apples are placed in a third bin and classified as Grade C. Every ton of apples produces 800 pounds of Grade A, 600 pounds of Grade B, and 600 pounds of Grade C. Grade A apples are sold to large supermarkets for Br 0.40 per pound. Grade B apples are packaged in 5-pound bags and sold to supermarkets for Br 1.30 per bag. (The cost of each bag is Br 0.05.) Grade C apples are processed further and made into applesauce. The sauce is sold in 16-ounce cans for Br 0.75 each. The cost of processing is Br 0.10 per pound of apples. The final output is 500 sixteen-ounce cans.

- A given joint product should be further processed if the incremental revenue is greater than incremental cost of further processing.

A large supermarket chain recently requested that Horra Corporation supply 16-ounce cans of apple pie filling for which the chain was willing to pay Br 0.90 per can. Horra Corporation determined that the Grade B apples would be suitable for this purpose and estimated that it would cost Br 0.20 per pound to process the apples into pie filling. The output would be 500 sixteen-ounce cans.

In deciding whether to sell Grade B apples at split-off or to process them further and sell them as pie filling, the common costs of spraying, pruning, and so on are not relevant. The company must pay the Br 300 per ton for these activities regardless of whether it sells at split-off or processes further. However, the revenues earned at split-off are likely to differ from the revenues that would be received if the Grade B apples are sold as pie filling. Therefore, revenues are a relevant consideration. Similarly, the processing costs occur only if further processing takes place. Hence, processing costs are relevant. Since there are 600 pounds of Grade B apples at split-off, Horra Corporation sells 120 five-pound bags at a net per-unit price of Br 1.25 (Br 1.30 – Br 0.05). Thus, the total net revenues at split-off are Br 150 (Br 1.25*120).

If the apples are processed into pie filling, then the total revenues are Br 450 (Br 0.90*500). Therefore, the incremental revenues from processing further are Br300 (Br 450-Br 150). The incremental costs of processing are Br 120 (Br 0.20*600 pounds). Since revenues increase by Br 300 and costs by only Br 120, the net benefit of processing further is Br 180. Thus, Horra Corporation should process the Grade B apples into pie filling.

The analysis is summarized as follows:

	Process Further	Sell	Differential Amount to Process Further
Revenues	Br 450	Br 150	Br 300
Processing cost	120	—	120
Total	Br 330	Br 150	Br 180

 ***Activity 4: Sell or further process***

What is the decision criterion to sell at split-off point or further process a join product?

E. Optimal Use of Limited Resources

Managers are routinely faced with the problem of deciding how scarce resources are going to be utilized. A **scarce resource** or a **limiting factor** refers to any factor that restrict or constraint the production or sale of a product or service. It include the following, among others, labor hours, machine hours, square feet of floor space, cubic meters of display space .A department store, for example, has a limited amount of floor space and therefore cannot stock every product that may be available. A manufacturing firm has a limited number of machine- hours and a limited number of direct labor-hours at its disposal. When capacity becomes pressed because of scarce resource, the firm is said to have a constraint.

When a plant that makes more than one product is operating at capacity, managers often must decide which orders to accept. The contribution margin technique also applies here, because the product to be emphasized or the order to be accepted is the one that makes the biggest total profit contribution per unit of the limiting factor. Fixed cost are usually unaffected by such choices.

In such kind of decision, the contribution margin technique must be used wisely. Managers sometimes mistakenly favor those products with the biggest contribution margin or gross margin per sales birr, without regard to scarce resources.

Assume, for example, that Jordan Company produces two types of gears: X and Y, with unit contribution margins of Br 25 and Br 10, respectively. If the firm possesses unlimited resources and the demand for each product is unlimited, then the product mix decision is simple—produce an infinite number of each product. Unfortunately, every firm faces limited resources and limited demand for each product. These limitations are called

constraints. A manager must choose the optimal mix given the constraints found within the firm.

Assuming that Jordan can sell all that is produced, some may argue that only Gear X should be produced and sold—it has the larger contribution margin. However, this solution is not necessarily the best. The selection of the optimal mix can be significantly affected by the relationships of the constrained resources to the individual products. These relationships affect the quantity of each product that can be produced and, consequently, the total contribution margin that can be earned. This point is most vividly illustrated when one is faced with a single resource constraint.

One Constrained Resource

Assume that each gear must be notched by a special machine. The firm owns eight machines that together provide 40,000 hours of machine time per year. Gear X requires two hours of machine time, and Gear Y requires 0.5 hour of machine time. Assuming no other constraints, what is the optimal mix of gears? Since each unit of Gear X requires two hours of machine time, a total of 20,000 units can be produced per year (40,000/2). At Br 25 per unit, Jordan can earn a total contribution margin of Br 500,000. On the other hand, Gear Y requires only 0.5 hour of machine time per unit; therefore, 80,000 (40,000/0.5) gears can be produced. At Br 10 per unit, the total contribution margin is Br 800,000. Producing only Gear Y yields a higher profit level than producing only Gear X—even though the unit contribution margin for X is 2.5 times larger than that for Y. The contribution margin per unit of each product is not the critical concern. The contribution margin per unit of scarce resource is the deciding factor. The product yielding the highest contribution margin per machine hour should be selected. Gear X earns Br 12.50 per machine hour (Br 25/2), but Gear Y earns Br 20 per machine hour (Br 10/0.5). Thus, the optimal mix is 80,000 units of Gear Y and none of Gear X.

Multiple Constrained Resources

The presence of only one constrained resource is unrealistic. All organizations face multiple constraints: limitations of materials, limitations of labor inputs, limited demand for each product, and so on. The solution of the product mix problem in the presence of multiple constraints is considerably more complicated and requires the use of a specialized mathematical technique known as linear programming.

F. Retain or Replace an Equipment

Management often has to decide whether to continue using an asset or replace it. To illustrate, assume that Jacob Company has a factory machine with a book value of Br 40,000 and a remaining useful life of four years. It is considering replacing this machine with a new machine. A new machine is available that costs Br 120,000. It is expected to have zero salvage value at the end of its four-year useful life. If the new machine is acquired,

variable manufacturing costs are expected to decrease from Br 160,000 to Br 125,000 annually, and the old unit will be scrapped.

The incremental analysis for the four-year period is as follows:

Net Income	**Retain Equipment**	**Replace Equipment**	
Increase (decrease)			
Variable manufacturing costs	Br 640,000	Br 500,000	Br 104,000
New machine cost			Br 120,000
(Br 120,000)			
Total	**Br 640,000**	**Br 620,000**	**Br 20,000**

Note: Br 640,000 (4 years*Br 160,000) and Br 500,000 (4 years*Br 125,000)

In this case, it would be to the company's advantage to replace the equipment. The lower variable manufacturing costs due to replacement more than offset the cost of the new equipment. One other point should be mentioned regarding Jacob's decision: The book value of the old machine does not affect the decision Sunk costs are not relevant in incremental analysis. In this example, if the asset is retained, book value will be depreciated over its remaining useful life. Or, if the new unit is acquired, book value will be recognized as a loss of the current period. Thus, the effect of book value on current and future earnings is the same regardless of the replacement decision. Any trade-in allowance or cash disposal value of the existing asset, however, is relevant to the decision, because this value will not be realized if the asset remains in use.

- Dear learner, here is a short summary of the above topics:

- Using relevant information, managers make a number of marketing and production decisions, these among others include; Special sales order, Deletion or Addition of Products or Departments, Optimal Use of Limited Resources, Make or buy decisions, Sell or further process decisions and Equipment replacement decisions

5.3 Pricing Decision

Establishing the price for any good or service is affected by many factors. In the long run, a company must price its product to cover its costs and earn a reasonable profit. But to price its product appropriately, it must have a good understanding of market forces at work. In most cases, a company does not set the prices. Instead the price is set by the competitive market (the laws of supply and demand). These companies are called **price takers.** This is the case for any product that is not easily differentiated from competing products, such as farm products (corn or wheat) or minerals

(coal or sand). In other situations, the company sets the prices. This would be the case where the product is specially made for a customer. This also occurs when there are few or no other producers capable of manufacturing a similar item. An example would be a company that has a patent or copyright on a unique process, such as the case of computer. However, it is also the case when a company can effectively differentiate its product or service from others.

Target Costing

In the currently existing business environment, most businesses face a competitive market. The price of their product is affected greatly by the laws of supply and demand, so no company in this industry can affect the price to a significant degree. Therefore, to earn a profit, companies in focus on controlling costs. This requires setting a target cost that provides a desired profit. The target cost for such companies can be computed as follows:

Market Price - Desired Profit =Target Cost

If these companies can produce their products for the target cost (or less), they will meet their profit goal. If they cannot achieve their target cost, they will fail to produce the desired profit (and will most likely “get hammered” by stockholders and the market). In a competitive market, a company chooses the segment of the market it wants to compete in—that is its market niche. For example, it may choose between selling luxury goods or economy goods in order to focus its efforts on one segment or the other. Once the company has identified its segment of the market, it conducts market research to determine the target price. This target price is the price that the company believes would place it in the optimal position for its target audience. Once the company has determined this target price, it can determine its target cost by setting a desired profit. The difference between the target price and the desired profit is the target cost of the product as shown above. After the company determines the target cost, it assembles a team of employees with expertise in a variety of areas (production and operations, marketing, and finance). The team’s task is to design and develop a product that can meet quality specifications while not exceeding the target cost. The target cost includes all product and period costs necessary to make and market the product or service.

Example

Finfine Phones is considering introducing a fashion cover for its phones. Market research indicates that 200,000 units can be sold if the price is no more than Br 20. If Finfine decides to produce the covers, it will need to

invest Br 1,000,000 in new production equipment. Finfine requires a minimum rate of return of 25% on all investments.

Required
Determine the target cost per unit for the cover.
Solution
The desired profit for this new product line is Br 250,000 (Br 1,000,000*25%)
Each cover must result in Br 1.25 of profit (Br 250,000/200,000 units)
Market price-Desired profit=Target cost per unit
Br 20- Br 1.25= Br 18.75 per unit

Cost-Plus Pricing

As discussed, in a competitive, common-product environment the market price is already set, and the company instead must set a target cost. But, in a less competitive or noncompetitive environment, the company may be faced with the task of setting its own price. When the company sets the price, price is commonly a function of the cost of the product or service. That is, the typical approach is to use cost-plus pricing. This approach involves establishing a cost base and adding to this cost base a markup to determine a target selling price. This is the selling price that will provide the desired profit when the seller has the ability to determine the product's price. The size of the markup (the "plus") depends on the desired return on investment (ROI= Net income / Invested assets) for the product line, product, or service. In determining the proper markup, the company must also consider competitive and market conditions, political and legal issues, and other relevant risk factors. The cost-plus pricing formula is expressed as follows:

Target Selling Price= Cost+ Cost Percentage*Cost

To illustrate, assume that Clean Products, is in the process of setting a selling price on its new product. The per unit variable cost estimates for the new product are as follows:

	Per Unit
Direct materials	Br 23
Direct labor	17
Variable manufacturing overhead	12
Variable selling and administrative expenses	8
Variable cost per unit	**Br 60**

In addition, Clean has the following fixed cost per unit at a budgeted sales volume of 10,000 units.

Fixed manufacturing overhead per unit= Br 280,000/10,000 = Br 28
Fixed selling and administrative expenses per unit=Br 240,000/10,000= Br 24
Fixed cost per unit = Br 52

Clean decided to price its new product to earn a 20% return on its Br 1,000,000 investment (ROI). Therefore, Clean expects to receive income of Br 200,000 (20% * Br 1,000,000) on its investment. On a per unit basis, the desired ROI is Br 20 (Br 200,000 / 10,000 units). Given the per unit costs shown above, it computes the sales price to be Br 132 as follows:

	Per Unit
Variable cost	Br 60
Fixed cost	52
Total cost	112
Desired ROI	20
Selling price per unit	**Br 132**

In most cases, companies like Clean will use a percentage markup on cost to determine the selling price. The formula to compute the markup percentage to achieve a desired ROI of Br 20 per unit is as follows:

Desired ROI per unit/Total Unit cost= Mark up percentage
Br 20/112=17.86%

Using a 17.86% markup on cost, Clean Products would compute the target selling price as follows:

Target selling Price= Total unit cost + (Total unit cost * Mark up percentage)
= Br 112+ (Br 112*17.86%) =Br 132

The cost-plus pricing approach has a major advantage: It is simple to compute. However, the cost model does not give consideration to the demand side. That is, will customers pay the price Clean computed for its vacuums? In addition, sales volume plays a large role in determining per unit costs. The lower the sales volume, for example, the higher the price Clean must charge to meet its desired ROI. To illustrate, if the budgeted sales volume was 8,000 instead of 10,000, Clean's variable cost per unit would remain the same. However, the fixed cost per unit would change as follows:

Fixed manufacturing overhead per unit= Br 280,000/8,000 = Br 35
Fixed selling and administrative expenses per unit=Br 240,000/8,000= Br 30
Fixed cost per unit = Br 65

As indicated in the illustration, the fixed cost per unit for 10,000 units was Br 52. However, at a lower sales volume of 8,000 units, the fixed cost per unit increases to Br 65. Clean's desired 20% ROI now results in a Br 25 ROI per unit [(20%* Br 1,000,000) /8,000]. Clean computes the selling price at 8,000 units as follows.

	Per Unit
Variable cost	Br 60
Fixed cost	65
Total cost	125
Selling price per unit	**Br 150**

As shown, the lower the budgeted volume, the higher the per unit price. The reason is fixed costs and ROI are spread over fewer units, and therefore the fixed cost and ROI per unit increase. In this case, at 8,000 units, Cleane would have to mark up its total unit costs 20% to earn a desired ROI of Br 25 per unit, as shown below:

The target selling price would then be Br 150, as indicated earlier:

Br 125+ (Br 125*20%) = Br 150

The opposite effect will occur if budgeted volume is higher (say, at 12,000 units) because fixed costs and ROI can be spread over more units. As a result, the cost-plus model of pricing will achieve its desired ROI only when Clean sells the quantity it budgeted. If actual volume is much less than budgeted volume, Clean may sustain losses unless it can raise its prices.

Variable-Cost Pricing

In determining the target price for Clean's product, we calculated the cost base by including all costs incurred. This approach is referred to as full-cost pricing. Instead of using full costs to set prices, some companies simply add a markup to their variable costs. Using variable-cost pricing as the basis for setting prices avoids the problem of using uncertain cost information related to fixed-cost-per-unit computations. Variable-cost pricing also is helpful in pricing special orders or when excess capacity exists. The major disadvantage of variable-cost pricing is that managers may set the price too low and consequently fail to cover their fixed costs. In the long run, failure to cover fixed costs will lead to losses. As a result, companies that use variable-cost pricing must adjust their markups to make sure that the price set will provide a fair return.

Example

Alliance Corporation produces air purifiers. The following per unit cost information is available: direct materials Br 16, direct labor Br 18, variable manufacturing overhead Br 11, fixed manufacturing overhead Br 10, variable selling and administrative expenses Br 6, and fixed selling and administrative expenses Br 10. Using a 45% markup percentage on total per unit cost, compute the target selling price.

Solution

Direct materials	Br 16
Direct labor	18
Variable manufacturing overhead	11
Fixed manufacturing overhead	10
Variable selling and administrative expenses	6

Fixed selling and administrative expenses 10
Total unit cost Br 71

Total Unit Cost+ (Total Unit Cost*Mark up Percentage) =Target Selling Price

Br 71+ (Br 71*45%) =Br 102.95

Time-and-Material Pricing

Another variation on cost-plus pricing is called time-and-material pricing. Under this approach, the company sets two pricing rates—one for the labor used on a job and another for the material. The labor rate includes direct labor time and other employee costs. The material charge is based on the cost of direct parts and materials used and a material loading charge for related overhead costs. Time-and-material pricing is widely used in service industries, especially professional firms such as public accounting, law, engineering, and consulting firms, as well as construction companies, repair shops, and printers.

 ***Activity 5: Pricing Decisions***

What are the most common pricing decisions that firms use

5.4 Transfer pricing

In today's global economy, growth is vital to survival. Frequently growth is "vertical," meaning the company expands in the direction of either its suppliers or its customers. Divisions within vertically integrated companies normally transfer goods or services to other divisions within the same company, as well as make sales to customers outside the company. When companies transfer goods internally, the price used to record the transfer between the two divisions is the **transfer price**.

The pricing issues presented by transfer pricing are similar to those related to outside pricing issues. The objective is to maximize the return to the whole company. In addition, in the transfer pricing situation, it is important that divisional performance not decline because of internal transfers. As a result, setting a transfer price is complicated because of competing interests among divisions within the company. For example, setting the transfer price high will benefit the selling division, but will hurt the purchasing division.

- A transfer price is a price charged by a selling division to the buying division in decentralized businesses

There are three possible approaches for determining a transfer price:

- Negotiated transfer prices
- Cost-based transfer prices
- Market-based transfer prices

Conceptually, a negotiated transfer price should work best, but due to practical considerations, companies often use the other two methods.

Negotiated Transfer Prices

The **negotiated transfer price** is determined through agreement of division managers. Under negotiated transfer pricing, the selling division establishes a minimum transfer price, and the purchasing division establishes a maximum transfer price. This system provides a sound basis for establishing a transfer price because both divisions are better off if the proper decision rules are used. However, companies often do not use negotiated transfer pricing because:

- Market price information is sometimes not easily obtainable
- A lack of trust between the two negotiating divisions may lead to a breakdown in the negotiations
- Negotiations often lead to different pricing strategies from division to division, which is cumbersome and sometimes costly to implement
- Many companies, therefore, often use simple systems based on cost or market information to develop transfer prices.

No excess capacity and Excess capacity

When the selling division has no excess capacity, it must receive from the buying division a payment that will at least cover its variable cost per unit. If the selling division cannot cover that amount called the minimum transfer price, it should not sell its product to the selling division. But if the selling division has excess capacity, there will be no opportunity cost

A negotiated transfer price is a practical alternative when market imperfections exist for the transferred good and it is considered a good transfer price only if the opportunity cost rule is met. That is, the opportunity cost of the selling division is less than the opportunity cost of the buying division. The minimum transfer price and the maximum transfer price set the limits of the negotiation set.

The transfer price can be negotiated from the market price when there are:

- Avoidable distribution costs such as selling, transportation, and collection expenses.
- Excess capacity in the selling division

Thus, the negotiated transfer price is set between the limits of:

The minimum transfer price = Market price – Avoidable distribution costs

The maximum transfer price = Market price

When the selling division has no excess capacity:

The minimum transfer price = Market price
The maximum transfer price = Market price

Note that the opportunity cost is zero.
When the selling division has excess capacity:
The minimum transfer price = Variable cost per unit
The maximum transfer price = Market price

Note that accepting an internal purchase order at a price above the minimum transfer price will provide positive contribution margin to the selling division.

Disadvantages of negotiated transfer prices include:

- One division manager may possess “private” information and, thus, can take advantage of another division manager.
- Divisional performance measures may be distorted by the negotiating skills of the managers.
- Negotiating takes considerable time and resources.

Cost-Based Transfer Prices

One method of determining transfer prices is to base the transfer price on the costs incurred by the division producing the goods or services. If the company uses a cost-based transfer price, the transfer price may be based on variable costs alone, or on variable costs plus fixed costs. The selling division may add a markup. Under a cost-based approach, divisions sometimes use improper transfer prices. This leads to a loss of profitability for the company and unfair evaluations of division performance. To

Notwithstanding these disadvantages, the cost system is simple to understand and easy to use because the information is already available in the accounting system. In addition, market information is sometimes not available, so the only alternative is some type of cost-based system. As a result, it is the most common method used by companies to establish transfer prices.

Market-Based Transfer Prices

The market-based transfer price is based on existing market prices of competing goods or services. A market-based system is often considered the best approach because it is objective and generally provides the proper economic incentives. As it is known, in many cases, there simply is not a well-defined market for the good or service being transferred. As a result, a reasonable market value cannot be developed, and therefore companies resort to a cost-based system. If there is a perfectly competitive outside market for the good to be transferred, the correct transfer price is the market price.

Activity 6: Transfer Pricing Decisions

Describe the techniques firms use in setting transfer price

- Dear learner, please make sure that you have read the chapter carefully and properly understood activity questions. If you have done that, please read summary and precede to self assessment questions.

Summary

Management's decision-making process consists of identifying the problem and assigning responsibility for the decision, determining and evaluating possible courses of action, making the decision, and reviewing the results of the decision. Incremental analysis identifies financial data that change under alternative courses of action. These data are relevant to the decision because they will vary in the future among the possible alternatives.
Using relevant information, managers usually make the following marketing and production decisions among others:

- Special sales order
- Deletion or Addition of Products or Departments
- Optimal Use of Limited Resources
- Make or buy decisions
- Sell or further process decisions
- Equipment replacement decisions

In accepting a special sales order, the relevant costs are those that change if the order is accepted. These are typically variable manufacturing costs. The relevant information in accepting an order at a special price is the difference between the variable manufacturing costs to produce the special order and expected revenues. In a make-or-buy decision, the relevant costs are (a) the variable manufacturing costs that will be saved, (b) the purchase price, and (c) opportunity costs. The decision rule for whether to sell or process materials further is: Process further as long as the incremental revenue from processing exceeds the incremental processing costs. The relevant costs to be considered in determining whether equipment should be retained or replaced are the effects on variable costs and the cost of the new equipment. Also, any disposal value of the existing asset must be considered. In deciding whether to eliminate an unprofitable segment, the relevant costs are the variable costs that drive the contribution margin, if any, produced by the segment. Disposition of the segment's fixed expenses must also be considered. The most common pricing decisions that firms use

include among others: Target Costing, Cost-Plus Pricing, Variable-Cost Pricing and Time-and-Material Pricing. To compute a target cost, the company determines its target selling price. Once the target selling price is set, it determines its target cost by setting a desired profit. The difference between the target price and desired profit is the target cost of the product. Cost-plus pricing involves establishing a cost base and adding to this cost base a markup to determine a target selling price. The cost-plus pricing formula is expressed as follows:

Target selling price= Cost+(Markup percentage*Cost).

Under time-and-material pricing, two pricing rates are set—one for the labor used on a job and another for the material. The labor rate includes direct labor time and other employee costs. The material charge is based on the cost of direct parts and materials used and a material loading charge for related overhead costs.

Companies use three techniques to establish transfer price. These are:

- Negotiated transfer prices
- Cost-based transfer prices
- Market-based transfer prices

The negotiated price is determined through agreement of division managers. Under a cost-based approach, the transfer price may be based on variable cost alone or on variable cost plus fixed costs. Companies may add a markup to these numbers. The cost-based approach often leads to poor performance evaluations and purchasing decisions. The advantage of the cost-based system is its simplicity. A market-based transfer price is based on existing competing market prices and services. A market-based system is often considered the best approach because it is objective and generally provides the proper economic incentives.

Checklist

Dear learner, now you have completed the fifth chapter, so you need to check whether you have grasped the concepts discussed in this chapter. If your answer to the questions below is No, then you have to go back and read the relevant sub-section again.

Can you:	**Yes**	**No**
1. Explain decision models and list steps in decision process	☐	☐
2. Explain relevant and irrelevant information	☐	☐
3. Differentiate between qualitative and quantitative information	☐	☐

4. Discuss the various production and marketing decisions

5. Discuss the various pricing decisions ☐ ☐

6. Explain transfer pricing ☐ ☐

Good! If, you have understood the above points, then proceed to the next exercise.

 **Self Assessment Questions**

Part I: True-False Questions

Write "True" if the statement is correct and "False" if the statement is wrong for the following questions

1. Relevant revenues are expected future revenues that do NOT differ among alternatives.
2. The cost of a machine purchased last year will be irrelevant in a decision for next year.
3. If a manufacturer chooses to continue purchasing direct materials from a supplier because of the ongoing relationship that has developed over the years, the decision is based partially on qualitative factors.
4. Full costs of a product are relevant for one-time-only special order pricing decisions.
5. In a one-time special order situation, if the price offered by the buyer is less than the absorption cost per unit, the special order may still be profitable since absorption costs include allocated fixed manufacturing overhead.
6. In a make-or-buy decision when there are alternative uses for capacity, the opportunity cost of idle capacity is irrelevant.
7. A cost may be relevant for one decision, but NOT relevant for a different decision.
8. Relevant revenues and relevant costs are the only information managers need to select among alternatives.
9. In a make-or-buy decision when there are alternative uses for capacity, the opportunity cost of idle capacity is irrelevant.
10. When capacity is constrained, relevant costs equal incremental costs plus opportunity costs.
11. For short-run product-mix decisions, maximizing contribution margin will also result in maximizing operating income.
12. Avoidable variable and fixed costs should be evaluated when deciding whether to discontinue a product, product line, business segment, or customer.
13. When replacing an old machine with a new machine, the book value of the old machine is a relevant cost.
14. All variable costs are relevant and all fixed costs are irrelevant.
15. For short-run product-mix decisions, maximizing

contribution margin will also result in maximizing operating income.

Part II: Multiple Choice Questions

Choose the letter of the best answer and Write the letter of the correct answer for the questions that follow

1. A decision model involves:

   A. only quantitative analyses
   B. both quantitative and qualitative analyses
   C. only qualitative analyses
   D. a manager's instinct

2. When using the five-step decision process, which one of the following steps should be done last?

   A. Obtain information
   B. Choose an alternative
   C. Evaluation and feedback
   D. Implementing the decision

3. For decision making, a listing of the relevant costs:

   A. will help the decision maker concentrate on the pertinent data
   B. will only include future costs
   C. will only include costs that differ among alternatives
   D. All of these answers are correct.

4. Which of the following costs are NEVER relevant in the decision-making process?

   A. fixed costs
   B. historical costs
   C. relevant costs
   D. variable costs

5. Relevant information has all of these characteristics EXCEPT:

   A. past costs are irrelevant
   B. all future revenues and expenses are relevant
   C. different alternatives can be compared by examining differences in total revenue and expenses
   D. qualitative factors should be considered

6. When making decisions:

   A. quantitative factors are the most important
   B. qualitative factors are the most important
   C. appropriate weight must be given to both quantitative and qualitative

factors
D. both quantitative and qualitative factors are unimportant

7. One-time-only special orders should only be accepted if:

A. incremental revenues exceed incremental costs
B. differential revenues exceed variable costs
C. incremental revenues exceed fixed costs
D. total revenues exceed total costs

8. With a constraining resource, managers should choose the product with the:

A. lowest contribution margin per unit of the constraining resource
B. highest sales price
C. highest contribution margin per unit of the constraining resource
D. highest gross profit

9. When deciding whether to discontinue a segment of a business, relevant costs include all of the following EXCEPT:

A. fixed supervision costs that can be eliminated
B. variable marketing costs per unit of product sold
C. cost of goods sold
D. future administrative costs that will continue

10. A company decided to replace an old machine with a new machine. Which of the following is considered a relevant cost?

A. the book value of the old equipment
B. depreciation expense on the old equipment
C. the loss on the disposal of the old equipment
D. the current disposal price of the old equipment

11. The product strategy in which companies first determine the price at which they can sell a new product and then design a product that can be produced at a low enough cost to provide adequate operating income is referred to as:

A. cost-plus pricing
B. target costing
C. variable costing
D. full costing

12. The markup percentage is usually higher if the cost base used is:

A. the full cost of the product
B. the variable cost of the product
C. variable manufacturing costs
D. total manufacturing costs

13. The objective of a transfer pricing system should be to _____.

A. maximize the transfer price
B. minimize the transfer price
C. maintain goal congruence between the divisions and the entire firm.
D. B and C.
E. none of the above

14. The use of cost-based transfer prices has the advantage of _____.

A. disguising the true cost-behavior pattern of the good or service being transferred
B. reducing inefficiency on the part of the supplying division
C. leading to goal congruence and managerial effort more than the use of market-based prices
D. being easy to determine using existing accounting records

15. Sometimes market prices cannot be used in a transfer-pricing situation. Which of the following is not a reason that market prices cannot be used?

A. may be impossible to determine
B. may be very costly to gather the information
C. may be nonexistent
D. may be inapplicable in the transfer pricing situation

Part-III: Workout each of the following questions clearly

1. Ratliff Company has a current production level of 20,000 units per month. Unit costs at this level are:

Direct materials	Br 0.25
Direct labor	0.40
Variable overhead	0.15
Fixed overhead	0.20
Marketing - fixed	0.20
Marketing/distribution - variable	0.40

Current monthly sales are 18,000 units. Jim Company has contacted Ratliff Company about purchasing 1,500 units at Br 2.00 each. Current sales would NOT be affected by the one-time-only special order, and variable marketing/distribution costs would NOT be incurred on the special order.

Required:

What is Ratliff Company's change in operating profits if the special order is accepted?

2. Southwestern Company needs 1,000 motors in its manufacture of automobiles. It can buy the motors from Jinx Motors for Br 1,250 each.

South western's plant can manufacture the motors for the following costs per unit:

Direct materials	Br 500
Direct manufacturing labor	250
Variable manufacturing overhead	200
Fixed manufacturing overhead	350
Total	Br 1,300

If Southwestern buys the motors from Jinx, 70% of the fixed manufacturing overhead applied will not be avoided.

Required:

A. Should the company make or buy the motors?
B. What additional factors should Southwestern consider in deciding whether or NOT to make or buy the motors?

3. Rambo Company has three products, A, B, and C. The following information is available:

	Product A	**Product B**	**Product C**
Sales	Br 60,000	Br 90,000	Br 24,000
Variable costs	36,000	48,000	15,000
Contribution margin	24,000	42,000	9,000
Fixed costs:			
Avoidable	6,000	15,000	4,000
Unavoidable	7,000	9,000	5,400
Operating income	Br 11,000	Br 18,000	Br (400)

Rambo Company is thinking of dropping Product C because it is reporting a loss. Assuming Rambo drops Product C and does NOT replace it.

Required:

What will happen to operating income as a result of this decision?

Answers or Solutions to Activities and Self Test Questions

Solutions to Activity Questions:

Chapter One

Activity 1:

Strategic cost management describes cost management that specifically focuses on strategic issues

Activity 2:

Value chain is the sequence of business functions in which customer usefulness is added to products.

Activity 3:

Managers use a five-step decision-making process to implement strategy these are:

- identify the problem and uncertainties
- obtain information
- make predictions about the future
- make decisions by choosing among alternatives and
- implement the decision, evaluate performance, and learn.

Activity 4:

The accounting system formalizes management plans by expressing them as budgets and control through performance reports

Chapter Two

Activity 1:

Fixed costs are costs that remain unchanged in total regardless of changes in the volume of production and variable costs are costs that change proportionally with the change in the volume of production

Activity 2:

Contribution margin per unit= (Br 7,000 – Br 2,800)/700 = Br 6

Breakeven point in units= Fixed cost/Unit contribution margin

Br 1,200/Br 6 = 200 units

Activity 3:

Let X be the number of units that should be manufactured and sold to cover the expenditure

Br 80X – Br 32X – Br 16,000 = 0; X = 334 units to cover the expenditures

Activity 4:

Birr sales = (Br 40,000 + Br 10,000) / .25 = Br 200,000

Selling price per unit =Br 200,000 / 50,000 units = Br 4 per unit

Activity 5:

Margin of safety percentage=Br 1,250-Br 1,000/ Br 1,250=20%

Activity 6:

If planned net income is Br 30,000 and the tax rate is 30%, then planned operating income would be: [Br 30,000 / (1.0 - .3) = Br 42,857].

Activity 7:

Let N = units of product Y; and 2N = units of product X;

(Br 10.00 – Br 2.50)2N + (Br 15.00 – Br 5.00) N – Br 50,000 = 0

Br 15N + Br 10N = Br 50,000

Br 25N = Br 50,000

N = 2,000 units

Product Y = 2,000 units; Product X = 4,000 units

Chapter Three

Activity 1:

Budgeting forces managers to plan, promotes coordination and communication, and provides a benchmark for evaluating actual performance. The budget really represents the plan the company has in place to achieve its goals.

Master budget consists of:-

An **operating budget** that results in a projected income statement and it consists:

- Sales budget
- Purchases budget
- Cost of goods sold budget
- Operating expense budget

A **financial budget** that results in a projected balance sheet and it consists of:

- Capital budget
- Cash budget
- Budgeted balance sheets
- Budgeted statement of cash flows

Activity 2:

A Master Budget is a consolidated summary of the various functional budgets. It coordinates all the financial projections in the organization's individual budgets in a single organization wide set of budgets for a set time period.

Activity 3:

Decentralization is the process of delegating decision making authority to low level managers. But if decisions are made at the top level without the participation of low level managers, it is centralization.

Activity 4:

Responsibility accounting is a system that measures the results of each responsibility center and compares those results with some measure of expected or budgeted outcome.

Chapter Four

Activity 1:

A **static budget** is a budget that is based on one level of output; it is not adjusted or altered after it is set, regardless of ensuing changes in actual output (or actual revenue and cost drivers). A **flexible budget** is adjusted in accordance with ensuing changes in actual output (or actual revenue and cost drivers). A flexible budget is calculated at the end of the period when the actual output is known.

Activity 2:

The two elements of master budget variance are flexible budget variance and sales activity variance

Activity 3:

Flexible budget variances measure the efficiency of operations at the actual level of activity but sales activity variances measure how effective managers have been in meeting the planned sales objectives.

Activity 4:

Standard cost is a cost per unit set that should be incurred under most efficient operating condition.

Activity 5:

Ideal standard represents perfect operating conditions and therefore can be hard to achieve. It assumes no material wastage, the worker always measures perfectly, and the machines never get out of adjustment

Activity 6:

Appropriateness and attainability are the two important things that should be considered in standard setting

Activity 7:

- Material price variance measures how much is paid for material consumed and how much should have been paid and if actual price is higher than standard, an unfavorable variance exists.
- Material efficiency or usage variance measures how much material is consumed and how much should have been consumed and an unfavorable variance results when the actual quantity used exceeds the standard quantity allowed.

Activity 8:

- Labor rate variance measures how much is paid and how much should have been paid. If the actual rate is higher than the standard rate, an unfavorable variance exists. If the actual rate is less than the standard rate, a favorable variance exists.
- Labor efficiency variance measures how much time is used and how much should have been used. If more hours are used to produce a given number of products than are allowed under standard, an unfavorable variance exists.

Activity 9:

The two elements of fixed overhead variance are spending variance and production volume variance

Activity 10:

The two items that will contribute to sales variance are the sales-price variance **(SPV**) and the sales-volume variance **(SVV)**

Chapter Five

Activity 1:

The five steps in the decision model include:

- Define the Problem
- Identify the Alternatives

- Identify the Costs and Benefits Associated with Each Feasible Alternative
- Total the Relevant Costs and Benefits for Each Feasible Alternative
- Assess the Qualitative Factors
- Make the Decision

Activity 2:

A special order is a one-time order that is not considered part of the company's normal or on-going business and the decision criteria are that the special order should be accepted if the incremental revenue from the special order exceeds the incremental costs of the order

Activity 3:

The decision criterion in make or buy decision is comparing cost of making and cost of buying and selecting an alternative with the lowest cost

Activity 4:

The decision criterion is to compare incremental costs and incremental revenues and further process if the incremental revenue is greater than incremental costs or otherwise.

Activity 5:

The most common pricing decisions that firms use include among others:

- Target Costing
- Cost-Plus Pricing
- Variable-Cost Pricing
- Time-and-Material Pricing

Activity 6:

Firms use three techniques to establish transfer price. These are:

- Negotiated transfer prices
- Cost-based transfer prices
- Market-based transfer prices

Solutions to Self Assessment Questions:

Chapter One

Part-I: True or False

1. TRUE
2. TRUE
3. TRUE

4. TRUE
5. FALSE

Part-II: Multiple Choices

1. D
2. D
3. C
4. A
5. D

Part-III: Discussion Questions

Q1

A budget is a planning tool, a quantitative expression of a plan of action. First, actions are planned and then they are communicated to the entire organization. The budget also helps with coordination.

Chapter Two

Part-I: True or False					**Part-II: Multiple Choices**		
1	TRUE	6	TRUE	1	C	6	D
2	FALSE	7	TRUE	2	C	7	A
3	FALSE	8	TRUE	3	B	8	A
4	TRUE	9	FALSE	4	D	9	A
5	FALSE	10	TRUE	5	B	10	C

Part-III: Workout

Q1

A. N = Breakeven units

Br 30N – Br 20N – Br 10,000 – Br 8,000 = 0

Br 10N – Br 18,000 = 0

N = Br 18,000/Br 10 = 1,800 batteries

B. Margin of safety = Br 60,000 - (Br 30 × 1,800) = Br 6,000
C. N = Breakeven units

Br 30N – Br 24N – Br 10,000 - Br 8,000 = 0

Br 6N – Br 18,000 = 0

N = Br 18,000/Br 6 = 3,000 batteries

D. N = Breakeven units

Br 33N – Br 20N – Br 9,000 – Br 7,900 = 0

Br 13N – Br 16,900 = 0 N = Br 16,900/Br 13 = 1,300 batteries

Q2

A. N = breakeven in boys' shirts 2N = breakeven in men's shirts

Br 24N + Br 28.80(2N) – Br 16.80N – Br 20.40(2N) – Br 38,400 = 0

Br 81.6N – Br 57.6N – Br 38,400 = 0

Br 24N – Br 38,400 = 0

N = Br 38,400/Br 24 = 1,600 shirts

Therefore, to break even, 1,600 boys' shirts and 3,200 men's shirts need to be sold.

B.	**Boys'**	**Men's**	**Total**
Sales in units	3,000	6,000	9,000
Revenue	Br 72,000	Br 172,800	Br 244,800
Variable costs	50,400	122,400	172,800
Contribution margin	Br 21,600	Br 50,400	Br 72,000
Fixed costs			38,400
Operating income			Br 33,600

Chapter Three

Part-I: True or False				**Part-II: Multiple Choices**			
1	TRUE	6	FALSE	1	D	6	A
2	FALSE	7	FALSE	2	B	7	C
3	TRUE	8	TRUE	3	D	8	A
4	FALSE	9	TRUE	4	C	9	C
5	TRUE	10	TRUE	5	D	10	D

Part-III: Workout

Q1

A. Sales Budget

	March	April	May	June	July	Total
Credit Sales	16,000	20,000	32,000	24,000	20,000	
Cash Sales	24,000	30,000	48,000	36,000	30,000	
Total Sales	40,000	50,000	80,000	60,000	50,000	240,000

B. Cash Collection Budget

	April	May	June	July
Cash sales this month	30,000	48,000	36,000	30,000
40% of last month credit sales	16,000	20,000	32,000	24,000
Total Collection	46,000	68,000	68,000	54,000

C. Purchases Budget and Disbursement Budget

Budgeted purchase=Desired ending inventory +Cost of goods sold-Beginning inventory

Disbursement includes; 50% of the current month's purchase and 50% of the previous month purchase.

	March	April	May	June	July
Desired Ending Inventory	48,000	64,800	53,600	48,000	42,400
Cost of Goods sold	28,000	35,000	56,000	42,000	35,000
Total Needed	76,000	99,800	109,600	90,000	77,400
Less: Beginning Inventory	42,400	48,000	64,800	53,600	48,000
Purchases	**33,600**	**51,800**	**44,800**	**36,400**	**29,400**
Disbursement Budget					
50% of last month purchase		16,800	25,900	22,400	18,200
50% of this month purchase		25,900	22,400	18,200	14,700
Disbursement for purchases		**42,700**	**48,300**	**40,600**	**32,900**

Operating Expense Budget

	March	**April**	**May**	**June**	**July**	**Total**
Wages (Fixed)	2,500	2,500	2,500	2,500	2,500	
Commission(15% of this month sales)	6,000	7,500	12,000	9,000	7,500	
Total Wages and Commission	**8,500**	**10,000**	**14,500**	**11,500**	**10,000**	**46,000**
Miscellaneous Expense(5% of this month sales		2,500	4,000	3,000	2,500	12,000
Rent Expense		2,000	2,000	2,000	2,000	8,000
Insurance		200	200	200	200	800
Depreciation		500	500	500	500	1,000
Total operating Expense		**15,200**	**21,200**	**17,200**	**15,200**	**68,800**

D. Disbursement for Operating Expenses

Disbursement includes; 50% of the last month's and this month's wages and commissions and miscellaneous expenses and rent.

	April	**May**	**June**	**July**
Wages and commissions				
50% of last month's expense	4,250	5,000	7,250	5,750
50% of last month's expense	5,000	7,250	5,750	5,000
Total wages and commissions	**9,250**	**12,250**	**13,000**	**10,750**
Miscellaneous expenses	2,500	4,000	3,000	2,500
Rent	2,000	2,000	2,000	2,000
Total Disbursement	**13,750**	**18,250**	**18,000**	**15,250**

E. Budgeted Income Statement

Awash Company **Income Statement** **For The Month Ended May 31 2004**

Sales	240,000		
Cost of Goods Sold	168,000		
Gross profit		**72,000**	
Operating Expenses:			
Wages and commissions	46,000		
Rent	8,000		
Miscellaneous Expenses	12,000		
Insurance Expense	800		
Depreciation Expense	2,000		
Total Operating Expenses		**68,800**	
Operating Income			**3,200**
Interest Expense			675
Net income			**2,525**

Cash Budget

	April	**May**	**June**	**July**
Beginning Cash Balance	10,000	10,550	10,970	10,965
Collections from Customers	46,000	68,000	68,000	54,000
Total cash Available Before Financing(W)	**56,000**	**78,550**	**78,970**	**64,965**
Cash Disbursement:				
Purchase of Merchandise	42,700	48,300	40,600	32,900
Operating Expense	13,750	18,250	18,000	15,250
Purchase of New Fixtures	3,000			
Total Disbursement (X)	**59,450**	**66,550**	**58,600**	**48,150**
Minimum Cash Needed (Y)	10,000	10,000	10,000	10,000
Total Cash Needed	**69,450**	**76550**	**68,600**	**58,150**
Excess(Deficiency of total Cash available Over Cash Needed Before Financing (W-X-Y)	(13,450)	2,000	10,370	6,815
Financing (Z):				
Borrowing	14,000			
Repayment		(1,000)	(9,000)	(4,000)
Interest		(30)	(405)	(240)
Total Cash Increase or Decrease from Financing	**14,000**	**(1,030)**	**(9405)**	**(4,240)**
Ending cash Balance (W-X+Z)	**10,550**	**10,970**	**10,965**	**12,575**

F. Budgeted Balance Sheet

Awash Company

Balance Sheet **July 31 2004**			
Assets:			
Current Assets			
Cash	12,575		
Accounts Receivable	20,000		
Merchandise Inventory	42,400		
Un Expired Insurance	1,000		
Total current assets		**75,975**	
Plant assets:			
Equipment and Fixtures	40,000		
Accumulated Depreciation	14,800		
Total Plant Assets		**25,250**	
Total Assets			**101,175**
Liabilities and Owner's Equity			
Current Liabilities			
Accounts Payable	14,700		
Accrued Wages and Commissions	5,000		
Total Liabilities		**19,700**	
Owner's Equity		**81,475**	
Total Liabilities and Owner's Equity			**101,175**

Note:

*Accounts Payable=0.5*29,400*

Accumulated Depreciation=12,800+2,000

Owners Equity=78,950+2,525

*Accrued wages and commissions=0.5*10,000*

Interest Expense=30+405+240

Chapter Four

Part-I: True or False				**Part-II: Multiple Choices**					
1	FALSE	**13**	TRUE	**1**	A	**13**	D		
2	TRUE	**14**	TRUE	**2**	B	**14**	A		

3	TRUE	**15**	TRUE	**3**	B	**15**	C		
4	TRUE	**16**	TRUE	**4**	D	**16**	D		
5	FALSE	**17**	FALSE	**5**	C	**17**	B		
6	FALSE	**18**	TRUE	**6**	D	**18**	B		
7	TRUE	**19**	TRUE	**7**	D	**19**	C		
8	TRUE			**8**	B	**20**	B		
9	TRUE			**9**	C	**21**	A		
10	TRUE			**10**	B	**22**	A		
11	FALSE			**11**	C	**23**	A		
12	TRUE			**12**	A	**24**	D		

Part-III: Workout

Q1:

A. Br 42,080 – Br 1,000 = Br 41,080
B. Br 41,080 + Br 1,400 = Br 42,480
C. Br 15,860 + Br 200 = Br 16,060
D. Br 17,740 – Br 16,080 = Br 1,660 favorable
E. Br 2,340 favorable + Br 1,400 unfavorable = Br 940 favorable
F. Br 17,740 – Br 15,140 = Br 2,600 favorable

Q2:

A.Actual amount spent for Material A=Br 20,000 + 1,000 U – Br 1,200 F = Br 19,800
B.Actual amount spent for Material B=Br 30,000 – Br 500 F + Br 800 U = Br 30,300
C.It is for Material B because un favorable efficiency variance

Q3:

A.Standard cost per urn =Br 6,000/1,000

= Br 6.00 per urn

Standard number of pounds per urn= Br 6.00/Br 6.00

= 1.0 pound per urn

B.Materials price variance= Total variance - efficiency variance

= (Br 5,600 – Br 6,000) – Br 120 unfavorable

= Br 520 favorable

C. Total standard labor cost of actual hours= ((1,000/2) × Br 24) – Br 336 favorable

= Br 11,664

Actual hours = Br 11,664/24 = 486 hours

Total actual costs = 486 × Br 24.50 = Br 11,907

D. Labor price variance = Br 11,907 – Br 11,664

= Br 243 unfavorable

Chapter Five

Part-I: True or False				**Part-II: Multiple Choices**			
1	FALSE	**9**	FALSE	**1**	B	**9**	D
2	TRUE	**10**	TRUE	**2**	C	**10**	D
3	TRUE	**11**	TRUE	**3**	D	**11**	B
4	FALSE	**12**	TRUE	**4**	B	**12**	C
5	TRUE	**13**	FALSE	**5**	B	**13**	C
6	FALSE	**14**	FALSE	**6**	C	**14**	D
7	TRUE	**15**	TRUE	**7**	A	**15**	B
8	FALSE			**8**	C		

Part-III: Workout

Q1:

Manufacturing cost per unit = Br 0.25 + Br 0.40 + Br 0.15 = Br 0.80 1,500 × (Br 2.00 –Br 0.80) = Br 1,800 increase

Q2:

A. Cost to buy the part: (1,000 × Br 1,250) Br 1,250,000

Relevant costs to make:

Variable costs:

Direct materials (1,000 × Br 500)	Br 500,000
Direct manufacturing labor (1,000 × Br 250)	250,000
Variable manufacturing overhead (1,000 × Br 200)	200,000
Total	950,000
Avoidable fixed costs: (Br 350 × 1,000 × 0.30)	105,000
Savings if part is manufactured	Br 195,000

B. Management should consider several qualitative factors in deciding whether to make or buy the motors.

- Quality controls - The Company's ability to manufacture quality motors versus that of the supplier.
- Delivery - Can they make them when needed versus Jinx delivering them when needed?
- Reputation - What is the overall reputation of Jinx?
- Term - Is Jinx willing to make long-term commitments for delivery of the motors?
- Facilities - What are the opportunity costs of using the space and equipment to manufacture other items?

Q3:

Dropping Product C would mean Rambo gives up Br 9,000 in contribution margin while only saving Br 4,000 in avoidable fixed costs. Without Product C, operating income would be Br 5,000 less than currently reported.

Glossary

Management accounting: is part of accounting that measures analyzes, and reports financial and nonfinancial information that helps managers make decisions to fulfill the goals of an organization.

***Financial accounting*:** Is part of accounting that focuses on reporting to external parties such as investors, government agencies, banks, and suppliers. It measures and records business transactions and provides financial statements that are based on generally accepted accounting principles (GAAP).

Value chain: Is the sequence of business functions in which customer usefulness is added to products.

Fixed Costs: *These* are costs that that remain the same in total regardless of the change in the volume of production within a given relevant range.

Variable Costs: These are costs that change in total in direct proportion with the change in the volume of production.

Cost-volume-profit analysis: Cost-volume-profit (CVP) analysis is a powerful tool that helps managers understand the relationships among cost, volume, and profit.

Contribution Margin: Is the amount remaining from sales revenue after variable expenses have been deducted.

***Break-even point*:** The point (sales quantity or birr sales) where the company covers all its cost

Contribution Margin Ratio (CM Ratio): Is the ratio of contribution margin to birr sales

Sensitivity Analysis: Is a tool that shows the changes that will occur to say profit whenever there is a change in other variables such as variable costs, fixed costs, selling price, sales quantity and the like.

Margin of safety: The margin of safety is the excess of budgeted (or actual) sales birr over the breakeven volume of sales birr.

Sales Mix: **S**ales mix refers to the relative proportions in which a company's products are sold. The idea is to achieve the combination, or mix, that will yield the greatest amount of profits.

Budget: A budget is a quantitative expression of a plan of action and an aid to the coordination and implementation of this plan.

***Master Budgets*:** A Master Budget is a consolidated summary of the various functional budgets. It coordinates all the financial projections in the organization's individual budgets in a single organization wide set of budgets for a set time period.

Decentralization: The act delegating decision making authority to low level managers

***Responsibility Accounting*:** Responsibility accounting is a system that measures the results of each responsibility center and compares those results with some measure of expected or budgeted outcome.

Responsibility Center: Is part of an entity whose managers are responsible only for the activities of the center.

***Flexible budget*:** Is a budget that is prepared at various levels of activity and adjusted in accordance with ensuing changes in actual output (or

actual revenue and cost drivers). A flexible budget is calculated at the end of the period when the actual output is known.

*F**avorable variance:*** Is a variance that increases operating income relative to the budgeted amount.

***Un-favorable variance*:** Is a variance that decreases operating income relative to the budgeted amount

Sales Activity Variances: Sales activity variances measure how effective managers have been in meeting the planned sales objectives.

Flexible Budget Variance: Flexible budget variances measure the efficiency of operations at the actual level of activity

Decision model: Is a formal method of making a choice that often involves both quantitative and qualitative analyses.

Relevant costs and revenues: Are *expected future costs,* and **relevant revenues** are *expected future revenues* that differ among the alternative courses of action being considered. Revenues and costs that are *not relevant* are said to be ***irrelevant*.**

Special sales order: A special order is a one-time order that is not considered part of the company's normal or on-going business.

Avoidable costs: Are costs that will not continue if an ongoing operation is changed or deleted. Therefore, avoidable costs are relevant costs. Avoidable costs include department salaries and other costs that could be eliminated by not operating the specific department.

Unavoidable costs: Aare costs that will continue even if an operation is halted for some time.

A scarce resource or a limiting factor: Refers to any factor that restrict or constraint the production or sale of a product or service.

Cost plus pricing: This approach involves establishing a cost base and adding to this cost base a markup to determine a target selling price.

Transfer price: Is a price at which goods are transferred from one responsibility center to the other in decentralized businesses.

Negotiated Transfer Prices: The **negotiated transfer price** is a price determined through agreement of division managers.

Cost-Based Transfer Prices: Method of determining transfer prices based on the costs incurred by the division producing the goods or services.

Standard cost: A per unit cost set carefully that should be attained under most efficient operating condition.

Variances: Variances are deviations of actual performances from expected performances.

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Tutor Marked Assignments

Part II: Multiple Choice Questions

Choose the letter of the best answer and Write the letter of the correct answer for the questions that follow

1. In CVP analysis, focusing on target net income rather than operating income:

A. will increase the breakeven point
B. will decrease the breakeven point
C. will not change the breakeven point
D. does not allow calculation of breakeven point

Assume the following cost information for Feye Company:

Selling price Br 120 per unit

Variable costs Br 80 per unit

Total fixed costs	Br 80,000
Tax rate	40%

2. What minimum volume of sales dollars is required to earn an after tax net income of Br 30,000?

A. Br 465,000
B. Br 330,000
C. Br 390,000
D. Br 165,000

3. The time coverage of a budget should be:

A. one year
B. guided by the purpose of the budget
C. cover design through manufacture and sale of the product
D. shorter rather than longer

4. Operating budgets include all of the following EXCEPT:

A. the revenues budget
B. the budgeted income statement
C. the administrative costs budget
D. the budgeted balance sheet

Wakuma Company provides the following data for next year:

Month	**Budgeted Sales**
January	Br 120,000
February	108,000
March	132,000
April	144,000

The gross profit rate is 40% of sales. Inventory at the end of December is Br 21,600 and target ending inventory levels are 30% of next month's sales, stated at cost.

Based on the above information, answer questions 5 and 6

5. Purchases budgeted for January total:

A. Br 130,800
B. Br 72,000
C. Br 69,840
D. Br 74,160

6. Purchases budgeted for February total:

A. Br 69,120
B. Br 60,480
C. Br 115,200
D. Br 64,800

ABC Furniture Company estimates the following number of mattress sales for the first four months of 2004:

Month	**Sales**
January	10,000
February	14,000
March	13,000
April	16,000

Finished goods inventory at the end of December is 3,000 units. Target ending finished goods inventory is 30% of the next month's sales.

Based on the above information, answer questions 7 and 8

7. How many mattresses need to be produced in January 2004?

A. 8,800 mattresses
B. 11,200 mattresses
C. 13,000 mattresses
D. 14,200 mattresses

8. How many mattresses need to be produced in the first quarter (January, February, March) of 2004?

A. 37,000 mattresses
B. 38,800 mattresses
C. 41,800 mattresses
D. 44,800 mattresses

9. An unfavorable variance:

A. may suggest investigation is needed
B. is conclusive evidence of poor performance
C. demands that standards be recomputed

D. indicates continuous improvement is needed

10. The variance that LEAST affects cost control is the:

A. flexible-budget variance
B. direct-material-price variance
C. sales-volume variance
D. direct manufacturing labor efficiency variance

Molla Corporation planned to use Br 37.50 of material per unit but actually used Br 36.75 of material per unit, and planned to make 1,800 units but actually made 1,600 units.

Based on the above information, answer questions 11-12

11. The flexible-budget amount is:

A. Br 60,000
B. Br 67,500
C. Br 59,200
D. Br 1,200

12. The flexible-budget variance is:

A. Br 7,500 favorable
B. Br 7,500 unfavorable
C. Br 1,200 unfavorable
D. Br 1,200 favorable

13. The variances that should be investigated by management include:

E. only unfavorable variances

F. only favorable variances

G. all variances, both favorable and unfavorable

H. both favorable and unfavorable variances considered significant in amount for the company

14. From the perspective of control, the direct materials efficiency variance should be isolated at the time of:

A. purchase

B. use

C. completion of the entire product

D. sale of the product

15. When evaluating a make-or-buy decision, which of the following does NOT need to be considered?

    A. alternative uses of the production capacity

    B. the original cost of the production equipment

    C. the quality of the supplier's product

    D. the reliability of the supplier's delivery schedule

16. If a company has excess capacity, the most it would pay for buying a product that it currently makes would be the:

    A. total variable cost of producing the product

    B. market value less the usual markup on the product

    C. total cost of producing the product

    D. market value of the product

Hika Kitchens is approached by Mr. Lemma, a new customer, to fulfill a large one-time-only special order for a product similar to one offered to regular customers. The following per unit data apply for sales to regular customers:

Direct materials	Br 455
Direct labor	300
Variable manufacturing support	45
Fixed manufacturing support	100
Total manufacturing costs	900
Markup (60%)	540
Targeted selling price	Br 1,440

Hika Kitchens has excess capacity. Mr. Lemma wants the cabinets in cherry rather than oak, so direct material costs will increase by Br 50 per unit.

17. For Hika Kitchens, what is the minimum acceptable price of this one-time-only special order?

    A. Br 850
    B. Br 950
    C. Br 805

D. Br 1,460

Part-III: Workout

Workout Each of the Following Questions Clearly

1. Leka Auto Company manufactures a part for use in its production of automobiles. When 10,000 items are produced, the costs per unit are:

Direct materials	Br 12
Direct manufacturing labor	60
Variable manufacturing overhead	24
Fixed manufacturing overhead	32
Total	Br 128

Moti Company has offered to sell Leka Auto Company 10,000 units of the part for Br 120 per unit. The plant facilities could be used to manufacture another part at a savings of Br 180,000 if Leka Auto accepts the supplier's offer. In addition, Br 20 per unit of fixed manufacturing overhead on the original part would be eliminated.

Required:

A. What is the relevant per unit cost for the original part?
B. Which alternative is best for Leka Auto Company? By how much?

2. The following data for the Lowbrow Garden Supplies Company pertains to the production of 2,500 garden spades during March. The spade consists of a wooden handle and a metal forged tool that comes in contact with the ground.

Direct Materials (all materials purchased were used):

Standard cost: Br 1.00 per handle and Br 3.50 per metal tool.

Total actual cost: Br 11,350.

Materials flexible-budget efficiency variance was Br 650 unfavorable.

Direct Manufacturing Labor:

Standard cost is 5 garden spades per hour at Br 20.00 per hour.

Actual cost per hour was Br 21.00.

Labor efficiency variance was Br 400 favorable.

Required:

A. What is the standard direct material amount per garden spade?
B. What is the standard cost allowed for all units produced?
C. What is the total direct materials flexible-budget variance?
D. What is the direct material flexible-budget price variance?
E. What is the total actual cost of direct manufacturing labor?
F. What is the labor price variance for direct manufacturing labor?

3. Wirtu Winter Woolens manufactures jackets and other wool clothing. One of its products requires following:

Direct materials standard 2 square yards at Br 13.50 per yard

Direct manufacturing labor standard 1.5 hours at Br 20.00 per hour

During the third quarter, the company made 1,500 parkas and used 3,150 square yards of fabric costing Br 39,375. Direct labor totaled 2,100 hours for Br 45,150.

Required:

A. Compute the direct materials price and efficiency variances for the quarter.
B. Compute the direct manufacturing labor price and efficiency variances for the quarter.

4. The Harro Card Company, a producer of specialty cards, has asked you to complete several calculations based upon the following information:

Income tax rate	30%
Selling price per unit	Br 6.60
Variable cost per unit	Br 5.28
Total fixed costs	Br 46,200.00

Required:

A. What is the breakeven point in cards?
B. What sales volume is needed to earn an after-tax net income of Br 13,028.40?
C. How many cards must be sold to earn an after-tax net income of Br 18,480?

5. Lensa Corporation has the following budgeted sales for the next six-month period:

Month	**Unit Sales**
June	90,000
July	120,000
August	210,000
September	150,000
October	180,000
November	120,000

There were 30,000 units of finished goods in inventory at the beginning of June. Plans are to have an inventory of finished products that equal 20% of the unit sales for the next month.

Five kilograms of materials are required for each unit produced. Each kilogram of material costs Br 8. Inventory levels for materials are equal to 30% of the needs for the next month. Materials inventory on June 1 was 15,000 kilograms.

Required:

A. Prepare production budgets in units for July, August, and September.
B. Prepare a purchases budget in kilograms for July, August, and September, and give total purchases in both kilograms and birr for each month.

Solutions for Tutor Marked Assignments

Part-I Multiple Choices

1	C	**6**	A	**11**	**A**	**16**	A
2	C	**7**	B	**12**	**D**	**17**	A
3	B	**8**	**B**	**13**	D		
4	D	**9**	**A**	**14**	B		
5	C	**10**	**C**	**15**	B		

Part-II Workout

Q1:

A. Direct materials Br 12

Direct manufacturing labor 60

Variable manufacturing overhead 24

Avoidable fixed manufacturing overhead 20

Total relevant per unit costs Br 116

B.	**Make**	**Buy**	**Effect of Buying**
Purchase price	Br 1,200,000	Br (1,200,000)	
Savings in space	(180,000)	180,000	
Direct materials	Br 120,000	120,000	
Direct manufacturing labor		600,000	600,000
Variable overhead	240,000	240,000	
Fixed overhead saved	(200,000)	200,000	
Totals	Br 960,000	Br 820,000	Br 140,000

- **The best alternative is to buy the part.**

Q2:

A. Standard cost per garden spade = Br 1.00 (handle) + Br 3.50 (tool)

= Br 4.50 per garden spade

B. Standard cost allowed for all units= 2,500 x Br 4.50

= Br 11,250 per garden spade

C.Total materials variance = Br 11,250 – Br 11,350

= Br 100 unfavorable

D.Materials price variance= Total variance - efficiency variance

= (Br 11,350 – Br 11,250) – Br 650 unfavorable

= Br 550 favorable

E. Total standard labor cost of actual hours = ((2,500/5) × Br 20) – Br 400 favorable

= Br 9,600

Actual hours = Br 9,600/20 = 480 hours

Total actual costs = 480 × Br 21 = $10,080

F.Labor price variance = Br 9,600 – Br 10,080

= Br 480 unfavorable

Q3:

A. Direct materials variances:

Actual unit cost = Br 39,375/3,150 square yards

= Br 12.50 per square yard

Price variance = 3,150 × (Br 13.50 – Br 12.50)

= Br 3,150 favorable

Efficiency variance= Br 13.50 × [3,150 - (1,500 × 2)]

= Br 2,025 unfavorable

B. Direct manufacturing labor variances:

Actual labor rate = Br 45,150/2,100

= Br 21.50 per hour

Price variance = 2,100 × ($21.50 - $20.00)

= Br 3,150 unfavorable

Efficiency variance = Br 20.00 × (2,100 - (1,500 × 1.5)

= Br 3,000 favorable

Q4:

A. Br 46,200/(Br 6.60 – Br 5.28) = 35,000 units
B. Br 13,028.40/0.70 = Br 18,612

Br 18,612 + Br 46,200 = Br 64,812

Br 64,812/Br 1.32 = 49,100 units

49,100 units × Br 6.60 = $324,060

C. Br 18,480/0.70 = Br 26,400

Br 26,400 + Br 46,200 = Br 72,600

Br 72,600/Br 1.32 = 55,000 units

Q5:

A.

	July	**August**	**September**
Budgeted sales	120,000	210,000	150,000
Add: Required ending inventory	42,000	30,000	36,000
Total inventory requirements	162,000	240,000	186,000
Less: Beginning inventory	24,000	42,000	30,000
Budgeted production	138,000	198,000	156,000

B.

	July	August	September
Production in units	138,000	198,000	156,000
Targeted ending inventory in Kg.*	297,000	234,000	**252,000
Production needs in Kg.***	690,000	990,000	780,000
Total requirements in Kg.	987,000	1,224,000	1,032,000
Less: Beginning inventory in Kg.****	207,000	297,000	234,000
Purchases needed in Kg.	780,000	927,000	798,000
Cost ($8 per lb.)	× Br 8	× Br 8	× Br 8
Total material purchases	Br 6,240,000	Br 7,416,000	Br 6,384,000

* 0.3 times next month's needs

** (180,000 + 24,000 - 36,000) times 5 Kg. × 0.3

*** 5 Kg. times units to be produced, across row

**** (690,000 × .3) = 207,000 Kg., etc. row across