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AGRICULTURE-LED EXPORT BUSINESSES

Supporting Egypt's Processed Foods Export Industry

Business Planning & Budgeting

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Budgetary Planning And Control

Contents

Section	Subject
A	The nature and purpose of budgets.
B	Operating budgets.
C	Cash budgets.
D	Performance reports and flexible budgets.

Budgetary Planning and Control

Although managers use the data contained in financial statements in a number of ways, these statements are designed primarily for reporting to external users (outside of the corporation), including investors, creditors, and governmental agencies. Financial statements report what has already happened in a business using, insofar as possible, objective facts to report on the past. For the most part, they do not reflect plans for the future or predictions of future events.

Budgets , are formal written statements of plans for the future of an enterprise, often expressed in financial terms, they make use of expected values and forecasts rather than historical accounting data. And, although they are often of interest to investors, bankers, and other external bodies, their primary use is by managers in the internal management of a company.

Objectives

Our objectives for this module are to be able to:

- Describe the nature and purpose of budgets.
- Prepare the following:
  - An operating budget.
  - A cash budget.
  - A projected income statement.
  - A projected balance sheet.
  - A budget performance report.
  - A flexible budget.

Section A
The Nature and Purpose of Budgets

Objectives

At the end of this section, participants will be able to:

- Define the key management function of:
  - Planning.
  - Control.
- Describe :
  - A budget.
  - The role of budgets in planning and control.
  - Other management uses of budgets.
  - The steps in the budgeting process.

The Nature and Purpose of Budgets

- Planning and control are two basic and interrelated functions in managing a business.
- Planning is the process of determining business objectives and formulating strategy to achieve them.
- Control is the process of evaluation results and taking actions to see that desired results are achieved.
- Planning and control are interrelated.
- A budget is a formal plan, expressed in quantitative (often financial) terms.

The Nature and Purpose of Budgets

- Budgets help to perform the following functions:
  - Developing plans and planning capabilities.
  - Controlling operations by measuring actual performance against plans.
  - Motivating employees to accomplish objectives
  - Coordinating plans of different organizational units and integrating them with overall goals.
  - Communicating company plans to managers and employees.

The Nature and Purpose of Budgets

- The following steps are usually performed in the budgeting process:
  - Establishment of overall policies and long - range plans (board of directors).
  - Development of specific budgeting guidelines and instructions (budget committee and departments' managers).
  - Preparation of budget estimates (supervisors and departments managers).
  - Negotiation (supervisors, departments' managers, and the budget committee).
  - Coordination and review (budget committee).
  - Final approval (board of directors).

The Nature and Purpose of Budgets

- Some companies have budgets prepared by a top level budget staff and approved by top management, then transmitted down to lower levels of the organization, however, this process is generally less effective in motivating employees than the budget process just described.
- Changing conditions may bring about budget revisions, or may be taken into account in evaluating actual performance against budgeted performance.

Exercise

For each multiple-choice statement, select the single most appropriate answer.

1. The two basic functions involved in managing a business described in this section are ..... and .....
2. Planning is given formal status by the ..... process.
3. ..... is the process of evaluating results and taking action to see that desired results are achieved.
4. A budget is a formal, quantitative plan, usually expressed in financial terms: true ☐ false ☐
5. In addition to serving the planning and control functions, budgeting helps managers to:

   A. Coordinate activities of various departments.
   B. Communicate goals and plans to the entire organization.
   C. Motivate employees by measuring their performance against pre-established standards.
   D. All of the above.

Exercise

6. Supervisors who are responsible for the preparation of budget estimates also formulate long-range plans and budget guidelines: true ☐ false ☐
7. Budgets are most effective motivating employees when budget estimates are:
   A. Prepared by a high-level budget staff and transmitted down through the organization.
   B. Made by supervisors at the organizational level closest to the operation being budgeted.
   C. The responsibility of the company's accountant.
8. Original budget estimates are usually subject to review by higher-level managers, who often negotiate though but still attainable budget goals with their subordinates: true ☐ false ☐
9. Completed budgets are usually approved by:
   A. Departmental supervisors.
   B. Accountants who compile historical data.
   C. The employees' union.
   D. The budget committee and the board of directors.
10. Once established, budgets should not be revised: true ☐ false ☐

Section B
Operating Budgets

Objectives

At the end of this section, participants will be able to:

- Prepare an operating budget consisting of the following components:
  - Sales budget.
  - Production budget.
  - Materials purchases budget.
  - Cost of goods manufactured budget.
  - Expense budget.
  - Projected income statement.
- Describe the factors considered in making:
  - Sales forecasts.
  - Cost and expense estimates.

Operating Budgets

- An important result of budget preparation is a set projected financial statements with supporting schedules and estimates

- Budget systems are designed to meet the needs of the particular company; no single set of procedures is involved in preparing budgets, and the planning period covered budgets may vary.

- An operating budget usually consists of the following components:
  - A sales budget.
  - A production budget.
  - A materials purchases budget.
  - A cost of goods manufactured budget.
  - An operating expense budget.
  - A projected income statement.

Operating Budgets

- Production and purchases budgets must be based on desired changes in inventory levels, as well as planned sales.

- Sales forecasts are based on past experience, general economic and competitive conditions, sales force estimates, and specific marketing plans.

- In estimating cost or expense, previous levels are often taken as a starting point; zero-based budgeting, however, requires that all estimates be fully justified regardless of previous levels.

Exercise

1. Wood industries, Inc. manufactures and sells a single product. The company prepares quarterly as well as annual budgets. The example here deals with preparation of an operating budget and supporting documents for the first quarter of the calendar year 19x2.

a) The company's sales forecast for the first quarter of 19x2 is 20,000 units, with an expected selling price of $10 per unit. Both the number of units and the selling price are based on careful consideration of a variety of factors, including the company's past experience, current marketing plans, and the general economic outlook. Prepare a sales budget.

Exercise

b) Second-quarter sales normally increase for the company, so management wishes to build up finished goods inventory to 13,000 units from its December 31, 19x1 level of 8,000 units. This inventory is valued on the December 31, l9xl balance sheet at $48,000, based on FIFO. Prepare a production budget.

c) Manufacture of the product requires 1.5 units of raw material per unit produced, allowing for waste and spoilage, and raw material cost for the first quarter is estimated to remain stable at $2 per unit. December 31, 19x1 materials inventory consists of 10,000 units, and it is felt this can safely be reduced to 6,000 by the end of the quarter. Prepare a materials purchases budget.

Exercise

d) Direct labor costs for the product are estimated at $3 per unit and the variable portion of factory overhead is estimated at $50 per unit. Fixed factory overhead for the period, including indirect wages and supervisory salaries, depreciation, maintenance, insurance, taxes, etc., are estimated at $15,000 for the first quarter. Prepare a cost of goods manufactured budget.

Exercise

e) Selling expenses for the period are estimated to be $1.00 per unit sold, and general and administration expenses are estimated to be $29,200. federal income taxes are estimated at 50% of net income before tax. Prepare a condensed projected income statement.

Exercise

2. Indicate by a check mark which of the following factors would probably be considered in forecasting sales of a product:

   a. Past company sales for the product.
   b. Seasonal influences .
   c. General economic conditions.
   d. Competition.
   e. Sales estimates made by the field sales force.
   f. A planned advertising campaign for the product.
   g. A change in pricing policy.

3. In estimating a particular category of operating expense, the level of that expense in the previous period is often taken as a starting point:

   ☐ true ☐ false

3. Under zero - based budgeting, a planned expenditure needs not to be justified if it is projected at a level equal to or less than the previous level: ☐ true ☐ false

Section C
Cash Budgets

Objectives

At the end of this section, participants will be able to:

- Translate data from the operating budget and other sources into projected cash receipts and disbursements.
- Prepare a cash budget.
- State why cash budgeting is important.
- Prepare a projected balance sheet.

Cash Budgets

- While operating budgets provide the information to prepare a projected income statement, financial budgets provide information to prepare a projected balance sheet, completing the master budget.

- The cash budget is the key financial budget prepared by translating data from the operating budget into cash receipts and disbursements.

- For most businesses, cash comes principally from cash sales and collections of accounts receivable; receivable collections may be estimated by assuming some lag pattern between credit sales and collections.

- Cash disbursements are made principally for materials purchases (often with a lag between purchase and cash payment) and other manufacturing costs and operating expenses. (usually in the same period the expense is incurred).

Cash Budgets

- Depreciation does not require a current cash disbursement. The cash budget shows estimated:
  - Total cash receipts.
  - Total cash disbursements.
  - Cash increase (or decrease) for the period.
  - Cash balance at the end of the period.

- The cash budget may also show the desired cash balance at the end of the period and the amount of any excess (or deficiency) of cash.

- Cash budgeting is important since either too much cash or too much cash creates a problem.

- A projected balance sheet can be constructed by estimating various balance sheet amounts (using supporting financial budgets where necessary).

- The plant asset budget shows planned expenditures for long -lived plant assets, and requires special techniques of analysis.

Exercise

1. Here is a December 31, 19X1 balance sheet corresponding to the beginning of the budget period for Wood Industries, Inc.

Wood Industries, Inc.
Balance sheet
December 31, 19X1
Assets

Current assets:		
Cash		$ 52,000
Accounts receivable		71,000
Inventories:		
Materials	$ 20,000	
Finished goods (fifo method)	48,000	68,000
Prepared expenses		12,000
Total current assets		$ 203,000
Plant equipment:		
Building and equipment	$ 650,000	
Less: Accumulated depreciation	400,000	
Total plant and equipment		$ 250,000
Total assets		$ 453,000

Exercise

Liabilities and Stockholders' Equity

Current liabilities:		
Accounts payable		$ 64,000
Income tax payable		46,000
Notes payable		110,000
Total current liabilities		$ 220,000
Stockholders' equity:		
Capital stock	$ 150,000	
Retained earnings	83,000	233,000
Total liabilities and stockholders' equity		$ 453,000

Exercise

Prepare a cash budget for Wood Industries for the first quarter of 19X2 using the operating budget you prepared in the last section plus the following data:

- All accounts receivable outstanding at the beginning of a quarter are assumed to be collected, in cash during the quarter.
- Seventy percent of sales made during a quarter result in cash received; the other 30 percent are still receivable from customers at the end of the quarter.
- All accounts payable outstanding at the beginning of a quarter are paid in cash during the quarter.
- No payments are required on materials purchased during a quarter until the next quarter (90 day credit terms).

Exercise

- Income taxes payable on December 31, 19X1 balance sheet (for the year 19X1) must be paid on March 15, 19X2. No payment on 19X2 income taxes is required during the quarter.

- Depreciation is included operating budget cost and expense estimates in the following amounts:

  - Fixed factory overhead - $5,000 depreciation.

  - General and administrative expense - $6,000 depreciation.

- No new prepayments are anticipated during the first quarter; advertising supplies of $4,000 are expected to be used up during the quarter (these are estimated in the operating budget as part of selling expense).

- All other costs and expenses of the quarter are assumed to be paid for in cash during the quarter.

Exercise

- No capital expenditures are planned for the quarter.
- No interest or principal payments on notes payable are required during the quarter.

Exercise

2. Wood Industries wish to maintain a minimum cash balance of $40,000 at the end of each quarter to handle normal business transactions. They achieve this balance by increasing their notes payable on a seasonal basis at the bank. What size additional bank loan will be required during the first quarter?

Exercise

3. Prepare a projected balance sheet as March 31, 19X2:

Wood Industries, Inc.
Projected Balance sheet
March 31, 19X1
Assets

Current assets:		
Cash		---------
Accounts receivable		---------
Inventories:		
Materials	---------	
Finished goods (fifo method)	---------	---------
Prepared expenses		---------
Total current assets		---------
Plant equipment:		
Building and equipment	---------	
Less: Accumulated depreciation	---------	
Total plant and equipment		---------
Total assets		---------

Exercise

Liabilities and Stockholders' Equity

Current liabilities:		
Accounts payable		---------
Income tax payable		---------
Notes payable		---------
Total current liabilities		---------
Stockholders' equity:		
Capital stock	---------	
Retained earnings	---------	---------
Total liabilities and stockholders' equity		---------

4. A shortage of cash can be costly , but too much cash is never a problem:

☐ true ☐ false

Section D
Performance Reports and Flexible Budgets

Objectives

At the end of this section, participants will be able to:

- Describe the nature and use of budget performance reports.
- Differentiate between fixed and variable costs.
- Describe the use of flexible budgets and state their advantages.

Budget performance reports:

A budget performance report compares actual performance to budget figures. Such reports usually show the difference or variance between actual and budgeted performance.

In the illustration below, the variances are identified as favorable (F) or unfavorable (U).

Wood Industries, Inc
Budget performance report
Cost of goods manufactured
For the quarter ended March 31, 19X2

	Actual	Budget	Variance
Direct materials	$ 87, 000	$ 75,000	$ 12,000 (U)
Direct labor	90,500	75,000	15,500 (U)
Variable factory overhead	14,000	12,500	1,500 (U)
Fixed factory overhead	13,000	15,000	- 2,000 (F)
Total cost of goods manufactured	$ 204,500	$ 177,500	$ 27,000 (U)

When sales revenues or production quantities are greater than budgeted, this represents a favorable variance. On the other hand, when sales or production quantities are lower than budget levels it would be unfavorable, while lower costs would be favorable.

The purpose of budget performance reports is to identify clearly any deviation from plan, so that the cause may be determined and appropriate corrective action is taken. Of course, if conditions have changed since the budget was prepared, they must be taken into account in evaluating past performance as well as in preparing future budgets.

Some companies have a policy that all unfavorable budget variances must be explained by managers responsible for a given budget in a written report to top management. This serves to ensure that causes are identified and directs attention toward corrective action to be taken.

Flexible budgets

In the preceding illustration, the production manager's performance would appear to be poor, since actual manufacturing costs exceed budget by $27,000.

Suppose, however, that for some reason (perhaps because sales volume had run well ahead of the amount budgeted) the volume of production during the quarter was substantially greater than the volume budgeted.

If, for example, actual production had been 30,000 units instead of the 25,000 units called for in the production budget, the preceding budget performance report would have to be viewed in an entirely different light. Indeed, with a substantial change in the volume of production, the cost of goods manufactured budget - previously constructed - becomes inadequate as a basis for judging performance or exercising managerial control.

Flexible budgets offer one solution to the problem just described. A flexible budget sometimes called a variable budget provides cost and expense estimates for each of several possible rates of operating activity.

Thus, a flexible budget is really a set of different budgets, each one based on a different assumed level of activity.

Note that the budgets you have examined earlier in this module are of the fixed variety; that is, they are based on one fixed level of activity. With a fixed budget results are compared with a fixed set of numbers, even though changing conditions may produce a quite different level or volume of activity.

While performance comparisons based on fixed budgets may indicate whether an organization or department is meeting predetermined volume goals, they are of very limited use in measuring the efficiency of operations at any activity level other than the one fixed level projected.

Flexible budgets, on the other hand, permit the measurement of performance efficiency at any level of activity within the range covered by the budget.

Variable Cost and Fixed Costs

Construction of flexible budgets requires that costs and expenses be separated into components that are variable and components that are fixed.

Remember, a variable cost is simply a cost that changes (in total) directly in proportion to changes in the level of activity.

A fixed same cost is assumed to be the same (in total) for a wide range of levels. It may be helpful to think of variable costs as those that remain constant on a per basis over all levels of output (and thus vary in total with the number of units produced).

Fixed costs, on the other hand, may be viewed as those costs that remain constant on a total cost basis over a wide range of output levels.

Of course, in practice, there are few costs which are strictly variable or strictly fixed. Some costs may vary in proportion to output (or activity level) over wide ranges of output but contain some fixed element that must be incurred.

For example, cost of electric power might be based on a per unit charge per kilowatt of power consumed plus a flat fee of a certain amount that is the same regardless of the consumption level.

Likewise, while some costs are fixed over wide ranges, at some level of output additional costs must be incurred.

It may be, for example, that the cost of operating storage warehouses is fixed regardless of the amount stored there until their total capacity is exceeded and additional warehouses are required.

Flexible budgeting, therefore, requires a careful study of cost behavior over various levels of activity.

For now, it is sufficient to estimate cost or expense elements for each of several levels of activity that are reasonably likely to occur.

These cost estimates could be obtained using an approach or cost formula that contains some mixture of fixed and variable components, where appropriate.

The use of flexible budget: An example

Here is a flexible budget for the Wood Industries example.

Wood Industries, Inc
Cost of goods manufactured budget
For the quarter ended March 31, 19X2

	Cost formula	Levels of activity (units produced)		
		20,000	25,000	30,000
Direct materials	$ 3,00 per unit	$ 60,000	$ 75,000	$ 90,0000
Direct labor	$ 3,000 per unit	60,000	75,000	90,000
Variable factory overhead	$ .50 per unit	10,000	12,500	15,000
Fixed factory overhead	$ 15,000 (Fixed)	15,000	15,000	15,000
Total cost of goods manufactured		$ 145,000	$ 177,500	$ 210,000

Note that fixed factory overhead does not depend on the level of activity, so that in a sense, it is not part of the flexible budget.

Some companies restrict the use of flexible budgets to variable cost only; some use flexible budgets only on variable items of overhead cost (excluding direct materials and labor).

Many companies, however, do prepare flexible budgets like the one shown here that contains a mixture of fixed and variable costs.

Let's see how actual performance stacks up against this flexible budget.

Taking the same actual results from the budget performance report and the budget figures from the flexible budget for the 30,000 units actually produced, we get the following comparison:

Wood Industries, Inc
Budget performance report
Cost of goods manufactured
For the quarter ended March 31, 19X2

		Budget	
	Actual	30,000 units	Variance
Direct materials	$ 87,000	$ 90,000	$ 3,000 (F)
Direct labor	90,000	90,000	500 (U)
Variable factory overhead	14,000	15,000	1,000 (F)
Fixed factory overhead	13,000	15,000	2,000 (F)
Total cost of goods manufactured	$ 204,500	$ 210,000	$ 5,500 (F)

Notice that with the exception of one small ($500) unfavorable variance in direct labor, the other individual variance, as well as the variance in total cost, appear favorable when the performance comparison is based on the flexible budget and the actual activity level achieved.

In the same way, proper use of a flexible budget can highlight unsatisfactory control of costs when activity levels achieved are lower than might have been called for in a fixed budget.

Exercise

1. A budget performance report shows a comparison between ----- and ----- figures, as the difference (often called the -----).

2. A favorable variance exists any time actual results are higher than budgeted figures:
☐ true ☐ false

3. Budget performance reports may be used to identify problem areas and stimulate corrective action: ☐ true ☐ false

4. Fixed budgets may provide a poor basis for evaluating performance when the ---------- is different than planned for by the budget.

5. A flexible budget is a set of budgets for various possible levels of activity:
☐ true ☐ false

6. Preparation of flexible budgets requires separation of costs into ----- costs and ----- costs.

7. A fixed cost is a cost that is incurred at a fixed rate per unit, regardless of the volume of output produced: ☐ true ☐ false

Exercise

8. Handy Manufacturing Corp. uses the following formulas to prepare its monthly factory overhead budget:

Indirect labor	$ 1,00 per unit
Supplies	.20 per unit
Repairs	.10 per unit
Maintenance	750,00 (fixed)

Prepare a flexible budget for factory overhead for the month of April with production volume from 3,000 to 5,000 units (in increments of 1,000 units):

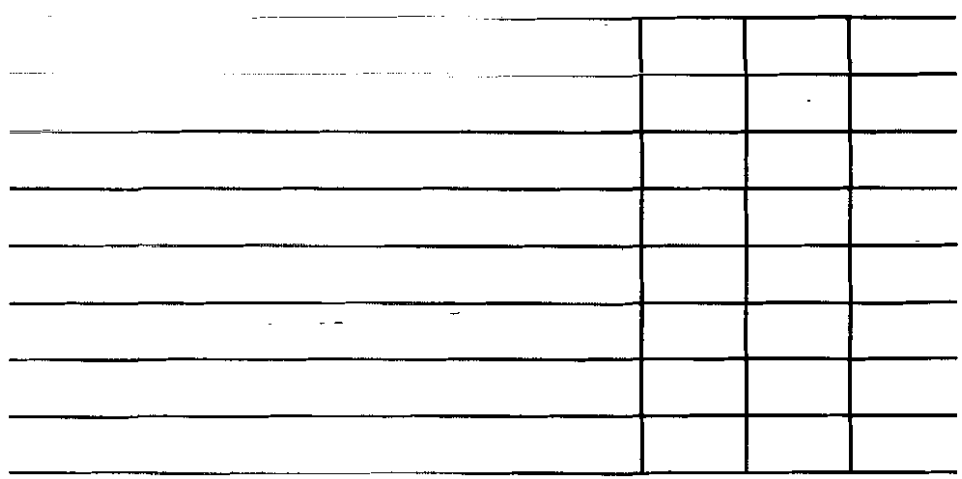
Handy Manufacturing Corp.
Flexible budget, factory overhead
For the month of April, 19 --

Exercise

8. Handy Manufacturing Corp. actually produced only 3,000 units during April. Actual factory overhead costs incurred were:

Indirect labor	$ 3,300
Supplies	500
Repairs	600
Maintenance	700

Prepare a budget performance report using these data and the flexible budget from the previous problem. Identify variances as favorable (F) or unfavorable (U).



Management Planning for Long Range Projects:

Introduction To Capital Budget

Introduction To Capital Budgeting

Budgeting deals (usually) with a variety of different uses of accounting data for management decision making. In this module, we focus on a special phase of management decision making: the process of evaluation and selection of long-range investments or projects, often referred to as capital budgeting.

Objectives

Our objectives are to be able to:

- Describe the nature an importance of capital budgeting.
- Explain the concepts of time value of money and present value.
- Use present value analysis and other capital budgeting techniques to evaluate proposed long-range investments.

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Capital Budgeting Decisions

Objectives

At the end of this section, participants will be able to:

- Describe the nature of a capital budgeting decision.
- Use capital budgeting decisions.
- Identify the similarities and differences between capital budgeting decisions and other management decision problems.

- Capital budgeting deals with evaluation of proposed investments or projects in which either costs or benefits are expected to extend beyond one year.

- Capital budgeting problems are important because:
  - Dollar amounts involved are o9ften large.
  - Decisions are often critical to a company's success.
  - Decisions are not easily reversed.

- Like other alternative choice problems, capital budgeting decisions require the identification of incremental inflows and outflows.

- However, capital budgeting decisions require analysis of cash inflows and outflows (rather than revenues and expenses) occurring at widely separated points in time.

- Since present dollars are worth more than future dollars, special techniques are required to analyze the cash flows associated with long-range projects.

Exercise

For each multiple-choice statement select the single, most appropriate answer and use its identification letter to indicate your choice.

1. Check each of the following are characteristics of capital budgeting decisions:

a. Deal only with tangible assets, such as plant or equipment.

b. involve costs or benefits that may extend over several accounting periods.

c. Often involve large dollar amounts.

d. Are often critical to the success of the business.

e. Involve choices between alternative courses of action.

f. Require estimates of incremental cash flows.

g. Require special techniques because of their long-term nature.

h. Are not easily reversed if they don't work out.

i. Generally assume that dollars received in the current period have the same value as dollars expected to be received in the future.

Exercise

2. Which items in the above list underline the importance of capital budgeting decisions?

_____

_____

3. Unlike other alternative choice problems, capital budgeting decisions involve consideration of:
   a. Incremental costs and revenues.
   b. Incremental revenues only.
   c. The different value of dollars paid or received at different points in time.
   d. None of the above.

Cost-Volume-Profit Analysis

Contents

Section	Subject
A	Cost behavior.
B	Break-even analysis.
C	Applications and limitations of break-even analysis.
D	Operating leverage.

COST- VOLUME-PROFIT ANALYSIS

Sales volume projections are an important input to the planning and budgeting process. However, static budgets based on a single sales figure are limited, and must be made flexible (for several different sales levels) if they are to be effective. In this module, we study some techniques for analyzing more closely the behavior of costs, revenues, and profits in response to volume changes.

These techniques, are used as a basis for management decision making in such problem areas as pricing, salary and compensation policy, selection of advertising and marketing channels, and many others. Thus, the tools here are planning tools, and as such they lack much of the precision of many accounting procedures used for recording historical data.

Objectives

Objectives for this module are to be able to:

- Understand the behavior of various cost components in response to volume changes.

- Apply break-even analysis to a variety of planning problems.

- Measure operating leverage.

SECTION A
Cost Behavior

Objectives

At the end of this section, participants will be able to:

- Calculate and understand the behavior of fixed, variable, and total costs with changes in volume on both a:
  - Total cost basis.
  - Cost per unit basis.
- Construct cost-volume graphs for these cost components.
- Apply a linear cost and state the uses and limitations of linear cost analysis for planning purposes.

Cost Behavior

Fixed costs remain at a constant level, regardless of volume.

Variable costs increase as volume increases, and are often assumed to increase indirect proportion.

Semi-variable (mixed) costs are usually separated into fixed and variable components for purposes of analysis.

Variable costs per unit are constant while fixed costs per unit and total costs per unit both decline with increasing volume.

Total costs are said to be linear if they form a straight line when graphed against volume, this occurs when a constant variable cost per unit is added to a given level of fixed cost.

In many businesses, total costs are non-linear, however, linear cost analysis is usually a good approximation of actual cost behavior over the relevant mid-range of volume where a business operates and is useful for planning purposes.

SECTION B
cost Concept and Behavior

Contents

- Cost concepts.
- Direct and indirect costs.
- Fixed and variable costs.
- Exercises.

Cost Concepts

The Nature of Cost

A cost is a sacrifice resources

Opportunity cost is the return that could be realized from the best foregone alternative use of a resou7rce.

An outlay cost is a past, present, or future cash outflows. Outlay costs are usually contrasted with opportunity costs; outlay costs are recorded in the accounting records, while opportunity costs are not.

Direct and Indirect Costs

Direct cost

Any cost that can be directly related to a cost object is a direct of that cost object. For example direct labor costs are the costs of the workers who transform direct materials into finished product.

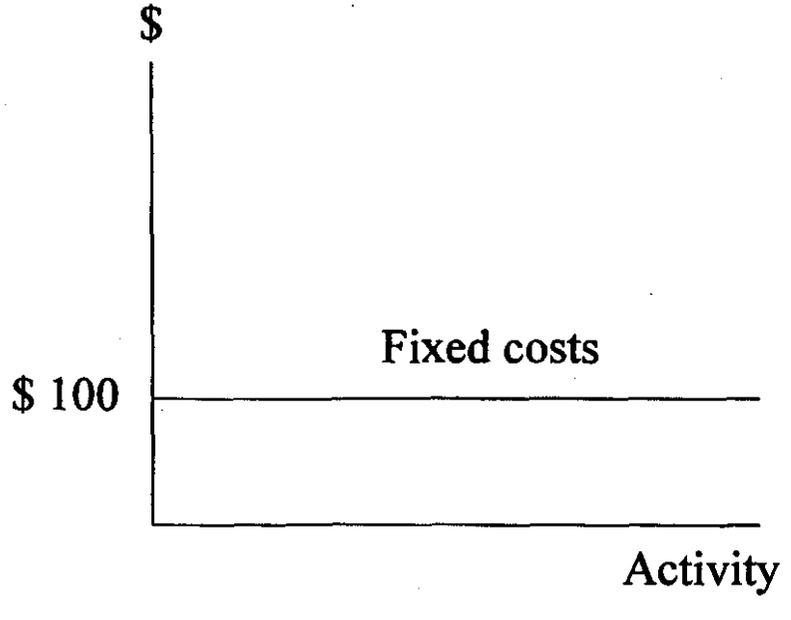
Indirect costs are sometimes referred to as ***common costs.***

Indirect costs result from the sharing of facilities (building, equipment) or services (data processing, maintenance staff) by several departments. For example indirect labor costs ate the costs of workers to operate the factory but do not work directly on a product.

Fixed and Variable Costs

Fixed costs

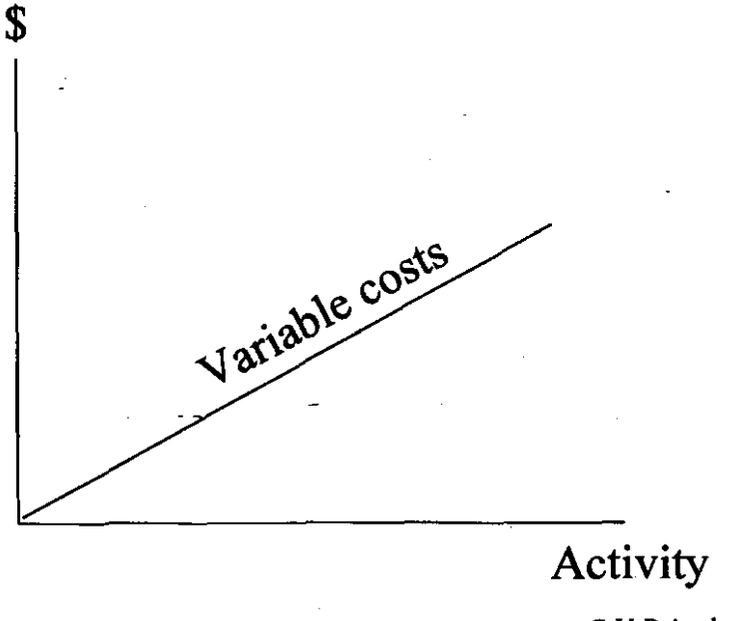
That are unchanged as volume changes within the relevant range of activity. For example rent of building, depreciation, and manager's salary.



Variable costs

Costs that change with a change in the volume of activity.

Variable costs include direct materials, direct labor, and some overhead.



Exercise

For each of the following costs incurred in a manufacturing operation, indicate whether the costs would be fixed or variable (F or V).

a) Salaries of top executives in the company.
b) Overtime premium for assembly worker.
c) Sales commissions.
d) Sales personnel office rental.
e) Production supervisory salaries.
f) Air conditioning.
g) Power to operate factory equipment.
h) Depreciation on furniture for sales staff.

SECTION C
Break-Even Analysis

Objectives

At the end of this section, participants will be able to:

- Construct a break-even chart.
- Calculate break-even volume.
- Calculate the volume necessary to achieve a planned profit level.

Break-Even Analysis

- On the linear break-even chart, revenue appears as a straight line describing volume x selling price per unit.

- A break-even point occurs where revenue equals total costs, a company can earn a profit only when it is operating at a volume level higher than break-even

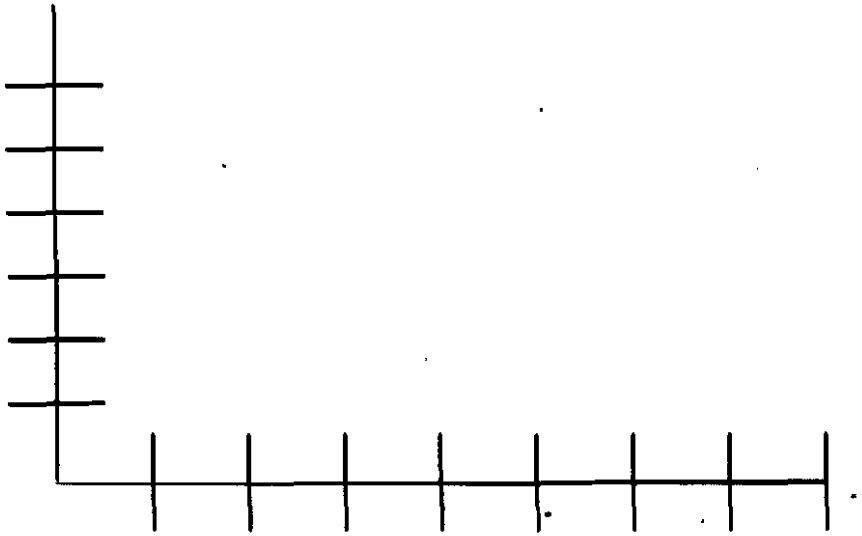
- To calculate volume at any planned profit level or at break-even (zero profit), the following relationship may be used:

$$\text{Volume required} = \frac{\text{Fixed costs and target profit}}{\text{Contribution margin per unit}}$$

Exercise

1- Quick and Clean Car Wash, Inc, which charges $1.00 per car, has fixed costs of $4,000 per month, and variable costs of $.20 per car. Calculate the number of cars the company must wash each month to break even.

2- Construct a break-even chart Quick and Clean Car Wash, using the data given in question 1. Be sure to label the scales and each line on the chart.



Exercise

3- How many cars would this company have to wash to earn a monthly profit of $2,000?

SECTION D
Application and limitations of break-even analysis

Objectives

At the end of this section, participants will be able to:

- State the effects on break-even volume caused by changes in selling price and fixed or variable costs.
- Compute the margin of safety and the contribution margin ration and show how these measures are used to estimate net income.
- Identify the limitations of the break-even analysis.
- State how contribution margin may be used in a sales mix problem.

Application and limitations of break-even analysis

- Break-even volume will be lowered by:
  - An increase in selling price.
  - A decrease in variable costs per unit.
  - A decrease in fixed costs.

- Break-even volume will be increased by the opposite change.

- Break-even charts may be constructed with volume expressed in sales value as well as units.

- Margin of safety-actual sales volume-break-even sales volume.

- Contribution margin ratio $= \dfrac{\text{Total contribution margin}}{\text{Total sales revenues}}$

$$\frac{\text{Contribution margin per unit}}{\text{Selling price per unit}}$$

- The net income for any project sales level may be estimated by:

$$\text{Net income} = \text{contribution margin ratio} \times \text{margin of safety}$$

Applications and limitations of break-even analysis

- Limitations of break-even analysis result from the assumptions made:
  - Constant selling price and constant variable costs.
  - The number of the units produced equals number of units sold.
  - A company produces a single product or a fixed mix of products.

Sales-mix problems may be analyzed by constructing separate break-even analysis for each product or by analyzing the contribution margin ratio for each product on its contribution margin per unit of scarce resource.

Exercise

For each multiple-choice statement, select the single most appropriate answer and use its identification letter to indicate your choice.

1- Indicate whether break-even volume is increased, decreased, or unchanged as a result of each of the following events:

A. An increase in fixed costs.

B. A decrease in variable costs per unit.

C. A decrease in unit selling price.

2- Data for one company were:

Fixed costs: $4,000 per month

Variable costs per unit: $.20

Selling price per unit: $1.00

Calculate the contribution margin ratio.

Exercise

3- Margin of safety is defined as the difference between --------- sales volume and ---------- sales volume.

4- Use the margin of safety volume concept to estimate net income for Quick and Clean Car Wash at a volume of 10,000 cars. (Recall that break-even volume was calculated in previous section to be 5,000 cars.)

5- Which of the following are assumed in the break-even analysis studied in this module:

A. Units manufactured = units sold

B. Constant selling price per unit

C. Declining variable costs per unit (as volume increases).

D. A fixed product mix.

6- Sales-mix problems exist when a company has to decide the questions of each of several products to produce or sell:

true ☐ false? ☐

Exercise

7- In analyzing its sales-mix problem, a company may:

A. Make separate break-even analysis for each of several products.

B. Calculate the contribution margin ratio for each product.

C. Calculate the contribution per unit of scarce resource for each product.

D. All of the above are useful>

SECTION E
Operating Leverage

Objectives

At the end of this section, participants will be able to:

- Apply operating leverage.
- State how it can be measured.
- Apply and compute its effect on profits (for given changes in sales volume).

The nature of operating leverage

If the company incurs some cost or expenses that are fixed for an accounting period, regardless of the volume of production or sales. Such fixed costs are often employed by a company in an effort to lower its variable costs per unit. For example, the purchase of a labor-saving machine, which would have a large element of fixed cost, would be only if it was expected to produce a sufficient saving in the direct labor cost per unit. What the company would hope, of course, is that the volume of sales was sufficiently large to generate enough revenues to cover all fixed as well as variable costs plus some margin of profit.

Operating leverage reflects the degree to which fixed costs are incurred in operations. The term leverage is used because fixed costs, like a mechanical lever used to magnify force, can be used to magnify the effects of volume changes on profits. A company with a high proportion of fixed costs is said to have high operating leverage, because swings in sales volume product wide swings in profits.

An airline, for example, has a large proportion of its total costs fixed. Its variable costs are low, and beyond its break-even volume, additional passenger fares yield very high profits. Of course, leverage is a two-edged sword that cuts both ways. Large fixed costs produce large losses when volume falls below the break-even point, as in the case of an airline.

Operating leverage is usually measured in terms of changes produced in net operating income, which is net income before any non-operating gains or losses, and before any interest income or expense. Net operating income is used here because interest expense is a special type of fixed charge that produces its own kind of leverage, called financial leverage.

Operating leverage is thus a result of fixed costs other than interest.

The impact of operating leverage can best be seen by comparing the operations of two companies with different proportions of fixed and variable components in their total costs. Suppose that two companies, handcraft products and automated industries, make and sell the same product with different production methods. Their cost-revenue data are summarized as follows:

Handcraft products	
Selling price:	$5 per unit
Variable costs:	$4 per unit
Fixed costs:	$10,000
Break-even value:	10,000 units

Automated industries	
Selling price:	$5 per unit
Variable costs:	$1a per unit
Fixed costs:	$40,000
Break-even value:	10,000 units

Note that the selling price is the same for both companies, but the variable and fixed cost pattern is different. However, in this example, the break-even volume is also the same for both companies, 10,000 units.

Now let's compare what happens to these two companies at a higher volume, say 15,000 units.

	Handcraft products	Automated industries
Revenues (15,000x$5)	$75,000	$75,000
Variable costs (15,000 x variable cost per unit)	60,000	15,000
Contribution margin	$15,000	$60,000
Fixed costs	10,000	10,000
Net operating income	$ 5,000	$20,000

Automated industries, which had the same break-even point as its competitor, achieves four times the net operating income ($20,000 as compared to $5,000) at the higher volume. This occurs because of its larger proportion of fixed cost, or greater operating leverage.

But now, let's compare results at a volume below break-even, say 5,000 units, where both companies are operating at a loss:

	Handcraft products	Automated industries
Revenues (5,000x$5)	$25,000	$25,000
Variable costs (5,000 x variable cost per unit)	20,000	5,000
Contribution margin	$ 5,000	$20,000
Fixed costs	10,000	40,000
Net operating loss	($ 5,000)	($20,000)

As you probably expected, the relative performance of the two companies is reversed. Handcraft had a net operating loss of only $5,000, while automated, with its greater operating leverage lost $20,000. Remember, operating leverage works both ways, magnifying profits or losses resulting from volume changes.

A company making heavy use of operating leverage can thus expect to have sizeable year-to-year fluctuations in net income, since this leverage magnifies the profit effects of fluctuations in the demand for a company's products.

Measurement of operating leverage

A quantitative measure of operating leverage is given by the contribution margin ratio, defined in last section as follows:

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

For example, the contribution margin ratio for automated industries, could be calculated (using the data given in the last illustration) as follows:

$$\text{Contribution margin ratio} = \frac{\text{Contribution margin}}{\text{Sales}} = \frac{\$\ 20{,}000}{\$\ 25{,}000} = 80\%$$

This would indicate a relatively high degree of operating leverage

$$\text{Contribution margin ratio} = \frac{\text{Contribution margin}}{\text{Sales}} = \frac{\$\ 5{,}000}{\$\ 25{,}000} = 20\%$$

This indicates a much smaller effect of operating leverage. This ratio, which shows the percentage of sales changes contributed to profit, it thus a useful quantitative of operating leverage.

Exercise

1- Operating leverage reflects the degree to which ---------- are incurred in operations.

2- Since it shows the increase in profit for a dollar increase in sales, ---------- is often used to measure operating leverage.

3- A company with higher operating leverage will generally show higher profits at all levels of sales volume: true or false?

4- Tender-care car wash company charges $1 for a deluxe car wash, incurring variable costs per car of $,65 and fixed costs of $1,750 per month. Is this company's operating leverage greater, less, or the same as quick and clean car wash, Inc. Which you analyzed in the review exercise for sections B and C? (compare contribution margin ratios to support your conclusions).

Capital Budgeting Decisions

Objectives

At the end of this section, participants will be able to:

- Describe the nature of a capital budgeting decision.
- Use capital budgeting decisions.
- Identify the similarities and differences between capital budgeting decisions and other management decision problems.

- Capital budgeting deals with evaluation of proposed investments or projects in which either costs or benefits are expected to extend beyond one year.

- Capital budgeting problems are important because:
  - Dollar amounts involved are o9ften large.
  - Decisions are often critical to a company's success.
  - Decisions are not easily reversed.

- Like other alternative choice problems, capital budgeting decisions require the identification of incremental inflows and outflows.

- However, capital budgeting decisions require analysis of cash inflows and outflows (rather than revenues and expenses) occurring at widely separated points in time.

- Since present dollars are worth more than future dollars, special techniques are required to analyze the cash flows associated with long-range projects.

Exercise

For each multiple-choice statement select the single, most appropriate answer and use its identification letter to indicate your choice.

1. Check each of the following are characteristics of capital budgeting decisions:

a. Deal only with tangible assets, such as plant or equipment.

b. involve costs or benefits that may extend over several accounting periods.

c. Often involve large dollar amounts.

d. Are often critical to the success of the business.

e. Involve choices between alternative courses of action.

f. Require estimates of incremental cash flows.

g. Require special techniques because of their long-term nature.

h. Are not easily reversed if they don't work out.

i. Generally assume that dollars received in the current period have the same value as dollars expected to be received in the future.

Exercise

2. Which items in the above list underline the importance of capital budgeting decisions?

   _____

   _____

3. Unlike other alternative choice problems, capital budgeting decisions involve consideration of:
   a. Incremental costs and revenues.
   b. Incremental revenues only.
   c. The different value of dollars paid or received at different points in time.
   d. None of the above.

Performance Indicators and Ratios

Objectives

At the end of this module, participants will be able to:

- Understand different performance indicators for a company and departmental level and how to apply them.
- Use of financial ratios in decision making.
- State the function of financial analysis in achieving business goals.

PERFORMANCE INDICATORS AND RATIOS

PERFORMANCE INDICATORS

Corporations and individuals, for a variety of reasons, desire to measure performance.

Effective performance measurement of individuals, companies, departments, and divisions can help to understand management challenges and opportunities.

INCOME STATEMENT ONLY ANALYSIS

SALES: THE TOP LINE

Using sales as a basis for evaluation was popular in the fifties as managers endeavored to build sales. However, using only sales as a measure of performance proved inadequate. This is illustrated by the fact that a manager could drop prices to increase sales, but if there is insufficient profit margin, the company could be in trouble even with a favorable looking "top line."

NET INCOME: THE BOTTOM LINE

Next, using net income as a measure of performance became popular. But this approach also had its limitations. Marginally profitable firms could merge to form larger firm. Net income could increase, even though when considering the larger resource base generating it, the new firm's performance hadn't improved at all. The "top line" and "bottom line" measurement methods were factors encouraging the merger and acquisition movement. What could be easier than merging two firms to get increased sales or net income?

EPS INDICATORS

The problem of stockholders' equity was addressed by requiring that each audited financial statement contains an earnings per share calculation. This calculation was presented immediately following the net income statement.

Two EPS measures, simple EPS and fully diluted EPS, became popular and are stills in use today.

The simple or primary EPS calculation is net income divided by number of shares of common stock issued and outstanding:

$$\text{Primary EPS} = \frac{\text{Net Income}}{\text{Shares of Common Stock}}$$

Strengths of EPS. The EPS indicator is popular because it is easy to be understood and explained. Further, it is easy to use wherever a revenue or profit center exists. In other words, if you can track both revenues and expenses to a department or an individual, you can calculate net income and EPS.

Weaknesses of UPS. Once managers understand the rules of EPS, it is only natural for them to try to look as good as possible within the constraints of Generally Accepted Accounting Principles (GAAP). Thus, GAAP are manipulated, twisted, and turned in an effort to reach expected or forecasted EPS. This has been especially true if the company is listed on a major stock exchange and "must" reach forecasted EPS levels.

Another, and more significant weakness of EPS is that long-term balance sheet health is frequently ignored. When management focused only on EPS, short-term income statement analysis became the rule while too little attention was given to the balance sheet. The case can be made that future balance sheets will be stronger if current profits are maximized, but this isn't always the case. Future earning power has sometimes been sacrificed by managers for current gains. By using only the income statement to measure performance, companies can literally "short-run" themselves to death.

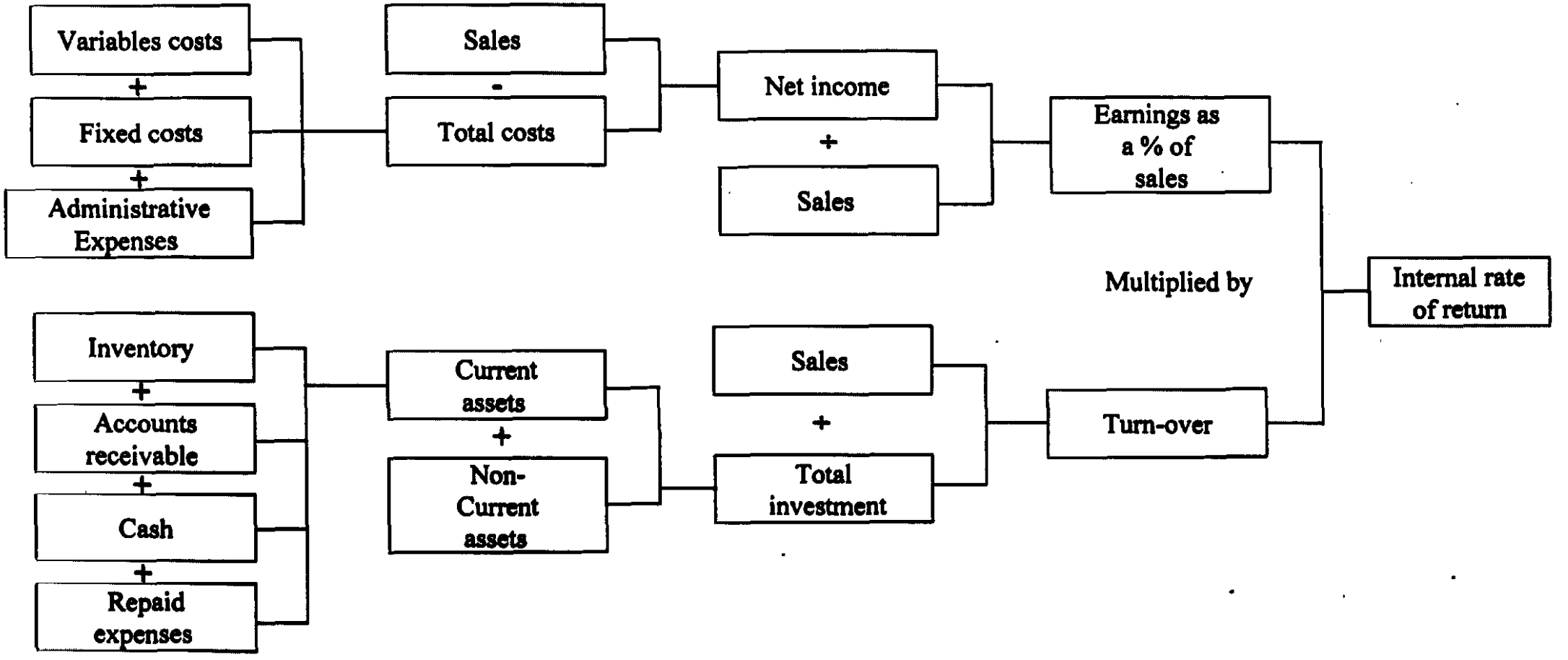
CURRENT PERFORMANCE INDICATORS

What then is the current state of the performance indicator art? Current thinking in this area requires not only income statement analysis, but also balance sheet input.

Thus, income statement accounts are considered in relationship to relevant balance sheet accounts that reflect the resource base the entity uses to produce the income.

One useful model that accomplishes this aim is the Dupont Formula.

THE DUPONT FORMULA



THE DUPONT MODEL

At first glance this appears somewhat complicated, but really it is quite simple to use.
First, imagine a horizontal line splitting the upper branch from the lower branch.
The upper branch is reflective of information presented on the income statement.
Move one column to the right and note that the costs have been totaled, deducted from sales, and that the difference is net income. Income is then divided by sales to produce a percentage called ROS or return on sales.

The bottom half begins at the far left with separate boxes for each type of current assets. These are totaled into a single box called current assets. Current assets combine with non-current assets to equal total investment . Total investment is now divided into sales to obtain asset turnover. Finally, the percent answer derived on the top is multipled by asset turnover to produce the Dupont Formula.

What does the Dupont Formula signify?

It shows that a company which earns 10% on sales (top half) and which turns its assets four times a year (bottom half) will realize a 40% return on assets. Changes in either branch can be offset by a reciprocal change in the other branch. Specifically, a decrease in the income statement branch can only be offset by an increase in the balance sheet branch. For example, if a 10% return on sales declines to 8%, the 40% ROA can only be maintained by accelerating turnover from 4, to 5 times a year.

We are beginning to see how the Dupont skeleton can be used as a performance indicator. Now let's simplify the model.

Simplifying the Dupont Model. The summary region of the Dupont Formula can be represented by the following algebraic equation:

$$\left[\frac{\text{Net income}}{\text{Sales}}\right] \times \left[\frac{\text{Sales}}{\text{Total assets}}\right] = \text{Dupont formula}$$

Canceling out"sales" in the numerator and denominator

$$\left[\frac{\text{Net income}}{\cancel{\text{Sales}}}\right] \times \left[\frac{\cancel{\text{Sales}}}{\text{Total assets}}\right] = \text{Dupont formula}$$

The expression is simplefied to:

$$\frac{\text{Net income}}{\text{Total assets}} = \text{Dupont formula}$$

The model is now seen as earnings divided by total investment-or in accounting jargon-net income divided by total assets. In other words the Dupont Formula is identical to ROA (return on assets).

The Need for Balance Sheet Information.

These ratios divide net income from the income statement by a balance sheet base. Recall that the income statement is a reflection of activity over the entire accounting period, while the balance sheet reflects assets and claims on assets at only the end of the period. Consequently, when a ratio compares income statement information against balance sheet information, it is appropriate to average the balance sheet values. This can be done by adding the balance sheet account balance at the beginning of the period (the balance at the end of last year) to the balance at the end of the current period and dividing the total by two. This convention should be applied to ratios that mix income statement and balance sheet figures. Applying it to Return on Assets:

$$\text{ROA} = \frac{\text{Net Income}}{\text{Average Total Assets}}$$

For example, given the following financial statement information, calculate the company's 1990 ROA:

Net income for year ended 12/31/90	$30,000	
	1990	1989
Total company assets	$200,000	$160,000

First, determine the average assets employed over:

$$\text{Average Assets} = \frac{\text{End of Year Balance} + \text{Beginning of Year Balance}}{2}$$

$$= \frac{\$200{,}000 + \$160{,}000}{2}$$

$$= \$180{,}000$$

Then, calculate ROA.

$$\text{ROA} = \frac{\text{Net Income}}{\text{Average Total Assets}}$$

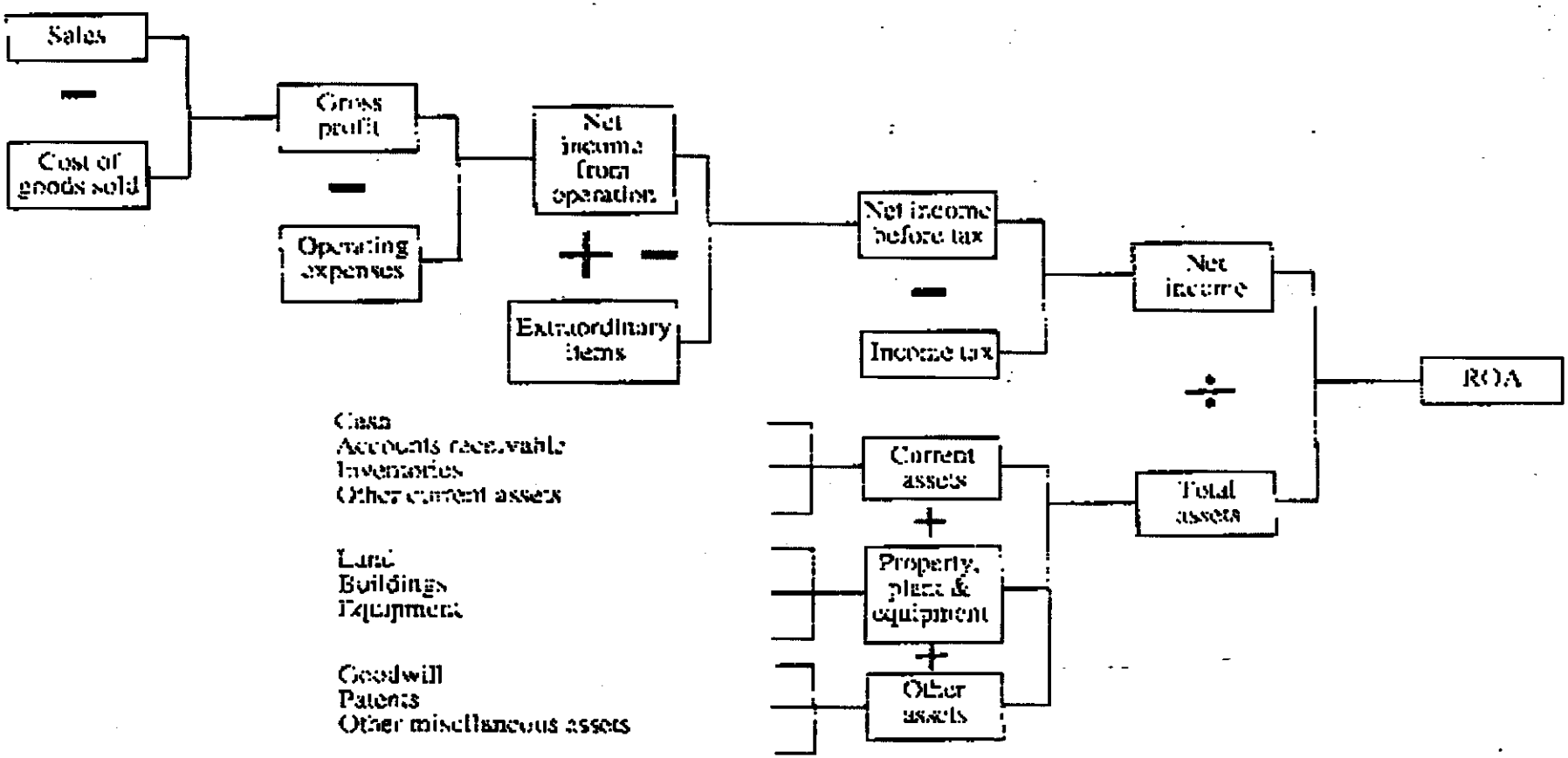
$$= \frac{\$30{,}000}{\$180{,}000} = .166$$

RETURN ON INVESTMENT (ROI) CAN BE MANY MEASURES

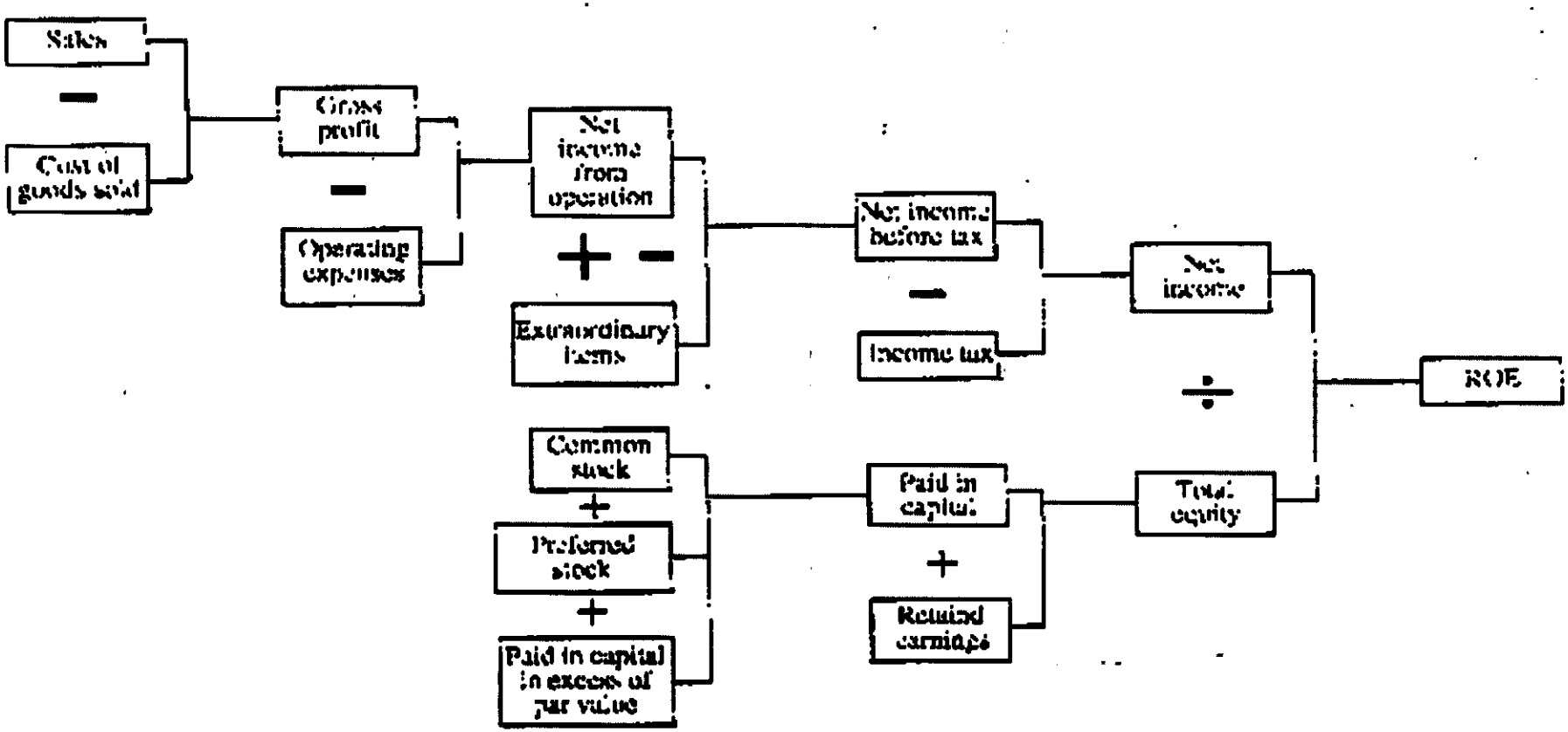
Frequently, the term ROI is used as a broad umbrella term to include a variety of performance measures. For instance, the Basic Dupont Formula just explained is a measure of return on assets (ROA). By substituting total owner's equity for total assets in the bottom branch of the model, we would obtain a return on equity (ROE). Both ROA and ROE are considered return on investment measures.

A variety of other ROI measures are sometimes used. Thus, ROI can mean ROA, ROE, or some other measure. Because of this possible ambiguity, when you encounter the term return on investment, endeavor to discern the underlying measure being used.

ROA
RETURN ON ASSETS



ROE
RETURN ON EQUITY



RETURN ON PRODUCTIVE ASSETS

Basic ROA is sometimes modified to exclude assets that are not currently being used in operations. Examples would include a spare typewriter stored in a closet and land held for speculation. Since these assets aren't used, they can be excluded to obtain a more accurate performance analysis. This measure is usually referred to as Return on Assets Employed (ROAE) or Return on Assets Utilized (ROAU).

$$ROAE = \frac{\text{Net income}}{\text{Average Productive Assets}}$$

Employing this measure is usually impractical when the analyst isn't intimately familiar with the entity being analyzed because assets on the balance sheet are usually not segregated into productive versus non-productive categories.

RETURN ON EQUITY (ROE) BY ANY OTHER NAME

Recall that:

$$ROE = \frac{\text{Net Income}}{\text{Average Owners Assets}}$$

RETURN ON INVESTED CAPITAL (ROIC)

Most organizations have long-term debt which becomes a layer of borrowed capital that is rarely retired. Instead, as it matures, it is rolled over. This roll-over cycle is perpetuated. Because there is evidence to suggest that this is a permanent layer of borrowed "equity," many organizations include it in performance analysis. Thus," Return on Invested Capital (ROIC) becomes:

$$ROIC = \frac{\text{Net Income}}{\text{Average Invested Capital}}$$

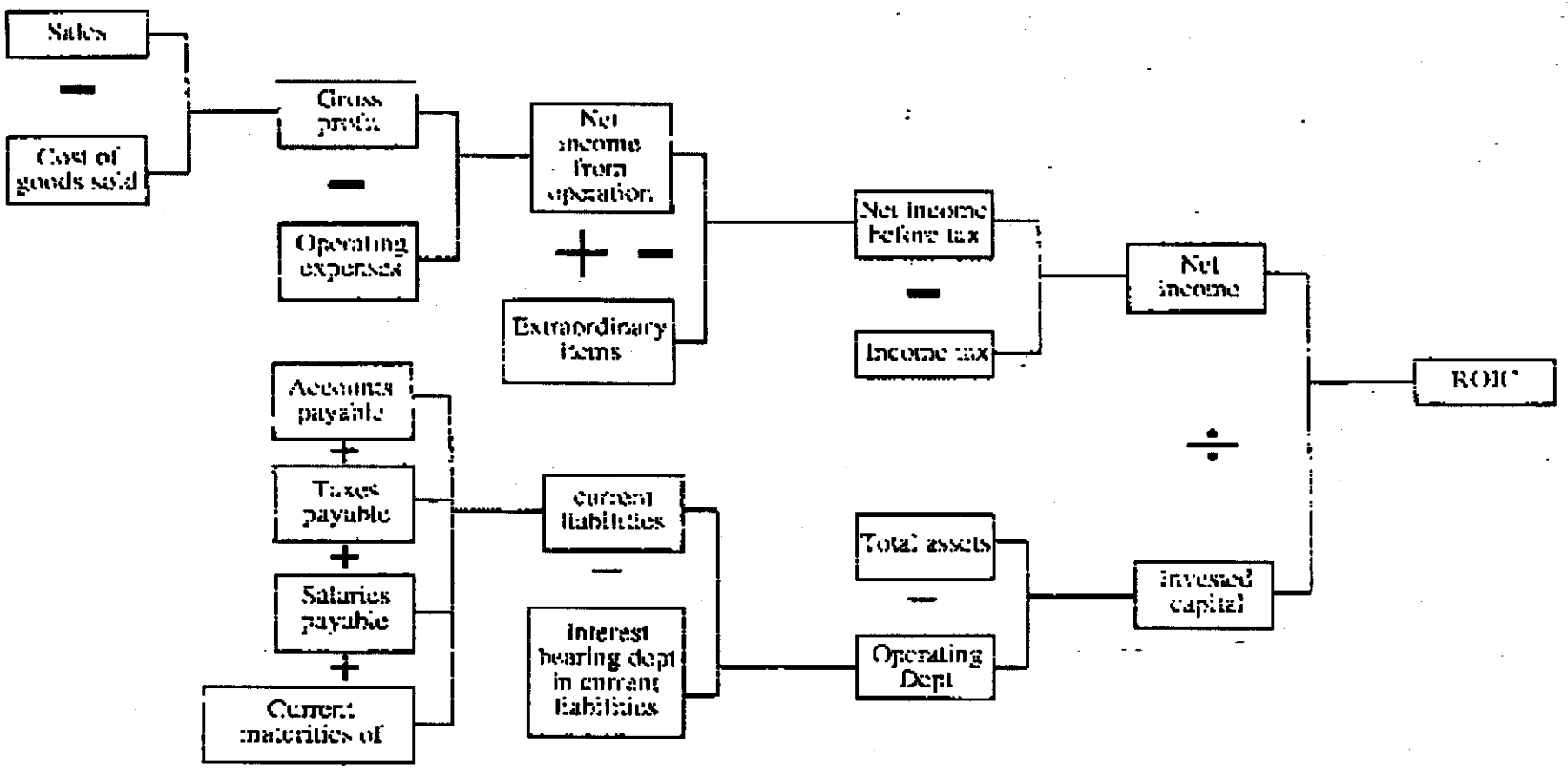
Which can also be represented by the following equivalent expressions

$$ROIC = \frac{\text{Net Income}}{\text{Average (Equity + Interest Bearing Debt)}}$$

$$ROIC = \frac{\text{Net Income}}{\text{Average (Assets — Non - Interest Bearing Debt)}}$$

ROIC can also be shown as a variation of the Dupont Formula.

ROIC
RETURN ON INVESTED CAPITAL



RETURN ON SALES (ROS)

Referring again to the Dupont Skeleton, notice that the upper branch contains:

$$\text{Earnings as a \% of Sales} = \frac{\text{Net Income}}{\text{Sales}}$$

Earnings as a % of sales, also referred to as Return on Sales (ROS), is a measure comparing income against the volume of sales producing that income. It is useful to look at this measure over time, to utilize it as a trending device.

DEPARTMENT & DIVISION MEASURES

Up to this point, we have been looking at performance measures for entire organizations. We can also measure the performance of divisions or departments within a company. Often, sufficient information is already available since both revenues and costs are frequently traced to departments as a part of the budgeting process. Departmental revenues can be compared with departmental costs to provide departmental income. This can be measured against a resource base employed by that department.

This is consistent with the management axiom that states that a manager's performance should be measured considering only factors within his or her control.
Utilizing this method, performance among the entity's departments can be both measured and compared.
Return on Sales is one measure well suited for this type of analysis. Other measures sometimes used include Return on Current Assets (ROCA) and Return on Working Capital (ROWC).

RETURN ON CURRENT ASSETS (ROCA)

This measure compares the department's income against the current assets within the department.

$$ROCA = \frac{\text{Net Income}}{\text{Average Current Assets}}$$

RETURN ON WORKING CAPITAL (ROWC)

This measure compares the department's net income against working capital within the department. Working capital is derived by subtracting current liabilities from current assets. This measure is more refined than Return on Current Assets because it recognizes that some current assets will have to be expended to satisfy current liabilities.

$$ROWC = \frac{\text{Net Income}}{\text{Average Working Capital}}$$

A subtle variation of this is Return on The Change in Working Capital (ROCWC), which is calculated by dividing net income by working capital at the beginning of the year less working capital at year end:

$$ROCWC = \frac{\text{Net Income}}{\text{Beginning Working Capital - Ending Working Capital}}$$

An obvious weakness of this indicator appears when working capital increases during the year, thus producing a negative denominator. In this case, the result of the measure is nonsense. This measure is usually seen in firms who attempt to decrease working capital each year.

RATIOS

BASICS ON RATIOS

WHY RATIOS?

Financial Statement accounts represent compiled transactions resulting from the entity's activity. By comparing some of these accounts to other relevant accounts, measures of how well the company performs in different areas can be approximated.
We will look at some basic ratios here drawing on Chrysler's 1984 and financial statements information 1985 as a data base for our analysis.

THE NEED TO AVERAGE BALANCE SHEET INFORMATION

Recall that the balance sheet reflects assets and sources of assets at a point in time, while the income statement measures activity over a period of time. When ratios compare income statement accounts to other income statement accounts, or balance sheet accounts to other balance sheet accounts, the measures are consistent so that no measurement problem results.

However, when a measure compares income statement information to balance sheet information, the balance sheet account must be averaged to approximate the average account balance over the time span during which income was earned. This is accomplished by taking the sum of the beginning of year (end of the previous year) and the year-end balance sheet account balances. The sum is then divided by two. An average has already been provided to provide for the convenient illustration of ratios we will consider.