Cost Analysis to Support Strategic Decisions

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Consultant's profile:

Manjit Biant

- Mr. Manjit Biant is a Senior Consultant with EuroMaTech specializing in Accounting which includes Finance & Business including Finance for Non Finance Managers, IFRS, IPSAS, Risk Anaylisis & Strategy Management, Forensic Accounting & Auditing and Corporate Governance.
- His degree in Business Administration included a placement year with Deloitte Haskins & Sells, one of the top five Accountancy firms at the time. He proceeded to continue his career with the newly merged firm Coopers & Lybrand Deloitte. He worked in Financial Services for a number of years with Lloyds TSB and AMP(UK Financial Services).
- He went on to work for Hays PLC as a Commercial Accountant, then finally decided to run his own business and get street experience, putting his entrepreneurial skills to the test. After selling his business at a young age, he now enjoys semi-retirement, working as a part-time lecturer, free-lance trainer, business consultant & Internet Marketing Coach.
- Manjit has had extensive training in the Thompsett Project Management program, Quality Management Techniques and Customer care implementation. Manjit has conducted courses in Europe, Africa, USA and the Middle East.

Opening

- Introductions
- Expectations
- Disclaimer
- Confidentiality
- Health and Safety



Disclaimer

- The information in this seminar or any manual, which does not purport to be comprehensive, has not been independently verified. While this information has been prepared in good faith, no representation or warranty, express or implied, is or will be made and no responsibility or liability is or will be accepted by EuroMaTech or by the presenter or by any of their respective officers, employees or agents in relation to the accuracy or completeness of this seminar or manual or any other written or oral information made available to any delegate or its advisers and any such liability is expressly disclaimed.

Training Methodology

- Your programme leader will present, guide and facilitate learning, using a range of methods including the use of the programme material, case studies and discussion of “real life” issues in organizations, to ensure the development of skills as well as knowledge
- Participants will learn by active participation preparing both budgets and forecasts using a variety of statistical tools and by using budgets to make management decisions.

Introduction

- Cost control is one of the most widely used tool for planning and monitoring organizational activities, as well as to support future strategic decision. Importantly, cost analysis is inextricably linked with strategy formulation, the budgetary process and performance management. It is crucial to interpret how costs behave so that realistic budgets and plans can be produced, and appropriate financial and non-financial resources can be made available to the business. This programme will allow you to explore the traditional tools of cost analysis and control as well as new advanced approaches, which reflect and respond to the current complex business environment. In particular, you will learn:

- the cause-and-effect relationship among business strategy, operational objectives, measures and targets, and systems of performance measurement and reporting
- traditional techniques of cost analysis and control
- advanced costing and management techniques (ABC, ABB, ABM, target costing)
- overhead cost allocation and reduction
- the balanced scorecard construction and implementation

Who should Attend?

- All business disciplines and sectors of industry, irrespective of functional responsibilities, where personnel have to plan and cost and who are responsible for strategic analysis

- Other professionals who would benefit from having the opportunity to consider new ideas and methods and personnel on a fast-track development

Programme Objectives

- Enhance cost awareness and its relationship with strategy
- Describe specific cost analysis and performance measurement techniques
- Select the costing measurement system that works
- Select the systems of performance measurement that works
- Discuss real case studies
- From cost to strategy to performance measurement
- Broadening the management accounting knowledge
- Deliver more timely and useful information to decision makers
- Identify and manage key financial and non-financial indicators for the business

Seminar Outline

DAY 1

Introducing the linkages between strategy and costing

- Managing contemporary organisation
- Strategic Plan, Budgeting, Costing and Management Control
- Management Accounting for organizational control systems
- Responsibility accounting and the process-view
- The context for costing
- The Budget and its role for achieving organizational targets
- What is it the situation in your organisation?

DAY 2

Cost analysis and classifications

- Cost terms and classification
- Inventoriable vs. period costs
- Manufacturing vs non-manufacturing costs
- Variable vs. Fixed costs (CVP analysis)
- Direct vs. indirect cost
- Under-costing and Over-costing problems
- Problems and Examples – Case study illustration

Seminar Outline

DAY 3

From cost accounting to management control

•Cost allocation: traditional costing and activity-based costing (ABC)
•From traditional budgeting to Activity-based budgeting (ABB)
•Activity-based management
•Decentralized organizations
•Cost/Profit/Investment centers
•Transfer-pricing issues
•Problems and Examples – Case study illustration

DAY 4

Flexible budgets and variance analysis

•The features of budgetary control
•Define the master budget and explain its major benefits to an organization
•Describe the difference between a static budget and a flexible budget
•Compute flexible-budget variances and sales-volume variances
•Explain why standard costs are often used in variance analysis
•Integrate continuous improvement into variance analysis
•Case study, problems and exercises

Seminar Outline

DAY 5

Linking strategy to actions: Beyond costing

•Shortcomings of traditional approaches to measurement
•The Balanced Scorecard: linking Strategy to Performance Measurement
•Financial perspective, Customer perspective
•Internal Business Process perspective, Learning and growth perspective
•Developing and adapting scorecard
•Case study illustration

Day 1

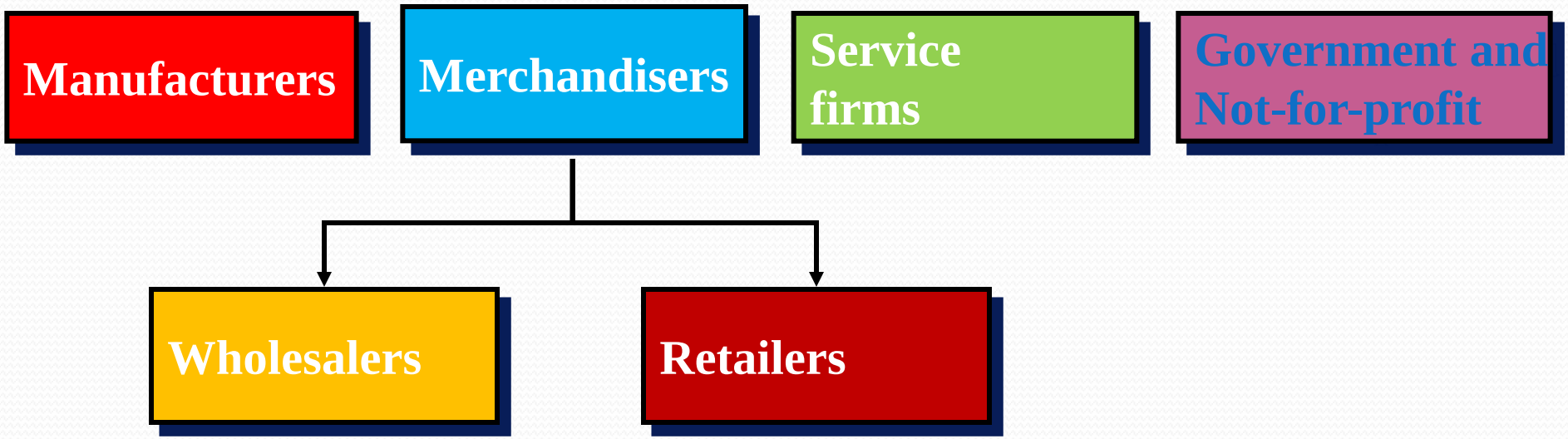
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Managing the Contemporary Organisation

- Case study: Video Troy

Types of Organizations



Changes in the Contemporary Business Environment

1. **Shift to a global business environment**
   - Economic interdependence and increased competition
2. **Lean Manufacturing**
   - Just-in-time (JIT) inventory methods, inventory reduction and quality control
   - Emphasis on *speed-to-market* (i.e., time-based competition)
   - Flexible manufacturing systems

Changes in the Contemporary Business Environment (continued)

3. **Importance of information technology**
   - Increased use of the internet has reduced processing time and facilitated information exchange
4. **Focus on the customer**
   - Consumers expect functionality, quality and customization
   - Shorter product life-cycles have intensified competition

Changes in the Contemporary Business Environment (continued)

5. **Shifts in management organization**
   - The focus has shifted from financial measures and hierarchal command-and-control organizations to nonfinancial measures and flexible organizational structures
6. **Social, political, and cultural considerations**
   - Changes include a more diverse workforce, a renewed sense of ethical responsibility, and increased deregulation of business

Strategic Plan, Budgeting, Costing and Management Control

IMA's New Definition of Management Accounting: a Focus on Strategy

Management accounting is a profession that involves partnering in management decision making, devising planning and performance management systems, and providing expertise in financial reporting and control to assist management in the formulation and implementation of an organization's strategy.

Introduction to Strategy

- **Success comes from developing and implementing an effective strategy aided by management accounting methods**
  - Clear mission statement
  - Strategy is a roadmap to achieve a company's mission
- **Management accountants can help a company be successful**
  - Key to success is having decision-relevant information

Strategy and Management Accounting

- Strategy specifies how an organization matches its own capabilities with the opportunities in the marketplace.

  There are two broad strategies: cost leadership or product differentiation

- Strategic cost management—describes cost management that specifically focuses on strategic issues.

Cost Management Information

- **Serves all management functions**

- **Information a manager needs to manage effectively**
  - Financial and nonfinancial
    - Financial information alone shows a short-term focus
  - Developed under the direction of the controller for the Chief Financial Officer (CFO) of the organization

Strategy and the Master Budget

- The starting point in the budget-preparation process is specification of the organization's *strategy*
- The organization's long-range plan identifies required actions over a 5- to 10-year period to attain the organization's strategic goal(s)
- An organization expresses its strategic goals and long-term objectives in its *capital budget* and *master budget*
- *Strategic budget expenditures* represent a special class of capital budgeting proposals, that is, those that lead to long-term value and competitive advantage by the organization

The Budgeting Process

- Budget Committee
- Budget Period
- Budget Guideline
- Negotiation, Review, and Approval
- Revision

The Master Budget

- Represents the "grand plan of action" for an upcoming period
- Translates the organization's short-term objectives into action steps
- Culminates in the preparation of a set of *pro-forma* financial statements
- Communicates to employees and managers alike the expectations of top management
- Helps coordinate subunit activities

The Master Budget

The master budget comprises a set of operating and financial budgets:

- ***Operating budgets*** are plans that identify resources needed to carry out the budgeted activities, such as sales and services or production
  - Operating budgets include production, purchase, personnel, marketing budgets, and a budgeted income statement
- ***Financial budgets*** identify sources and uses of funds for the budgeted operations
  - Financial budgets include the cash budget, budgeted statement of cash flows, the budgeted balance sheet, and the capital expenditures budget

Preparing Individual Budgets (e.g., a Sales Budget)

Three-step process:

(1) Define the "bottom-line" information contained in the budget (e.g., sales for the upcoming period)

(2) Determine what this information is a function of (e.g., budgeted unit sales, budgeted selling price/unit)

(3) Put together information in a user-friendly way

Sales Budget

The *sales budget* is often referred to as the cornerstone of the entire master budget

The sales budget has two components:

- Forecasted sales *volume*
- Budgeted selling *prices*

Sales Budget

Kerry Industrial Company
Sales Budget
For the Quarter Ended June 30, 2013

	April	May	June	Quarter
Sales in units	20,000	25,000	35,000	80,000
Selling price per unit	× $30	× $30	× $30	× $30
Total sales	$600,000	$750,000	$1,050,000	$2,400,000

Production Budget

- After the sales budget, we prepare a set of manufacturing budgets, beginning with a *production budget*, which shows planned production for a given period

- Budgeted production (in units) can be calculated through use of the following formula:

$$\text{Budgeted production (in units)} = \text{Budgeted Sales (in units)} + \text{Desired ending inventory (in units)} - \text{Beginning inventory (in units)}$$

Production Budget

Kerry example:

(1) Beginning inventory (April 1st) = 5,000 units (assumed)

(2) Desired ending inventory (April 30th) = 30% of the following month's projected unit sales

(3) The sales budget has total sales for May at 25,000 units.

Production Budget

Desired ending level at **April 30:**

30% × 25,000 units (May sales) = 7,500 units

Budgeted production for April

$$22{,}500 = 20{,}000 + 7{,}500 - 5{,}000$$

From the Sales Budget

Inventory from **April 1**: 5,000 units

Production Budget

July sales are budgeted at 40,000 units: 30% × 40,000 = 12,000

Kerry Industrial Company
Production Budget
For the Quarter Ended June 30, 2013

	April	May	June	Quarter
Budgeted sales in units	20,000	25,000	35,000	80,000
Desired ending inventory	7,500	10,500	12,000	12,000
Units needed	27,500	35,500	47,000	92,000
Beginning inventory	5,000	7,500	10,500	5,000
Budgeted production	**22,500**	**28,000**	**36,500**	**87,000**

30% of June's budgeted sales

Direct Materials Budgets

Two required budgets:

- Direct material *usage* budget
- Direct materials *purchases* budget

The direct materials *usage* budget :

- Shows the amount (and budgeted cost) of direct materials required for budgeted production
- The last line of the production budget = first line of the direct materials usage budget

Direct Materials Purchases Budget

The direct materials *purchases* budget :

- Contains budgeted purchases, in units and dollars, of direct materials for the upcoming period
- Is needed to complete the direct materials usage budget (i.e., provides unit cost data)
- Is a function of: materials required for production (from materials usage budget), target ending inventory of materials, beginning-of-period materials inventory, budgeted purchase price per unit of raw material

Direct Materials Purchases Budget: Kerry Company

KERRY WINDOW SYSTEMS, INC.
Direct Materials Purchases Budget
For the Quarter Ended June 30, 2013

Line	Item		April		May		June		Quarter
1.	Total direct materials needed in production (from part A of Exhibit 10.5), in lbs.		67,500		84,000		109,500		261,000
2.	Add: Desired direct materials ending inventory	+	8,400	+	10,950	+	10,800*	+	10,800
3.	Total direct materials needed		75,900		94,950		120,300		271,800
4.	Less: Direct materials beginning inventory	−	7,000	−	8,400	−	10,950	−	7,000
5.	**Total Direct materials purchases**		**68,900**		**86,550**		**109,350**		**264,800**
6.	Purchase price per pound	×	$ 2.45	×	$ 2.50	×	$ 2.60		
7.	**Total cost of direct materials purchases**		**$168,805**		**$216,375**		**$284,310**		**$669,490†**

*Assumed, based on estimated production in July.
†$669,490 = $168,805 + $216,375 + $284,310

Direct Labor Budget

- Enables the personnel department to plan for hiring & repositioning of employees, based on production needs
- Is prepared for each class (type) of labor, e.g., skilled and semi-skilled
- Is a function of:
  - Budgeted output (from *production budget*)
  - Standard labor hours per unit of output
  - Standard wage rate per hour

Direct Labor Budget

Kerry uses 0.5 hours of semiskilled labor and 0.2 hours of skilled labor per unit @ standard wage rates of $8 and $12 per hour, respectively



Direct Labor Budget: Kerry Company

KERRY WINDOW SYSTEMS, INC.
Direct Labor Budget
For the Quarter Ended June 30, 2013

Line			April		May		June		Quarter
	Semiskilled Labor								
1.	Budgeted production (Exhibit 10.4)		22,500		28,000		36,500		87,000
2.	Semiskilled direct labor-hours per unit	×	0.5	×	0.5	×	0.5	×	0.5
3.	Total semiskilled direct labor-hours needed		11,250		14,000		18,250		43,500
4.	Hourly wage rate of semiskilled labor	×	$8	×	$8	×	$8	×	$8
5.	Total wages for semiskilled labor		$90,000		$112,000		$146,000		$348,000
	Skilled Labor								
6.	Budgeted production (Exhibit 10.4)		22,500		28,000		36,500		87,000
7.	Skilled direct labor-hours per unit	×	0.2	×	0.2	×	0.2	×	0.2
8.	Total skilled direct labor-hours needed		4,500		5,600		7,300		17,400
9.	Hourly wage for skilled labor	×	$12	×	$12	×	$12	×	$12
10.	Total wages for skilled labor		$ 54,000		$ 67,200		$ 87,600		$208,800
11.	**Total cost for direct manufacturing labor (5 + 10)**		**$144,000**		**$179,200**		**$233,600**		**$556,800**
12.	Total direct manufacturing labor-hours (3 + 8)		15,750		19,600		25,550		60,900

Cost of Goods Manufactured & Cost of Goods Sold (CGS) Budget

- The *cost of goods manufactured and CGS budget* is prepared after the factory overhead budget is prepared
- The budgeted income statement and the budgeted balance sheet both use information from this budget

Kerry Company: Cost of Goods Manufactured & CGS Budget, April 2013

	April
Direct materials (Line 12, Exhibit 10.5)	$165,025
Direct labor (Line 11, Exhibit 10.7)	144,000
Total factory overhead (Exhibit 10.8)	133,600
Total cost of goods manufactured	$422,625
Finished goods beginning inventory	90,000*
Total cost of goods available for sale	$512,625
Finished goods ending inventory†	140,875
Cost of goods sold	**$371,750**

*Finished goods beginning inventory, April 1, 5,000 units @ $18/unit.

Selling & Administrative Expense Budget

- This budget includes all the planned expenditures for selling and general administrative activities
- Many of the expenses included in this budget are considered discretionary and are a likely place for spending cuts
- Managers must be careful not to focus solely on short-term affects when making cuts in these areas (e.g., customer-service expenditures)

Kerry Company—Cash Receipts Budget: Operating Activities April 2013

Sales Data	March	April
Cash and bank credit card sales (70% of total sales)	$315,000	$420,000
Credit sales (30% of total sales)	135,000	180,000
Gross sales revenue (Exhibit 10.3)	$450,000	$600,000
Cash received from cash sales		
(60% of cash plus bank credit card sales)		$252,000
Cash received from bank credit card sales		
(40% of cash and bank credit card sales × 97%)		162,960
Collections of accounts receivable:		
From credit sales the month before this month:		
Within cash discount period		
(Prior month's credit sales × 80% × 60% × 98%)		63,504
After the cash discount period		
(Prior month's credit sales × 80% × 40%)		43,200
From credit sales two months before this month		
(75% of 20% of credit sales two months prior)		18,000
Total cash receipts, net of bank service charge (3%)		$539,664

Cash Budget

The *cash budget* brings together the cash effects of all budgeted activities--to ensure that the firm has adequate cash on hand:

- This budget generally has three sections:
  - Cash flow from operations
  - Investing activities, and
  - Financing activities

- Preparation of this budget involves careful review of all other budgets to identify cash inflows and outflows

Kerry Company—Cash Budget: April 2013

	April
Cash balance, beginning of period	**$75,000**
Cash flow from operations:	
Operating cash inflows (Exhibit 10.13)	$539,664
Operating cash outflows:	
Cash payments for direct material purchases	$163,283
Direct labor (Exhibit 10.9, line 11)	$144,000
Factory overhead (Exhibit 10.10, last line)	$83,600
Selling & administrative expenses (Exhibit 10.12, last line)	$139,000
Net cash flow from operations	$9,781
Investing activities	
Equipment purchase	$0
Cash balance before financing activities	$84,781
Financing activities:	
Bank borrowing, beginning of month	$0
Payments (i.e., cash outflows, for interest and principal)	$0
Net effect of financing activities	$0
Ending cash balance	**$84,781**

Budgeted I/S and B/S

The *budgeted income statement (I/S)* and *budgeted balance sheet* (B/S) can then be prepared using all the aforementioned budgets:

- The budgeted I/S describes the expected net income for the upcoming period
- The budgeted B/S, the last budget in the budget-preparation process, incorporates the effects of all operations and cash flows during the budget period and shows projected ending balances in asset, liability, and equity accounts

Budgeted Income Statement: Kerry Company

	April
Gross sales revenue (Exhibit 10.3)	$600,000
Less: Cash discounts for early payment of credit sales (last month's credit sales × 80% × 60% × 2%)	$ 1,296
Bank service charge (3% of bank credit-card sales)	$ 5,040
Net sales	$593,664
Less: Cost of goods sold (Exhibit 10.9)	371,750
Gross profit	$221,914
Selling and administrative expenses (Exhibit 10.10)	175,000
Net operating income	$ 46,914
Less: Interest expense (Exhibit 10.12)	0
Income before income taxes	$ 46,914
Less: Income taxes (@30%)	14,074
Net income	**$ 32,840**

Budgeted Balance Sheet: (Total Assets)

Assets			
Current assets:			
Cash (Exhibit 10.12)		$ 90,980	
Net accounts receivable[a]		333,000	
Direct materials inventory (Exhibit 10.5, line 11)		28,080	
Finished goods inventory (Exhibit 10.9)		224,852	
Total current assets			$ 676,912
Property, plant, and equipment:			
Land (Exhibit 10.14)		$ 40,000	
Buildings and equipment, gross	$969,750		
Less: Accumulated depreciation[b]	349,000	620,750	
Total property, plant and equipment			660,750
Total assets			$1,337,662

Budgeted Balance Sheet: (Liabilities + Stockholders' Equity)

Liabilities and Stockholders' Equity		
Current liabilities:		
Accounts payable[c]	$113,724	
Income tax payable (Exhibit 10.13)	94,841	
Total liabilities		$ 208,565
Stockholders' equity:		
Common stock (Exhibit 10.14)	$303,300	
Retained earnings[d]	825,797	
Total stockholders' equity		1,129,097
Total liabilities and stockholders' equity		**$1,337,662**

Uncertainty and the Budgeting Process

- What-If Analysis
- Sensitivity Analysis
- Scenario analysis:
  - Best-case scenario
  - Worst-case scenario
  - Most-likely scenario

Budgeting in Service Companies

- These firms have different operating characteristics, operating environments, and considerations than those of manufacturing and merchandising firms

- Service firms are different due to the absence of production or merchandise purchase budgets and their ancillary budgets–the focus of the budgeting process must be personnel planning:
  - Does the firm have sufficient staff and resources to provide the expected level of service output in the upcoming period?
  - Do staff members have the appropriate skills?

Alternative Budgeting Approaches

Zero-base budgeting (ZZB) is a budgeting process that requires managers to prepare budgets from a zero base

- This type of budgeting allows no activities or functions to be included in the budget unless managers can justify their needs
- In-depth reviews and analyses of all budget items make managers aware of activities and functions that have outlived their usefulness
- Can be a difficult and time-consuming process

Alternative Budgeting Approaches

- *Activity-based budgeting (ABB)* is a budgeting process based on activities and cost drivers of operations:
  - Starts with the budgeted output and segregates costs required for the budgeted output into homogeneous cost pools
  - Can be a simple extension of a firm's ABC system
- *Time-driven activity-based budgeting* is a budgeting process based on the use of time-driven activity-based costing (TDABC) system

Alternative Budgeting Approaches

- Budgeting in both ABC and TDABC systems facilitates resource capacity planning
  - Role of practical capacity?
- Kaizen (Continuous improvement) budgeting:
  - Incorporates continuous improvement expectations into the budgets
  - Promotes active engagement in reforming and altering business practices and processes

Behavioral Issues in Budgeting

- *Budgetary slack*, or padding the budget, is the practice of managers knowingly including a higher amount of expenditures or a lower amount of revenue in a budget
- *Spending the budget* is another issue; managers often feel if they do not use all the resources they receive, next year's budget may be cut
- *Goal congruence* is a term that refers to the degree of consistency between goals of the firm, its subunits, and its employees
  - Involving employees in the budgeting process fosters goal congruence

Behavioral Issues in Budgeting

- Difficulty level of the budget target?
  - An easy budget may fail to encourage employees to give their best efforts, while a very difficult target can be discourage managers from even trying
  - A "highly achievable target" is suggested with incentives for exceeding the budgeted figures
- Authoritative or participative budgeting?
  - Top-down budgeting is referred to as *authoritative budgeting*
  - Bottom-up budgeting is referred to as *participative budgeting*
  - Effective budgeting processes often combine the two types

Behavioral Issues in Budgeting

- **Linkage of compensation and budgeted performance:**
  - Problems with the "fixed performance contract"
  - Gaming the performance measure
- **Suggested improvements to basing incentive compensation on the basis of the fixed performance contract:**
  - Use of linear compensation plan
  - Use of "rolling forecasts" and relative performance (relative improvement contracts

Summary

- A *budget* is a financial or nonfinancial expression of an organization's plan of action for a specified period; it identifies the resources and commitments required to achieve the organization's goals for the period identified
- Strategy is the starting point in preparing its plans and budgets
- The "grand plan of action" for an upcoming period is the organization's *Master Budget*

Summary

Components of a master budget for a manufacturing firm include:

- Sales budget
- Production budget
- Direct materials usage budget
- Direct materials purchases budget
- Direct labor budget
- Factory overhead budget
- Budgeted cost of goods manufactured/cost of goods sold budget
- Selling and general administrative expenses budget
- Cash receipts budget
- Cash budget
- Budgeted income statement (I/S), and
- Budgeted balance sheet (B/S)

Summary

- Service organizations have different operating characteristics, operating environments, and considerations than those of manufacturing and merchandising firms

- ZBB, ABB (activity-based budgeting), time-driven activity-based budgeting (TDABB), and kaizen are alternative approaches to budgeting that can improve budgeting effectiveness

Summary

Primary behavioral issues associated with the budgeting process:

- Managers must be aware of the potential for budgetary slack and "budget spending"
- Participative budgeting often increases motivation in employees
- goal-congruence problems associated with the use of "fixed performance" contracts
- future role of *relative performance* (relative improvement) contracts and *rolling financial forecasts*

Management Accounting for organizational control systems

- How the organisational structure is set up will affect the way management accounting is carried out.

Accounting Discipline Overview

- Management accounting—measures, analyzes, and reports financial and nonfinancial information to help managers make decisions to fulfill organizational goals. Management accounting need not be GAAP compliant.

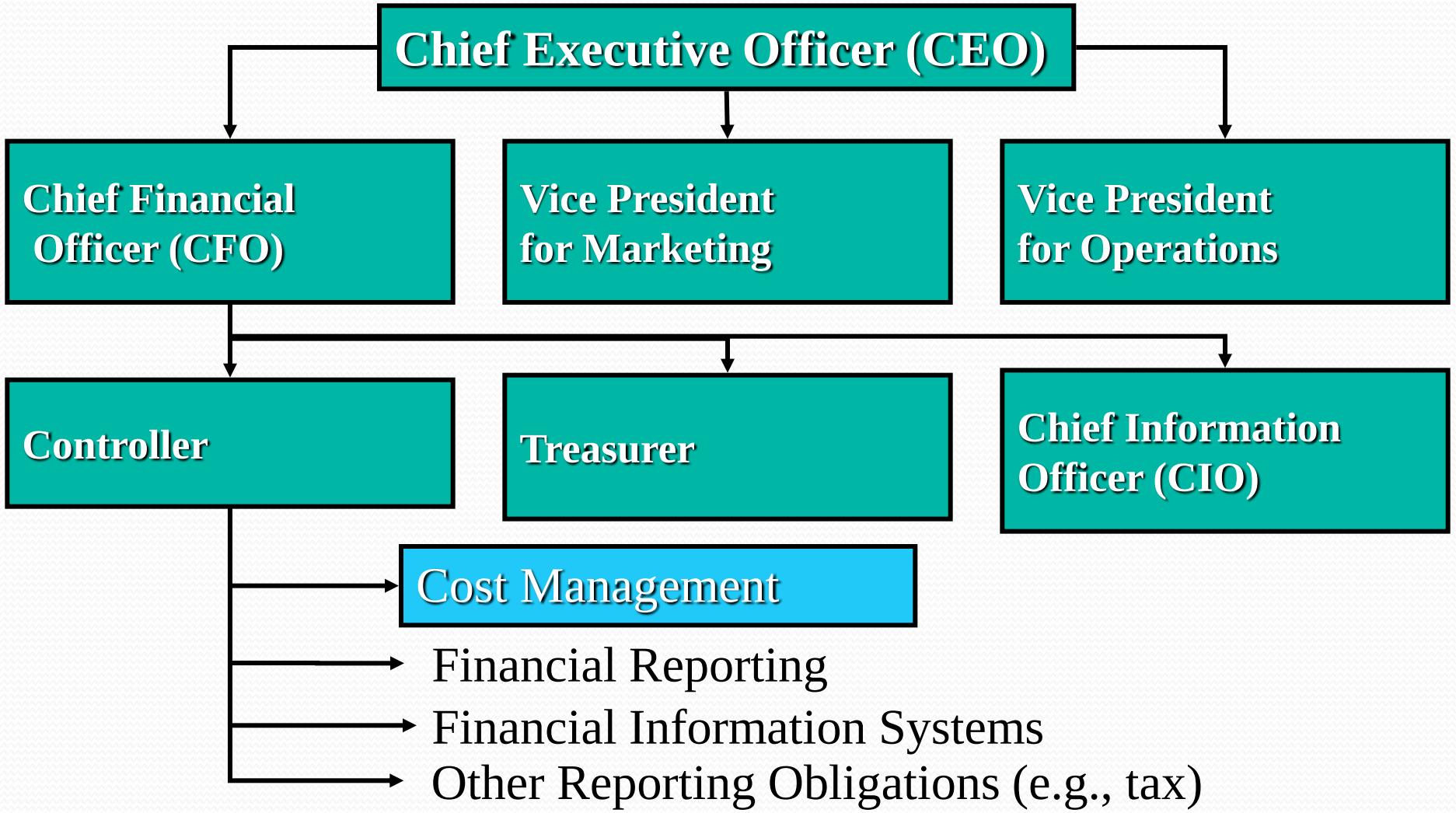
- Financial accounting—focuses on reporting to external users including investors, creditors, banks, suppliers, and governmental agencies. Financial statements must be based on GAAP.

Accounting Discipline Overview

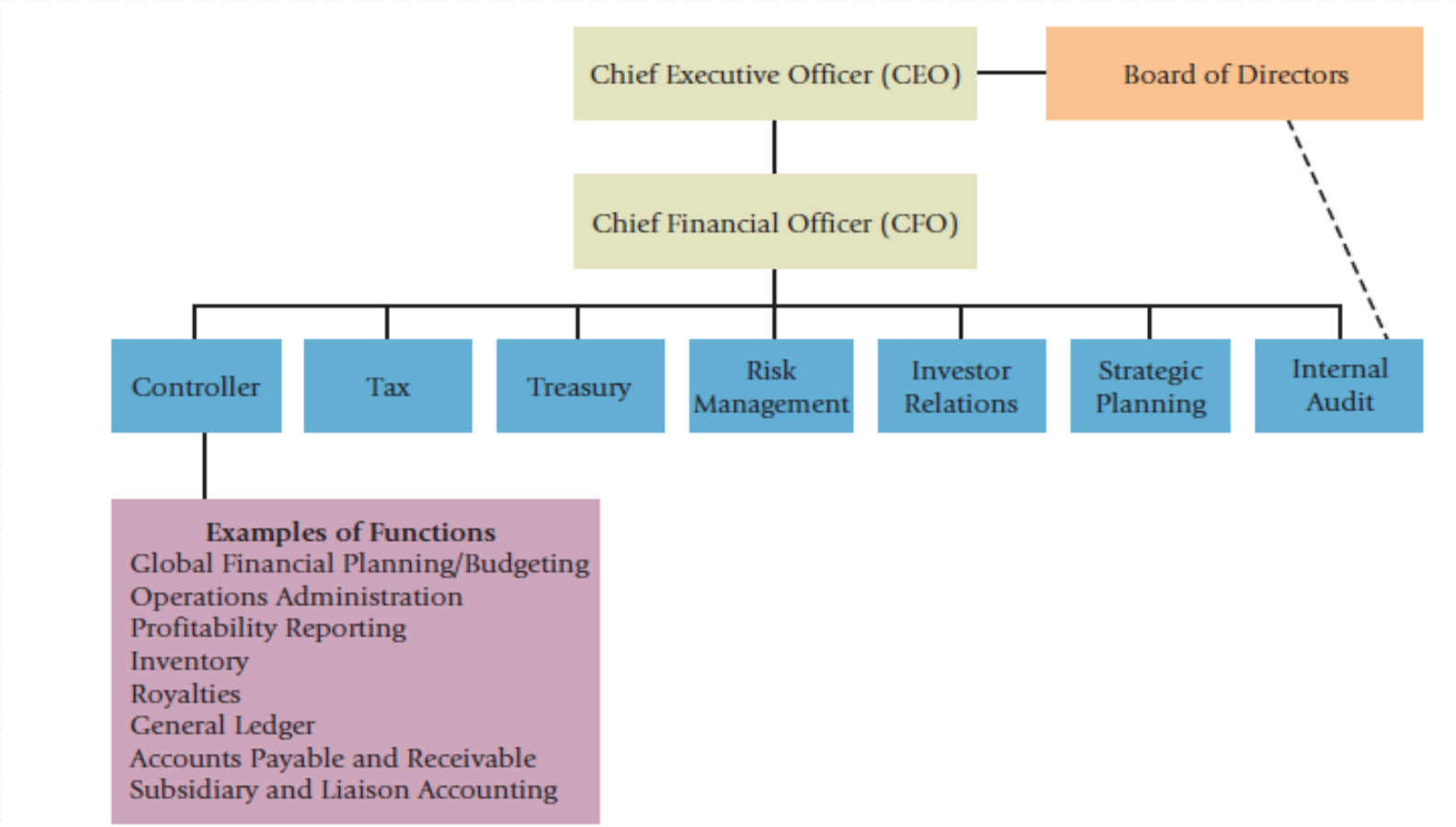
- Cost accounting – measures, analyzes and reports financial and nonfinancial information related to the costs of acquiring or using resources in an organization.

- Today, most accounting professionals take the position that cost information is part of management accounting; therefore, the distinction between the two is not clear-cut, but we often use the terms interchangeably.

Typical Organization Chart



A Typical Organizational Structure and the Management Accountant



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Cost Management vs.Financial Reporting

- **Financial reporting**
  - External users
  - Emphasis on accuracy and compliance
- **Cost management**
  - Internal users
  - Emphasis on usefulness and timeliness, key characteristics of decision-relevant information
- **Challenge for controller to reconcile these potentially conflicting roles**

Major differences between management and financial accounting

	Management Accounting	Financial Accounting
Purpose of information	Help managers make decisions to fulfill an organization's goals	Communicate organization's financial position to investors, banks, regulators, and other outside parties
Primary users	Managers of the organization	External users such as investors, banks, regulators, and suppliers
Focus and emphasis	Future-oriented (budget for 2014 prepared in 2013)	Past-oriented (reports on 2013 performance prepared in 2014)
Rules of measurement and reporting	Internal measures and reports do not have to follow GAAP but are based on cost-benefit analysis	Financial statements must be prepared in accordance with GAAP and be certified by external, independent auditors
Time span and type of reports	Varies from hourly information to 15 to 20 years, with financial and nonfinancial reports on products, departments, territories, and strategies	Annual and quarterly financial reports, primarily on the company as a whole
Behavioral implications	Designed to influence the behavior of managers and other employees	Primarily reports economic events but also influences behavior because manager's compensation is often based on reported financial results

Responsibility accounting and the process-view

Strategy and Management Accounting

Management accounting helps answer important questions such as:

- 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 own?
- What is our most critical capability?
- Will adequate cash be available to fund the strategy or will additional funds need to be raised?

Management Accounting and Value

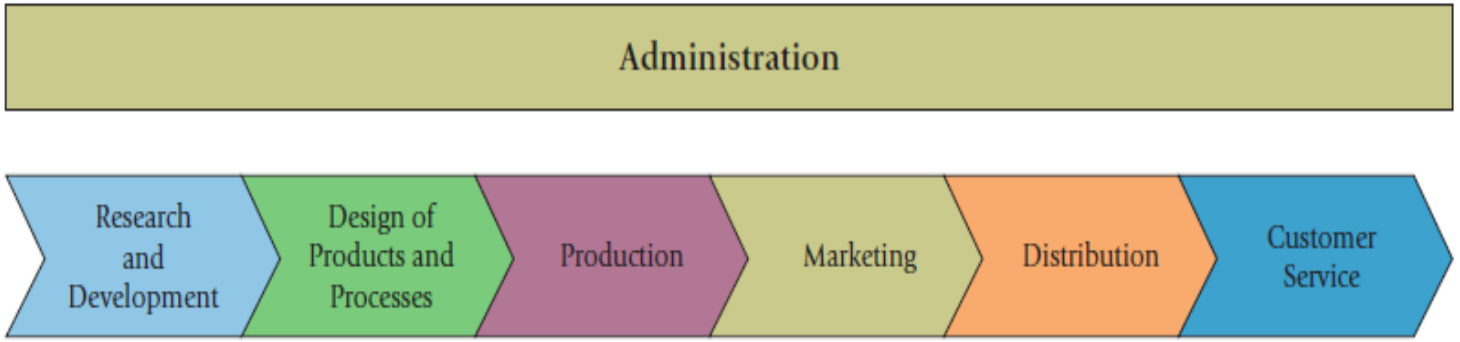
- Creating value is an important part of planning and implementing strategy.
- Value is the usefulness a customer gains from a company's product or service. The entire customer experience determines the value a customer derives from a product.

Management Accounting and Value, concluded

- The Value chain is the sequence of business functions in which a product is made progressively more useful to customers.
- The Value chain consists of:
  1. Research & development
  2. Design of Products and Processes
  3. Production
  4. Marketing
  5. Distribution
  6. Customer service

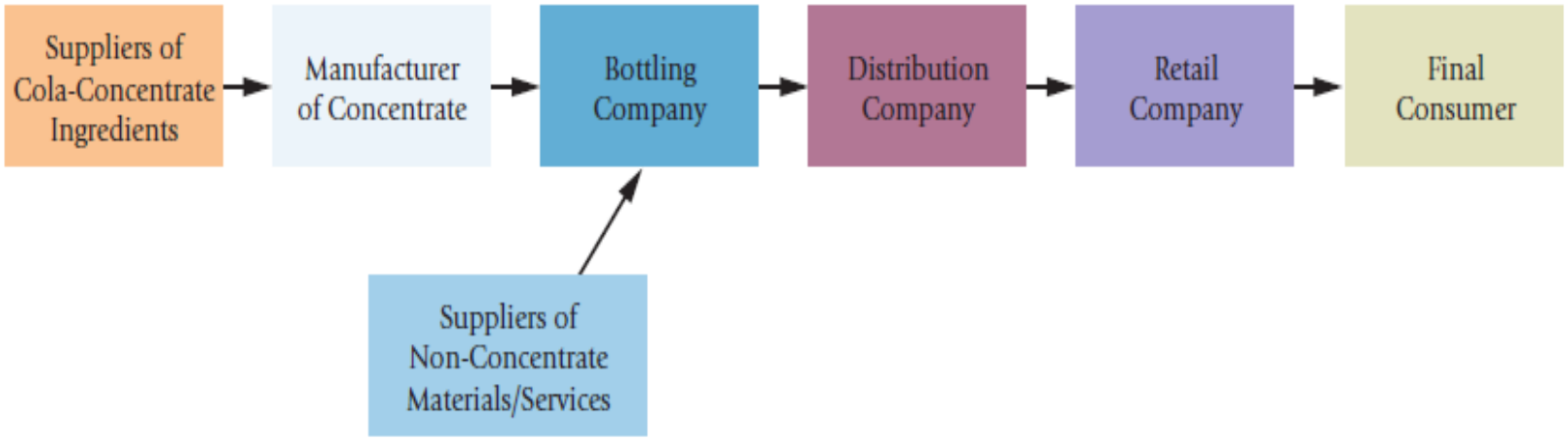
The Value Chain Illustrated

Exhibit 1-2 Different Parts of the Value Chain



A Value Chain Implementation

Exhibit 1-3 Supply Chain for a Cola Bottling Company



Supply-chain analysis

- Production and Distribution are the parts of the value chain associated with producing and delivering a product or service.
- These two functions together are known as the Supply-Chain
- The supply chain describes the flow of goods, services and information from the initial sources of materials, services, and information to their delivery regardless of whether the activities occur in one organization or in multiple organizations.

Key Success Factors

- Customers want companies to use the value chain and supply chain to deliver ever-improving levels of performance when it comes to several (or even all) of the following:
  - Cost and efficiency
  - Quality
  - Time
  - Innovation
  - Sustainability

A Five-Step Decision Making Process in Planning and Control

1. Identify the problem and uncertainties.
2. Obtain information.
3. Make predictions about the future.
4. Make decisions by choosing between alternatives.
5. Implement the decision, evaluate performance, and learn.

Planning and Control Systems

- Planning selects goals and strategies, predicts results, decides how to attain goals, and communicates this to the organization.
  - Budget—the most important planning tool-is the quantitative expression of a plan of activity by management and is an aid to coordinating what needs to be done to execute that plan.
- Control takes actions that implement the planning decision, evaluates performance, and provides feedback and learning to the organization.

Management Accounting Guidelines

Three guidelines help management accountants provide the most value to the strategic and operational decision-making of their companies:

- Cost–benefit approach: benefits of an action/purchase generally must exceed costs as a basic decision rule.
- Behavioral and technical considerations: people are involved in decisions, not just dollars and cents.
- Different Costs for Different Purposes: Managers use alternative ways to compute costs in different decision-making situations.

Budgeting and Responsibility Accounting

- Responsibility center—a part, segment, or subunit of an organization whose manager is accountable for a specified set of activities.
- Responsibility accounting—a system that measures the plans, budgets, actions, and actual results of each responsibility center.
- Generally, we consider 4 levels of responsibility center.

Types of Responsibility Centers

1. Cost—accountable for costs only
2. Revenue—accountable for revenues only
3. Profit—accountable for revenues and costs
4. Investment—accountable for investments, revenues, and costs

Budgets and Feedback

- Budgets offer feedback in the form of variances: actual results deviate from budgeted targets.
- Variances provide managers with:
  - Early warning of problems
  - A basis for performance evaluation
  - A basis for strategy evaluation

Responsibility & Controllability

- Controllability is the degree of influence that a manager has over costs, revenues, or related items for which he or she is being held responsible.
- Responsibility accounting helps managers to first focus on whom they should ask to obtain information and not on whom they should blame.
- Responsibility accounting focuses on gaining information and knowledge, not only on control.
- The fundamental purpose of responsibility accounting is to enable future improvement.

Human aspects of budgeting

- Budgetary slack is the practice of underestimating budgeted revenues or overestimating budgeted costs to make budgeted targets easier to achieve.
- Stretch targets are targets that are challenging but achievable to focus effort on achieving the targets.
- Kaizen Budgeting is a practice whereby each budget process incorporates continuous improvement from past results.

Budgeting in multinational companies

- International companies face significant exchange rate uncertainty rendering budgets for traditional purposes of evaluating a firm's performance moot but still very useful as a tool to help manager's adapt plans and coordinate actions when conditions are volatile.

Context for Cost Accounting

Four Functions of Management

Cost management information is assembled to aid management in the following functions:

- Strategic management
- Planning and decision-making
- Management and operational control
- Preparation of financial statements

Management Functions

Strategic management

- Most important management function
- Involves identifying and implementing goals and action plans to maintain a competitive advantage
- Monitoring of Critical Success Factors (CSFs) is necessary
- Critical to a firm's success due to global competition and rapidly changing markets

Management Functions (continued)

Planning and decision-making

- Information is needed to support recurring decisions such as scheduling production and pricing
- Information is needed for short-run planning (budgeting) and profit planning (Cost-Volume-Profit analysis)

Management and operational control

- Information is needed to identify inefficient operations and reward effective management practices

Preparation of financial statements

- Information is needed to guarantee compliance with regulatory reporting requirements

The Strategic Focus of Cost Management: Kaplan's Phases for Developing Cost Management Systems

Stage One	Cost-management systems are basic transaction reporting systems
Stage Two	Cost-management systems focus on external reporting–decision-usefulness of cost-management data is limited
Stage Three	Cost-management systems track key operating data and relevant cost information for decision-making
Stage Four	Strategically relevant cost-management information is an integral part of the system

How do the Changes in The Contemporary Business Environment Affect Cost Management?

The management accountant's role:

- Provide strategically relevant cost management information to help the organization keep up with the ever-changing environment
- Thirteen Contemporary Management Techniques developed and employed by the management accountant

Contemporary Management Techniques

1. The Balanced Scorecard and Strategy Map
2. The Value Chain
3. Activity Based Costing and Management
4. Business Intelligence
5. Target Costing
6. Life Cycle Costing
7. Benchmarking
8. Business Process Improvement
9. Total Quality Management
10. Lean Accounting
11. The Theory of Constraints
12. Sustainability
13. Enterprise Risk Management

Contemporary Management Techniques (continued)

1. The Balanced Scorecard and the Strategy Map

- **The Balanced Scorecard (BSC)**
  - An accounting report that addresses a firm's performance in four areas: financial, customer, internal business processes, and innovation and learning
- **The Strategy Map**
  - The strategy map is a method, based on the balanced scorecard, which links the four perspectives in a cause-and-effect diagram.

Contemporary Management Techniques (continued)

2. The Value Chain

- An analysis tool used to identify the specific steps required to provide a competitive product
- Helps identify steps that can be eliminated or outsourced

3. Activity-Based Costing and Management

- Activity-Based Costing (ABC) improves the tracing of costs to individual products and customers
- Activity-Based Management (ABM) improves operational and management control

Contemporary Management Techniques (continued)

4. Business Intelligence

- an approach to strategy implementation in which the management accountant uses data to understand and analyze business performance.

5. Target Costing

- Target Cost = Market-determined price – Desired Profit
- A method that has resulted from intensely competitive markets

Contemporary Management Techniques (continued)

6. Life-Cycle Costing

- Costs should be monitored throughout a product's life cycle – from research and development to sales and service

7. Benchmarking

- Process by which a firm identifies its CSFs, studies the best practices of other firms in achieving these CSFs, and institutes change based on the assessment results

Contemporary Management Techniques (continued)

8. Business Process Improvement

- This technique involves managers and workers committing to a program of continuous improvement in quality and other CSFs

9. Total Quality Management (TQM)

- A technique by which management develops policies and practices to ensure the firm's products and services exceed customer's expectations

Contemporary Management Techniques (continued)

10. Lean accounting uses value streams to measure the financial benefits of a firm's progress in implementing lean manufacturing.

11. The Theory of Constraints (TOC)

- Helps firms improve *cycle-time* (i.e., the rate at which raw materials can be converted to finished products)

Contemporary Management Techniques (continued)

12. **Sustainability** means the balancing of the company's short and long term goals in all three dimensions of performance – social, environmental, and financial.
13. **Enterprise risk management** is a framework and process that firms use to managing the risks that could negatively or positively affect the company's competitiveness and success.

The Budget and its role for achieving organizational targets

Budgeting

The Purpose of Budgets

Meeting organization's objectives

Planning

Monitor & Control

Co-ordination

Evaluating Performance

Motivation for Managers

Management Contract

Communication

Provide a basis for authorising expenditure

Identify scarce resources

Delegation of responsibility

Competitive Strategies

- A firm succeeds by implementing a set of policies, procedures, and approaches to business called a strategy
- Strategy must have a long-term focus and adapt to the changing environment
- Cost management information should be used to develop and monitor strategic information

Michael Porter: Strategic Positioning

- **Cost Leadership**—outperform competitors by producing at the lowest cost, consistent with quality demanded by the consumer
- **Differentiation**—creating value for the customer through product innovation, product features, customer service, etc. that the customer is willing to pay for

Competitive Strategies (continued)

Aspect	Cost Leadership	Differentiation
Strategic Target	Broad cross section of the market	Focused cross section of the market
Basis of competitive advantage	Lowest cost in the industry	Unique product or service
Product line	Limited selection	Wide variety
Production emphasis	Lowest possible cost and essential features	Innovation in differentiating products
Marketing emphasis	Low price	Premium price and innovative features

The Five Steps of Strategic Decision Making

1. Determine the Strategic Issues Surrounding the Problem
2. Identify the Alternative Actions
3. Obtain Information and Conduct Analyses of the Alternatives
4. Based on Strategy and Analysis, Choose and Implement the Desired Alternative
5. Provide an On-going Evaluation of the Effectiveness of implementation in Step 4.

Budget Defined

- A budget is the quantitative expression of a proposed plan of action by management for a specified period.
- A budget is an aid to coordinating what needs to be done to implement that plan.

A budget generally includes both the plan's financial and nonfinancial aspects and serves as a blueprint for the company to follow in an upcoming period.

Budgets help managers….

- Communicate directions and goals to different departments of a company to help them coordinate the actions they must pursue to satisfy customers and succeed in the marketplace.
- Judge performance by measuring financial results against planned objectives, activities, and timelines to learn about potential problems.
- Motivate employees to achieve their goals.

Strategic plans and operating plans

To develop successful strategies, managers must consider questions such as the following:

1. What are our objectives?
2. How do we create value for our customers while distinguishing ourselves from our competitors?
3. Are the markets for our products local, regional, national or global?
4. What trends affect our markets?
5. What organizational and financial structures serve us best?
6. What are risks and opportunities of alternative strategies and what are our contingency plans if our preferred plan fails?

Professional Certifications

There are three important certifications that are relevant for management accountants in the U.S. (other certifications worldwide):

- Certified Management Accountant (CMA)
- Certified Public Accountant (CPA)
- Certified Global Management Accountant(CGMA)

Professional Ethics

- The four standards of ethical conduct for management accountants as advanced by the Institute of Management Accountants are:
  - Competence
  - Confidentiality
  - Integrity
  - Objectivity

Sarbanes-oxley act (sox)

The Sarbanes-Oxley legislation was passed in 2002 in response to a series of corporate scandals. The act focuses on improving:

1. Internal controls
2. Corporate governance
3. Monitoring of managers
4. Disclosure practices of public companies

IMA Statement of Ethical Professional Practice

- Commitment to competence, integrity, confidentiality, and credibility is necessary for the management accountant to provide a useful service to management
- When presented with an ethical issue that cannot be resolved through the organization's established policies, the IMA suggests a three step process:
  - ❶ Discuss the situation with a superior not involved in the issue
  - ❷ Clarify the issue through discussion with an IMA Ethics Counselor or impartial advisor
  - ❸ Consult your own attorney as to your legal obligations and rights

Summary

- Cost management information is used in all four of the management functions and is important in the pursuit of a firm's mission and goals
- The contemporary business environment expects fast results and has influenced the role of the management accountant
- There were several contemporary management techniques in which cost management responds to the changing business environment

Summary

- The two main competitive strategies are cost leadership and differentiation
- There are five steps for strategic decision making
- The management accountant looks to professional organizations for guidance, training, and professional support
- Professional certifications can be obtained in many areas, but there are three main areas applicable to management accountants

Implementing a Strategy

- **There are two main competitive strategies:**
  - cost leadership
  - differentiation
- **Once a firm chooses which strategy to follow, there are various means of implementation:**
  - SWOT Analysis
  - Focus on execution
  - Value-chain analysis
  - Balanced scorecard (BSC)

SWOT Analysis

- **Identification of critical success factors (CSFs) tied to strategy—for example:**
  - Product innovation
  - Quality
  - Skill development
- **Identification of quantitative measures for the specified CSFs—for example:**
  - Number of design changes or new patents
  - Number of defects or number of returns
  - Number of training hours or amount of skill performance improvement

SWOT Analysis

- **The SWOT analysis has four areas:**
  - **S** – strengths/internal
  - **W** – weaknesses/internal
  - **O** – opportunities/external
  - **T** – threats/external

Look at product lines, management, R&D, manufacturing, marketing, and strategy

Look at barriers to entry, intensity of rivalry among competitors, substitute goods, and customer/supplier bargaining power

Execution

- **The CSFs a manager executes depend on the chosen strategy**
  - Cost leadership: operational performance and quality
  - Differentiation: customer satisfaction and innovation
- **Differentiated firms must pay close attention to marketing and product development**
  - Management accountants assist by gathering, analyzing, and reporting on relevant information
- **Can be improved through benchmarking and total quality improvement (e.g., Malcolm Baldrige Quality Award)**

Value-Chain Analysis

- **An analysis for better understanding the details of the organization's competitive strategy**
  - CSFs must be implemented in each and every phase of operations
- **Helps a firm better understand its competitive advantage by analyzing what processes add value (processes that do not add value can be deleted or outsourced)**
- **Will include upstream (prior to manufacturing or operations) and downstream activities**

Value-Chain Analysis

- **Value-chain analysis has two steps:**
  - Identify the value-chain activities at the smallest level possible
  - Develop a competitive advantage by reducing cost or adding value
- **To develop a competitive advantage, a firm must consider the following:**
  - What is our competitive advantage (strategy)?
  - Where can we add value for the customer?
  - Where can we reduce costs?
  - Are any of our processes linked (linkages exploited)?

Example: Value-Chain Analysis in Computer Manufacturing

- Computer Intelligence Company (CIC) manufactures computers for small businesses
- The company has an excellent reputation for service and reliability as well as a growing customer list: competes on differentiation
- Is there any way to add value for the customer while reducing costs?

Example: Value-Chain Analysis in Computer Manufacturing

- **The company is considering two options:**
  - **Option One** is to continue functioning as is
  - **Option Two** includes two separate outsourcing decisions: (a) the purchase or manufacture of parts, and (b) providing service internally or outsourcing it
- **It is important to consider company strategy in outsourcing decisions**

Value-Chain Analysis in Computer Manufacturing

Value Activity	Option One – Current	Option Two – Potential
Acquiring raw materials	CIC is not involved at this step	CIC is not involved at this step
Manufacturing computer chips and other parts	CIC is not involved at this step; cost is $200	CIC is not involved at this step; cost is $200
Manufacturing components, some of which CIC can make	CIC purchases $300 of parts for each unit	CIC manufactures these parts for $190 per unit plus $55,000 monthly
Assembling	CIC's costs are $250	CIC's costs are $250
Marketing, distributing, and servicing	CIC's costs are $175,000 per month	CIC contracts out these services for $130 per month

Results of Value-Chain Analysis

	Manufacturing	Marketing, distributing, and servicing
Option One	600 x $300 = $180,000	$175,000 per month
Option Two	600 x 190 + $55,000 = $169,000	$78,000 per month
Savings with Option Two	$11,000	$97,000 per month

Results of Value-Chain Analysis

- **CIC can save $108,000 ($11,000 + $97,000) per month by manufacturing the parts and contracting out marketing, distributing, and servicing**

- **The main factor driving the decision is company strategy, which in this case is quality and customer service**
  - For a firm pursuing a differentiation strategy, the best option is not necessarily the one which provides the most savings (savings is a secondary consideration)
  - From a strategic viewpoint, Option One is preferred over Option Two

The Five Steps of Strategic Decision Making for CIC

1. Determine the Strategic Issues Surrounding the Problem: CIC competes on differentiation
2. Identify the Alternative Actions: two options
3. Obtain Information and Conduct Analyses of the Alternatives: calculate the relevant costs
4. Based on Strategy and Analysis, Choose and Implement the Desired Alternative – support CIC's strategy, this is the key to the analysis
5. Provide an On-going Evaluation of the Effectiveness of implementation in Step 4.

The Balanced Scorecard (BSC)

- **A performance report** based on a broad set of financial and nonfinancial measures that is crucial to understanding and implementing a strategy

- **This report groups a firm's CSFs into four areas:**
  - Financial perspective (financial measures)
  - Customer perspective (customer satisfaction)
  - Internal process perspective (e.g., productivity and speed)
  - Learning and growth (e.g., training and number of new patents or products)

The Balanced Scorecard

- **Benefits**
  - Provides a means for implementing strategy
  - Provides a means to achieve a desired organizational change in strategy
  - Can be used to determine management's compensation and rewards
  - Aligns managers' efforts with strategy
  - Coordinates efforts within the firm to achieve CSFs

The Balanced Scorecard

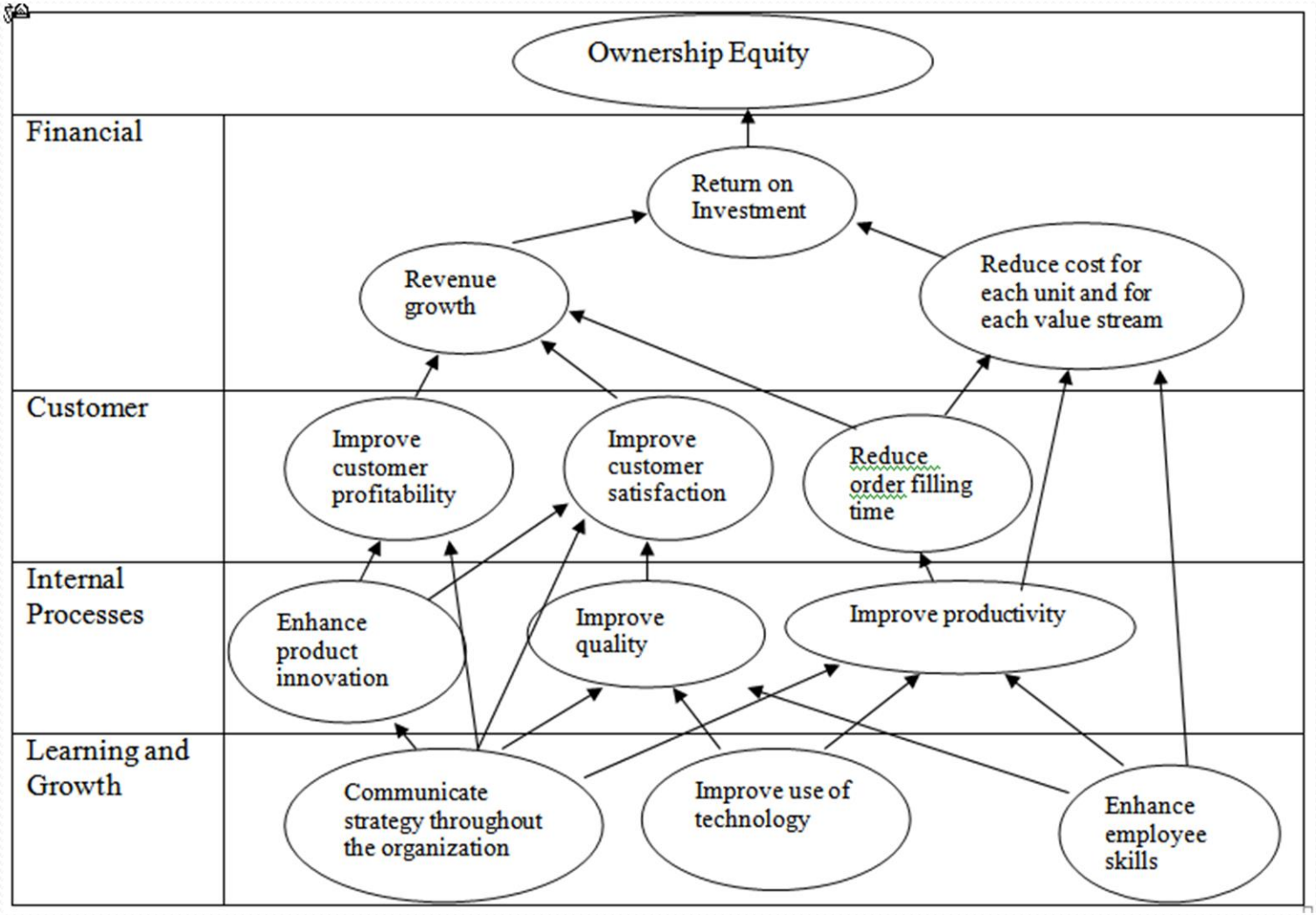
- **A properly constructed BSC can be used to infer a company's strategy**
  - BSC → Strategy, and Strategy → BSC
- **The emphasis placed on each performance perspective reflects the strategy of the firm**
  - For a cost leader, the operations perspective might be the most important; for a differentiator, the customer perspective…

Strategy Map

A strategy map is a cause-and-effect diagram of the relationships embodied in a BSC:

- Shows how the achievement of CSFs in one perspective should affect the achievement of goals in another perspective
- The financial perspective is the target in the strategy map because financial performance is the ultimate goal for most profit-seeking organizations
- Success in the other perspectives leads directly to improved financial performance and shareholder value

An Example Strategy Map



Sustainability

- **The fifth perspective for many organizations**

- **The balancing of short-term and long-term goals in all three dimensions of the company's performance–financial, social, and environmental:**
  - Environmental reports use environmental performance indicators (EPIs) to measure sustainability
  - These indicators are in three areas:
    - Operational measures (stresses to the environment/regulatory compliance issues)
    - Management measures (efforts to reduce environmental effects)
    - Environmental measures (environmental quality)

Sustainability

- Sustainability reports also use social performance indicators (SPIs) to measure sustainability

- These indicators are in three areas:
  - Working conditions (worker safety and training)
  - Community involvement (for example, employees participation in community activities such as Habitat for Humanity)
  - Philanthropy (direct contributions)

Summary

- **S**trengths-**W**eaknesses-**O**pportunities-**T**hreats (**SWOT**) Analysis provides a system and structure in which to identify a firm's critical success factors (CSFs)
- Execution of goals is important in implementing a strategy
- Execution depends on the competitive strategy a firm is pursuing
- Value-chain analysis builds on the CSFs identified in SWOT analysis by breaking them into detailed activities

Summary

- The balanced scorecard (BSC) provides the processes for evaluating a firm's achievement of CSFs
- Sustainability, often included as a perspective of the BSC, builds on the conventional BSC by balancing short-term and long-term goals
- Sustainability focuses on financial, social, and environmental issues

What is the situation in your organisation

- Discussion

Day 2

Cost analysis and classifications

- Cost terms and classification
- Inventoriable vs. period costs
- Manufacturing vs non-manufacturing costs
- Variable vs. Fixed costs (CVP analysis)
- Direct vs. indirect cost
- Under-costing and Over-costing problems
- Problems and Examples – Case study illustration

Cost terms and classification

Cost Terms & Classification

- Cost—a sacrificed or forgone resource to achieve a specific objective.
- Actual cost—a cost that has occurred.
- Budgeted cost—a predicted cost.
- Cost object—anything for which a cost measurement is desired.

Basic Definitions

- A *cost* is incurred when a firm uses a resource for some purpose
- Costs are assembled into meaningful groups called *cost pools* (e.g., by type of cost or source)
- Any factor that has the effect of changing the level of total cost is called a *cost driver*
- A *cost object* is any product, service, customer, activity, or organizational unit to which costs are assigned for some management purpose

Cost Object Examples at BMW

Cost Object	Illustration
Product	A BMW X6 sports activity vehicle
Service	Telephone hotline providing information and assistance to BMW dealers
Project	R&D project on DVD system enhancement in BMW cars
Customer	Herb Chambers Motors, a dealer that purchases a broad range of BMW vehicles
Activity	Setting up machines for production or maintaining production equipment
Department	Environmental, Health and Safety department

Basic Cost Terminology

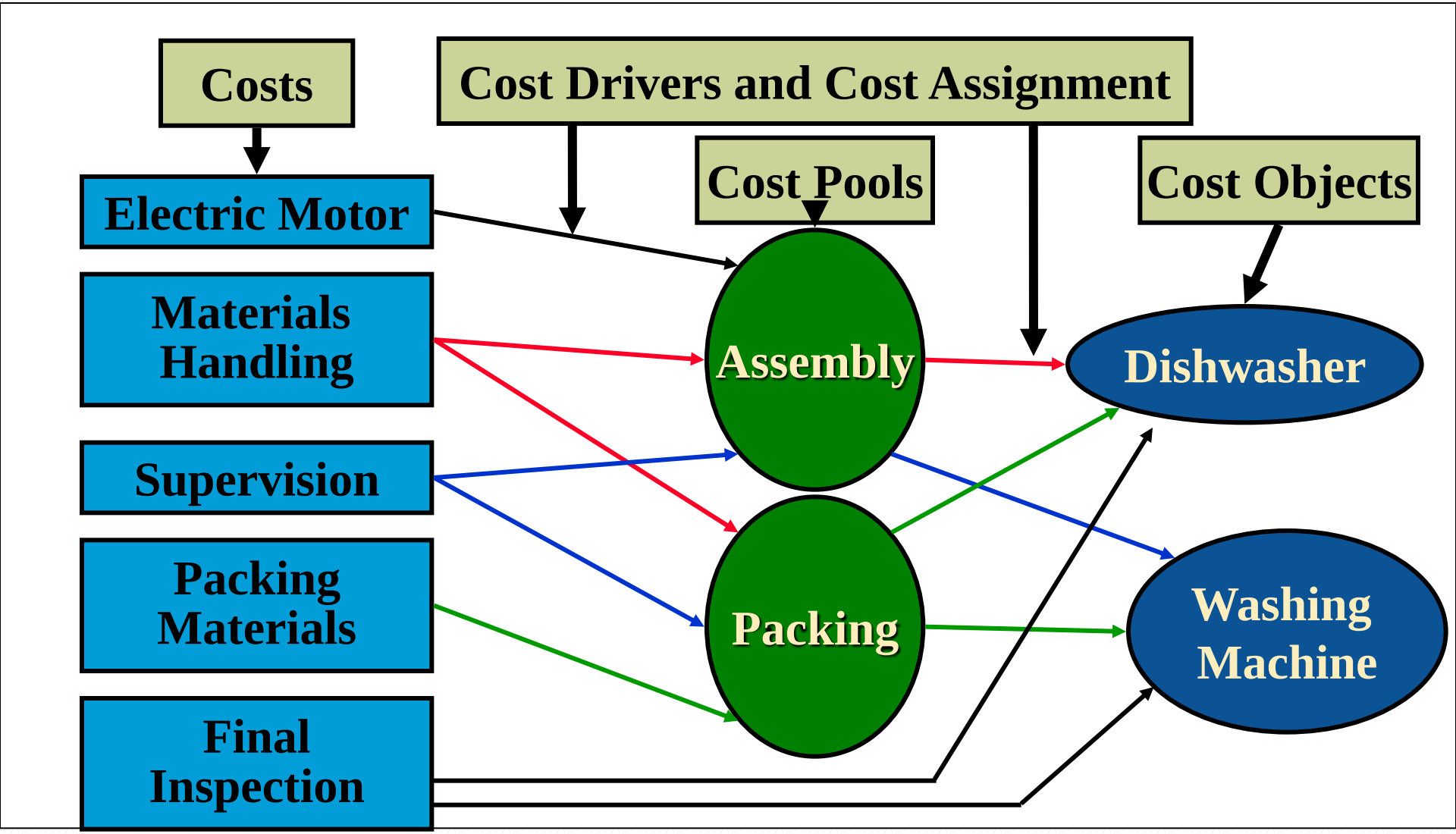
- Cost accumulation—the collection of cost data in an organized way by means of an accounting system.
- Cost assignment—a general term that encompasses the gathering of accumulated costs to a cost object in two ways:
  - Tracing accumulated costs with a direct relationship to the cost object and
  - Allocating accumulated costs with an indirect relationship to a cost object.

Product/Service Costing: Cost Assignment

The process of assigning costs to cost pools or from cost pools to cost objects

- *Direct costs* can be conveniently and economically traced to a cost pool or a cost object
- *Indirect costs* cannot be traced conveniently or economically to a cost pool or a cost object
- Because indirect costs cannot be traced, assignment is made through the use of cost drivers (*cost allocation*)
- These cost drivers are often called *allocation bases*

Cost Assignment: General Principles



Inventoriable vs. period costs

Types of inventory

- Direct materials—resources in-stock and available for use
- Work-in-process (or progress)—products started but not yet completed, often abbreviated as WIP
- Finished goods—products completed and ready for sale

- Note: Merchandising-sector companies hold only one type of inventory: merchandise inventory

Commonly used classifications of manufacturing costs

- Also known as inventoriable costs
  - Direct materials—acquisition costs of all materials that will become part of the cost object.
  - Direct labor—compensation of all manufacturing labor that can be traced to the cost object.
  - Indirect manufacturing—factory costs that are not traceable to the product in an economically feasible way. Examples include lubricants, indirect manufacturing labor, utilities, and supplies.

Inventoriable costs vs. period costs

- Inventoriable costs are all costs of a product that are considered assets in a company's balance sheet when the costs are incured and that are expensed as cost of goods sold only when the product is sold. For manufacturing companies, all manufacturing costs are inventoriable costs.
- Period costs are all costs in the income statement other than cost of goods sold. They are treated as expenses of the accounting period in which they are incurred.

Cost Flows

- The Cost of Goods Manufactured and the Cost of Goods Sold section of the Income Statement are accounting representations of the actual flow of costs through a production system.
  - Note how inventoriable costs to through the balance sheet accounts of work-in-process and finished goods inventory before entering the cost of goods sold in the income statement.

Product and Service Costing Concepts

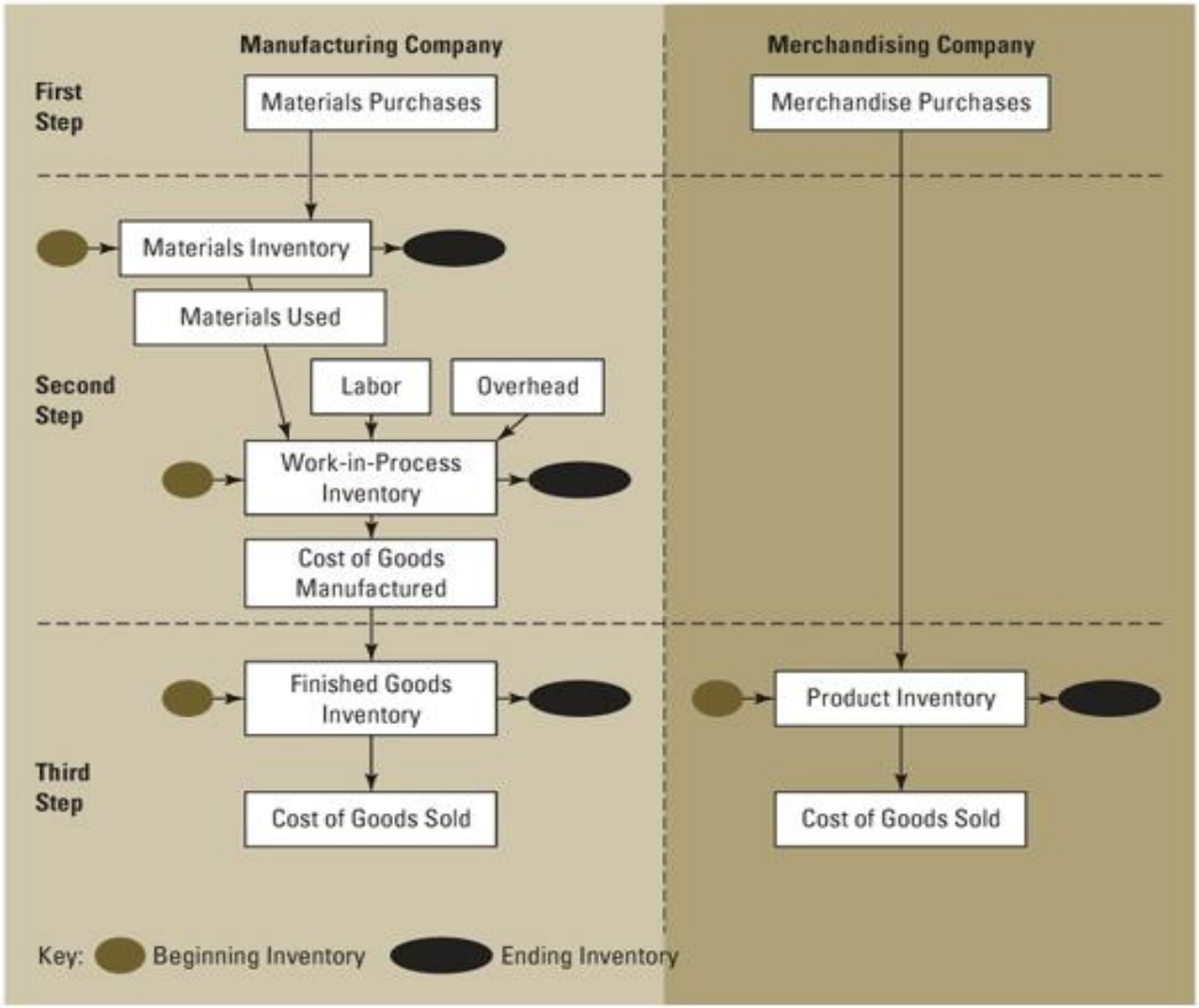
- **Product costs** include only the costs necessary to complete the product at the manufacturing step in the value chain (manufacturing) or to purchase and transport the product to the location of sale (merchandising)

- **Period costs (also called non-product costs)** include all other costs incurred by the firm in managing or selling the product (indirect costs outside the manufacturing step of the value chain)

Manufacturing vs non-manufacturing costs

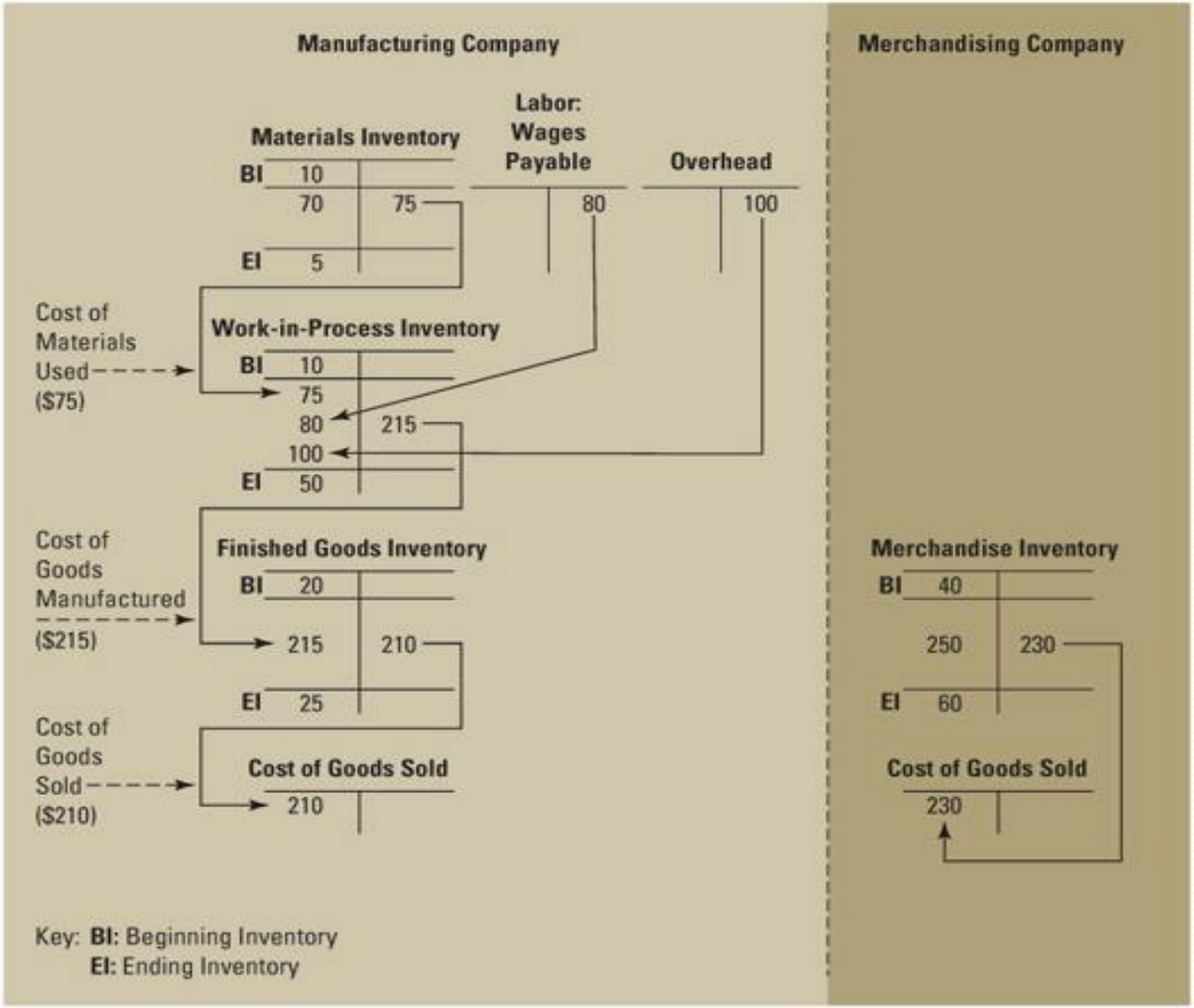
Manufacturing vs. Merchandising

EXHIBIT 3.13
Cost Flows in Manufacturing and Merchandising Firms

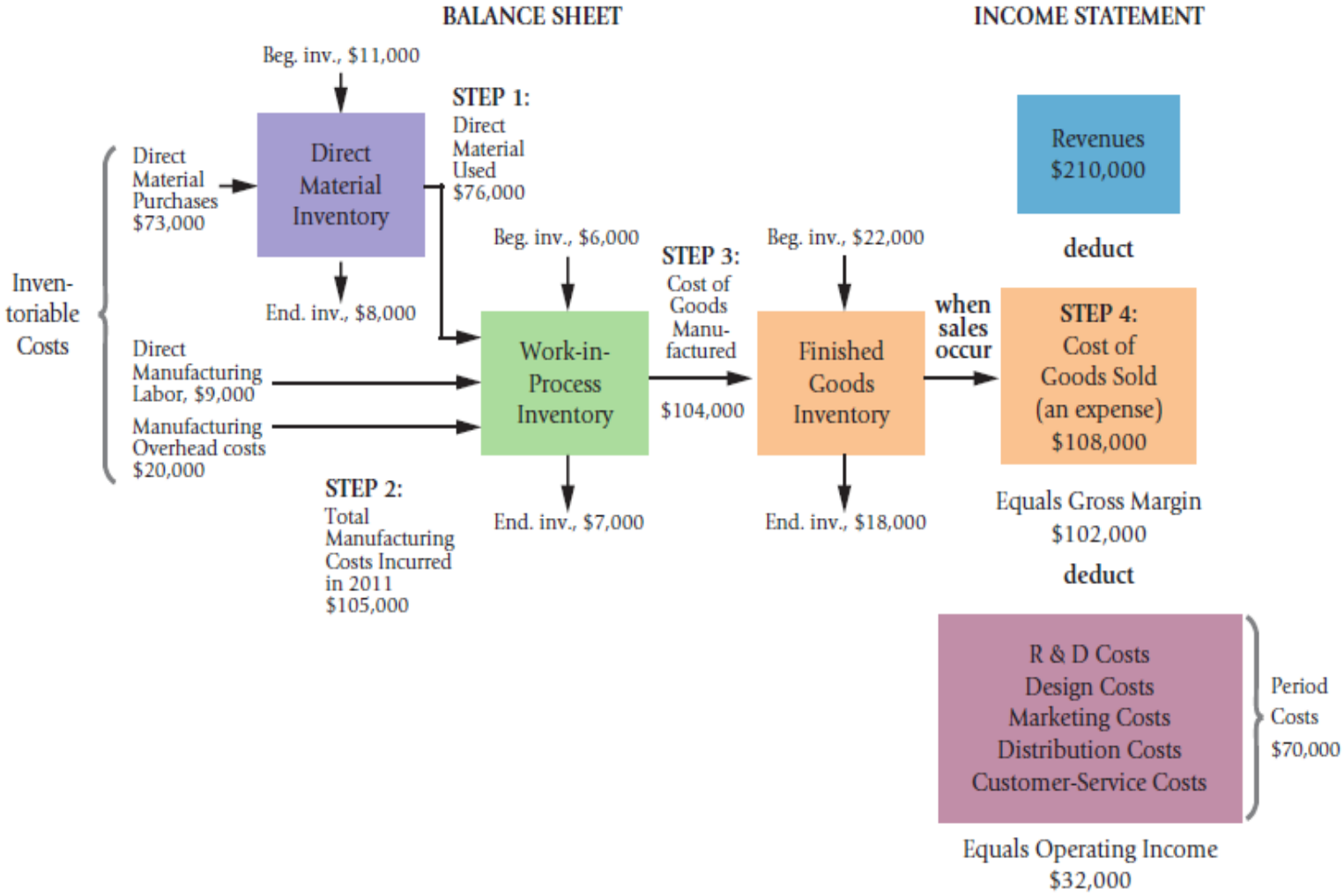


Inventory and Related Expense Accounts

EXHIBIT 3.14
Account Relationships for Manufacturing and Merchandising Companies



Cost flows illustrated



Multiple-step income statement, part one

	A	B	C	D
1	**PANEL A: INCOME STATEMENT**			
2	**Cellular Products**			
3	**Income Statement**			
4	**For the Year Ended December 31, 2014 (in thousands)**			
5	Revenues		$210,000	
6	Cost of goods sold:			
7	Beginning finished goods inventory, January 1, 2014	$ 22,000		
8	Cost of goods manufactured (see Panel B)	104,000		
9	Cost of goods available for sale	126,000		
10	Ending finished goods inventory, December 31, 2014	18,000		
11	Cost of goods sold		108,000	
12	Gross margin (or gross profit)		102,000	
13	Operating costs:			
14	R&D, design, mktg., dist., and cust.-service cost	70,000		
15	Total operating costs		70,000	
16	Operating income		$ 32,000	

STEP 4

Multiple-step income statement, part two

18	**PANEL B: COST OF GOODS MANUFACTURED**		
19	**Cellular Products**		
20	**Schedule of Cost of Goods Manufactured[a]**		
21	**For the Year Ended December 31, 2014 (in thousands)**		
22	Direct materials:		
23	Beginning inventory, January 1, 2014	$11,000	
24	Purchases of direct materials	73,000	
25	Cost of direct materials available for use	84,000	
26	Ending inventory, December 31, 2014	8,000	
27	Direct materials used		$ 76,000
28	Direct manufacturing labor		9,000
29	Manufacturing overhead costs:		
30	Indirect manufacturing labor	$ 7,000	
31	Supplies	2,000	
32	Heat, light, and power	5,000	
33	Depreciation—plant building	2,000	
34	Depreciation—plant equipment	3,000	
35	Miscellaneous	1,000	
36	Total manufacturing overhead costs		20,000
37	Manufacturing costs incurred during 2014		105,000
38	Beginning work-in-process inventory, January 1, 2014		6,000
39	Total manufacturing costs to account for		111,000
40	Ending work-in-process inventory, December 31, 2014		7,000
41	Cost of goods manufactured (to income statement)		$104,000
42	[a]Note that this schedule can become a schedule of cost of goods manufactured and sold simply by including the beginning and ending finished goods inventory figures in the supporting schedule rather than in the body of the income statement.		

STEP 1

STEP 2

STEP 3

Direct and Indirect Product Costs for a Manufacturer

- **Direct material costs** = cost of materials that can be readily traced to outputs = purchase price of materials + freight – purchase discounts + reasonable allowance for scrap and defective units
- **Indirect material costs** = cost of materials that cannot readily be traced to outputs (e.g., rags, lubricants, and small tools)
- **Direct labor costs** = labor that can be readily traced to outputs = wages paid plus a reasonable allowance for nonproductive time
- **Indirect labor costs** = labor costs that cannot be readily traced to outputs (i.e., they are manufacturing support costs)

Direct and Indirect Product Costs:

- **All indirect costs** for the manufacturer, including indirect materials, indirect labor, and other indirect items are often combined in a cost pool referred to as *overhead* (or, *factory overhead*, or *indirect manufacturing costs*)

- **The three main types of costs,** direct materials, direct labor, and overhead, are often condensed even further:
  - Direct materials + Direct labor = Prime costs
  - Direct labor + Overhead = Conversion costs

Cost Behavior: Cost Drivers

- ***Cost drivers* provide two roles for the management accountant**
  - Assigning costs to cost objects
  - Explaining cost behavior, i.e., how total cost changes as the cost driver changes
- **There are four types of *cost drivers*:**
  - Activity-based
  - Volume-based
  - Structural
  - Executional

Cost Drivers

- ***Activity-based* cost (ABC) drivers** are developed at a detailed level of operations using activity analysis–a cost driver is determined for each activity
- ***Volume-based* cost drivers** relate to the amount produced or quantity of service provided:
  - The relationship between the cost driver and total cost is approximately linear within the relevant range

Volume Based Cost Drivers: Classification by Behavior

- *Fixed cost* is the portion of total cost that does not change with changes in output
- *Variable cost* is the change in total cost associated with each change in quantity of the cost driver
- *Mixed cost* is used to refer to a total cost figure that includes both a fixed and variable component
- *Step costs* vary with the cost driver but do so in steps

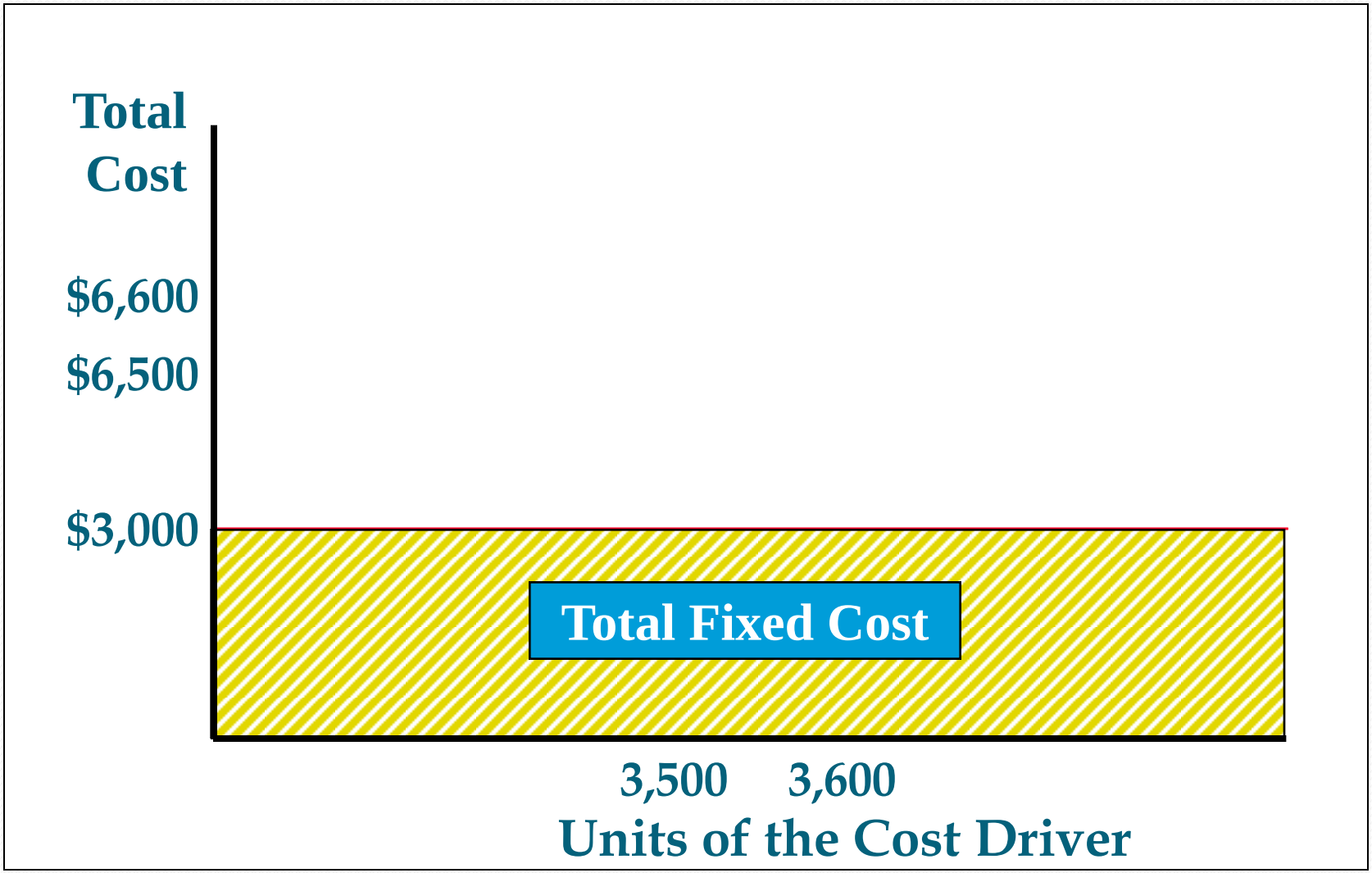
Cost Drivers

- ***Structural cost* drivers** facilitate strategic decision making because they involve plans and decisions that have long-term effects
  - Scale, experience, technology, and complexity are considered in hopes of improving competitive position

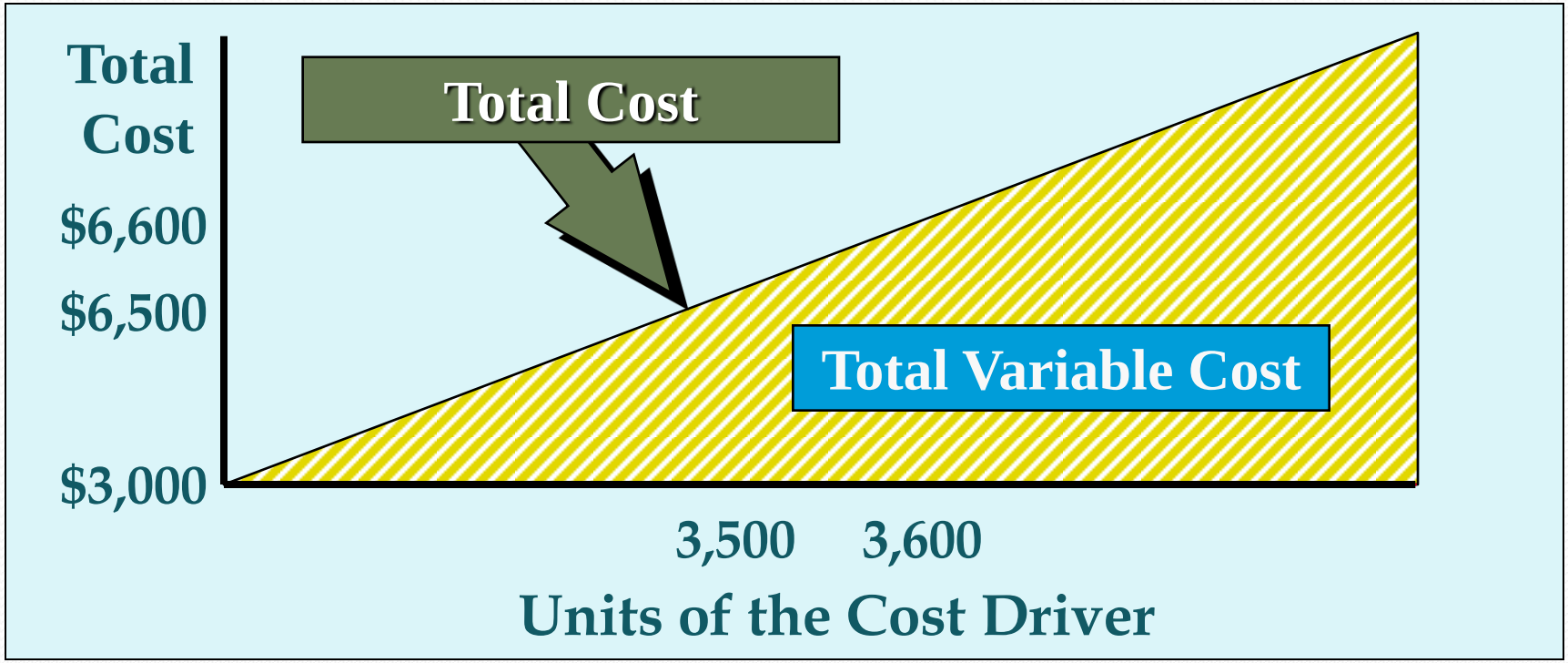
- ***Executional cost* drivers** facilitate operational decision making by focusing on short-term effects
  - Workforce involvement, design of the production process, and supplier relationships are considered in an attempt to reduce costs

Variable vs Fixed Costs (CVP Analysis)

Fixed Costs


Total Cost
$6,600
$6,500
$3,000
Total Fixed Cost
3,500
3,600
Units of the Cost Driver

Variable Costs



Cost Behavior

- Variable costs—change in total in proportion to changes in the related level of activity or volume of output produced.
- Fixed costs—remain unchanged in total, for a given time period, despite changes in the related level of activity or volume of output produced.
- Costs are fixed or variable only with respect to a specific activity or a given time period.

Cost Behavior

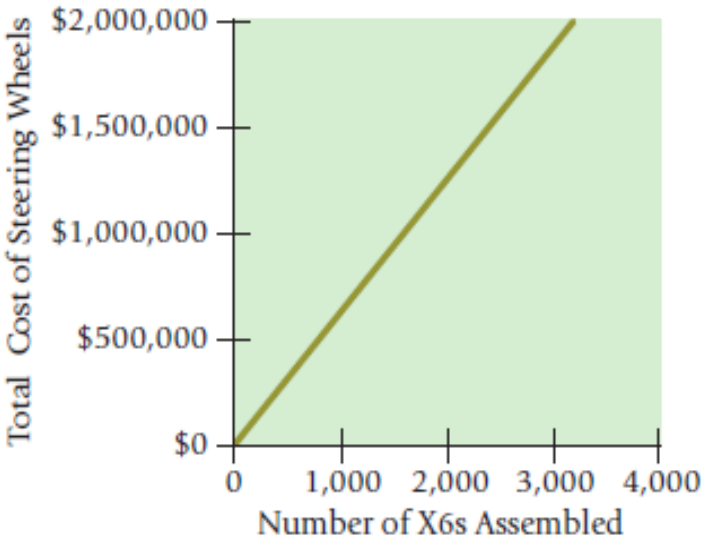
- Variable costs are constant on a per-unit basis. If a product takes 5 pounds of materials each, it stays the same per unit regardless if one, ten, or a thousand units are produced.
- Fixed costs per unit change inversely with the level of production. As more units are produced, the same fixed cost is spread over more and more units, reducing the cost per unit.

Cost Behavior Summarized

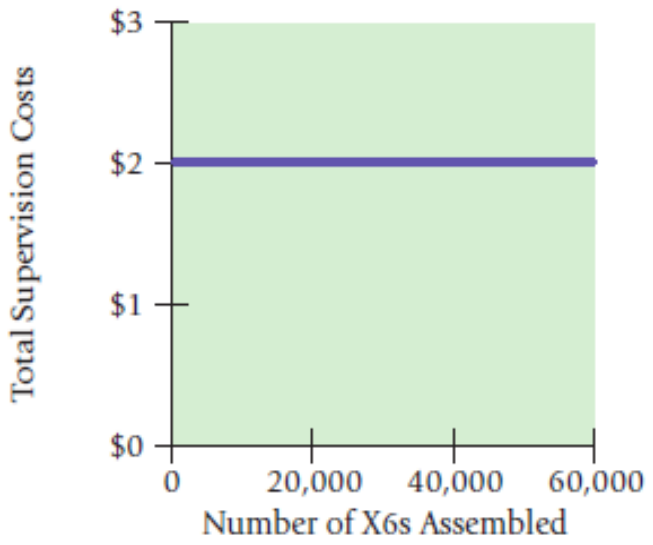
	Total Dollars	Cost per Unit
Variable Costs	**Total Dollars** Change in proportion with output More output = More cost	**Cost Per Unit** Unchanged in relation to output
Fixed Costs	Unchanged in relation to output	Change inversely with output More output = lower cost per unit

Graphs of variable and fixed costs

PANEL A: Variable Cost of Steering Wheels at $60 per BMW X6 Assembled



PANEL B: Supervision Costs for the BMW X6 assembly line (in millions)



What is CVP? How is it used?

- Managers want to know how profits will change as the units sold of a product or service changes.
- Managers like to use "what-if" analysis to examine the possible outcomes of different decisions so they can make the best one.
- We discussed total revenues, total costs and income. We need to take a closer look at the relationship among the elements (selling price, variable costs, fixed costs).

CVP Analysis

- CVP analysis is a planning tool for analyzing how operating decisions and marketing decisions affect short-term operating profit

- CVP relies on an understanding of the relationship between variable costs, fixed costs, unit selling price, and output level (volume)

CVP Analysis

CVP analysis can be used in:

- Setting prices for products and services
- Determining whether to introduce a new product or service
- Replacing a piece of equipment
- Determining breakeven point
- Making "Make-or-buy" (i.e., sourcing) decisions
- Determining the best product mix
- Performing strategic "what-if" (sensitivity) analysis

CVP Analysis

The CVP model is as follows:

Operating profit = Sales – Total costs

or

Sales = Fixed costs + Variable costs + Operating profit

or

Operating profit = (Units sold × selling price/unit) – (Units sold × variable cost/unit) – Fixed costs

A Five-Step Decision-Making Process in Planning and Control - Revisited

1. Identify the problem and uncertainties.
2. Obtain information.
3. Make predictions about the future.
4. Make decisions by choosing between alternatives, using cost-volume-profit (CVP) analysis.
5. Implement the decision, evaluate performance, and learn.

The Five Steps of Strategic Decision Making for CVP Analysis: A Real Estate Business Example

1. **Determine the Strategic Issues Surrounding the Problem:** *the business competes on quality and reliability of service*
2. **Identify the Alternative Actions**: *choose among printer and cartridge options*
3. **Obtain Information and Conduct Analyses of the Alternatives:** *CVP analysis favors the larger cartridge and determines an indifference point for the new printer*
4. **Based on Strategy and Analysis, Choose and Implement the Desired Alternative**: *because of concerns for the print quality of the new printer, the current printer is chosen*
5. **Provide an On-going Evaluation of the Effectiveness of implementation in Step 4.**

Foundational Assumptions USED in CVP ANALYSIS

- Changes in production/sales volume are the sole cause for cost and revenue changes.
- Total costs consist of fixed costs and variable costs.
- Revenue and costs behave and can be graphed as a linear function (a straight line).
- Selling price, variable cost per unit, and fixed costs are all known and constant.
- In many cases only a single product will be analyzed. If multiple products are studied, their relative sales proportions are known and constant.
- The time value of money (interest) is ignored.

CVP: Contribution Margin

- Manipulation of the basic equations yields an extremely important and powerful tool extensively used in cost accounting: contribution margin (CM).
- Contribution margin equals revenue less variable costs.
- Contribution margin per unit equals unit selling price less unit variable costs or can be obtained by taking contribution margin divided by number of units sold.

CVP: Contribution Margin Additional calculations

You can also calculate:

- Contribution margin which is equal to the contribution margin per unit multiplied by the number of units sold.
- Contribution margin percentage which is the contribution margin per unit divided by unit selling price or Contribution margin divided by revenue.

Cost–Volume–Profit Equation

REVENUE – VARIABLE - FIXED = OPERATING
COSTS COSTS INCOME

(Selling Price * Quantity of Units Sold) - (Unit Variable Costs * Quantity of Units Sold) - Fixed Costs = Operating Income

Keep in mind the following:

Selling Price * Quantity of Units Sold = Revenue
Unit Variable Costs * Quantity of Units Sold = Variable Costs
Revenue – Variable Costs = Contribution Margin
Contribution Margin – Fixed Costs = Operating Income

Breakeven Point

- At the breakeven point, a firm has *no profit or loss* at the given sales level. Breakeven is where:
  - Sales – Variable Costs – Fixed Costs = 0
- Calculation of breakeven number of units
  - Breakeven Units = $\frac{\text{Fixed Costs}}{\text{Contribution Margin per Unit}}$
- Calculation of breakeven revenues
  - Breakeven Revenue = $\frac{\text{Fixed Costs}}{\text{Contribution Margin Percentage}}$

Breakeven Point, extended: Profit Planning

- The breakeven point formula can be modified to become a profit planning tool by adding Target Operating Income to fixed costs in the numerator.

$$\text{Quantity of Units Required to Be Sold} = \frac{\text{(Fixed Costs+Target Operating Income)}}{\text{Contribution Margin per Unit}}$$

CVP Analysis

For convenience, the (single-product) model is commonly shown in symbolic form:

$$\pi_B = (p \times Q) - (v \times Q) - F$$

Where:

Q = units sold (i.e., sales volume)
p = selling price per unit
F = total fixed cost
v = variable cost per unit
π_B = operating profit (before tax)

CVP Analysis

Three additional concepts regarding the CVP model:

1. Contribution margin:

- *Unit contribution margin* (cm) = Unit sales price (p) – Unit variable cost (v)
- Unit contribution margin (cm) = the increase in operating profit for a unit increase in sales = (p – v)
- *Total contribution margin* (CM) = Unit contribution margin (cm) × Units sold (Q)

CVP Analysis

- *Contribution margin ratio* = Unit contribution margin (cm)÷ unit sales price (p)

$$= (p - v) \div p \quad = \quad cm/p$$

- The *contribution income statement*:
  - A useful way to show information developed in CVP analysis
  - Classifies costs based on cost *behavior* (fixed versus variable) rather than cost type (product versus period)
  - Provides an easy and accurate prediction of the effect of a change in sales on operating profit

Strategic Role of CVP Analysis

CVP analysis can help a firm choose its competitive position and execute its strategy by providing an understanding of how changes in sales volume affect costs and profits

- This process is most important for cost leadership firms during the manufacturing stage
- Differentiated firms use CVP analysis to assess profitability and desirability of new products and features

Strategic Role of CVP Analysis (continued)

CVP analysis is also important in life-cycle costing and target costing

- CVP analysis can assist in *life-cycle costing* by helping to determine whether a product is likely to achieve its desired profitability, the most cost-effective manufacturing process, the best marketing and distribution channels, the best compensation plan, whether to offer discounts, etc.
- CVP analysis can assist in *target costing* by showing the effect on profit of alternative product designs that have different target costs

Let's review: emma

Emma has fixed costs of $2,000 and a contribution margin percentage of 40%.

If Emma wants to make a profit of $2,000, what must revenue equal?

What if Emma wants to make a profit of $3,000, what must revenue equal?

Remember the formula: (Fixed Cost+ Target Operating Income) / Contribution Margin %

Let's look at the details:

EMMA's ANALYSIS FOR TARGET OPERATING INCOME

For OPERATING INCOME of $2,000

Revenue=(FC+TOI)/CM%

Revenue = (2,000+2,000)/.40 =

Revenue = $10,000

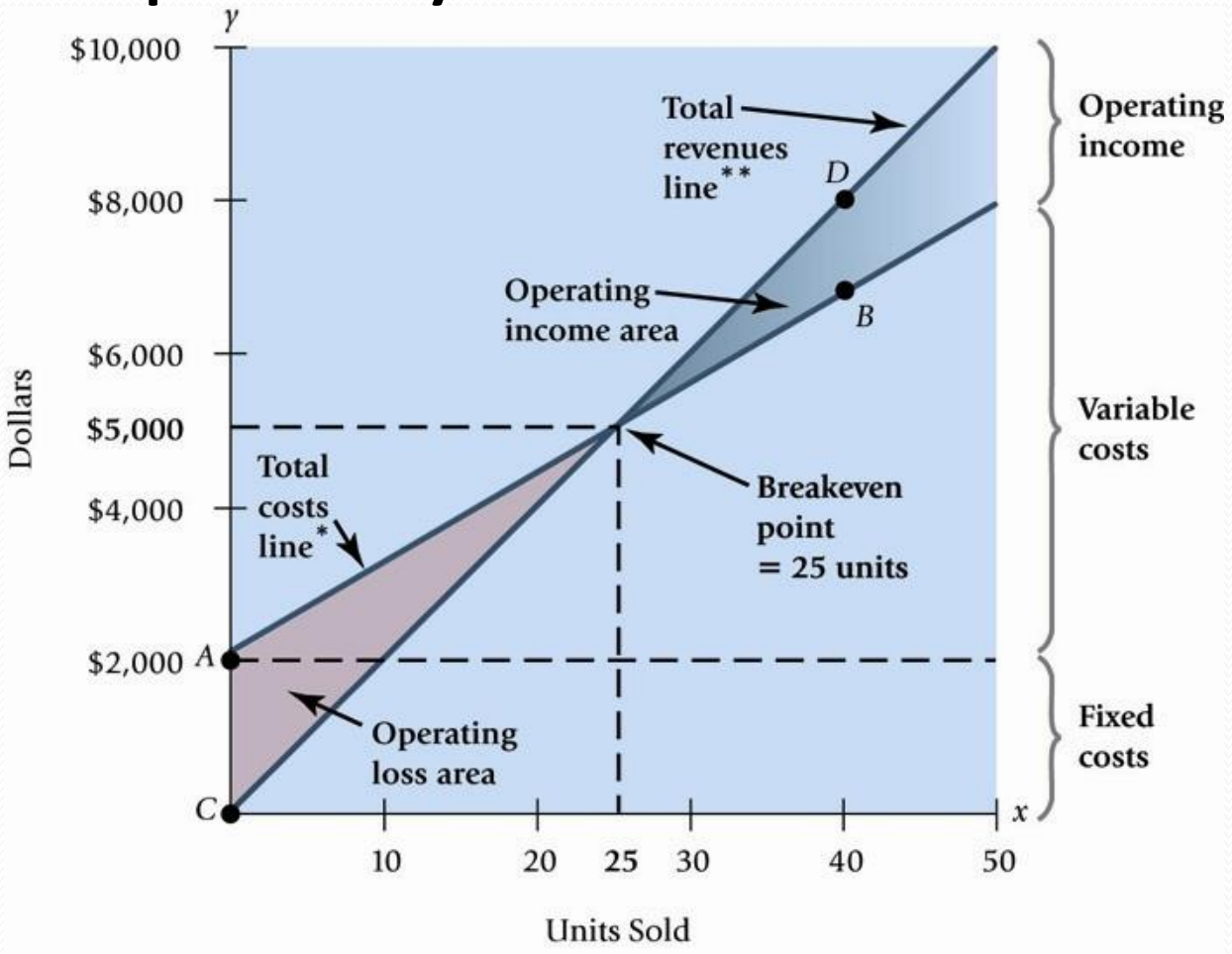
For OPERATING INCOME of $3,000

Revenue=(FC+TOI)/CM%

Revenue = (2,000+3,000)/.40 =

Revenue = $12,500

CVP: Graphically



*Slope of the total costs line is the variable cost per unit = $120

**Slope of the total revenues line is the selling price = $200

CVP and Income Taxes

- After-tax profit (Net Income) can be calculated by:
  - Net Income = Operating Income * (1-Tax Rate)
- Net income can be converted to operating income for use in CVP equation
  - $\text{Operating Income} = \frac{\text{Net Income}}{(1\text{-Tax Rate})}$

Note: The CVP equation will continue to use operating income. We'll use this conversion formula to obtain the operating income value when provided with Net Income.

Profit Planning, Illustrated

File Edit View Insert Format Tools Data Window Help

D5 fx =($A5+D$3)/(F1-$B5)

	A	B	C	D	E	F
1			Number of units required to be sold at $			200
2			Selling Price to Earn Target Operating Income of			
3		Variable Costs	$0	$1,200	$1,600	$2,000
4	Fixed Costs	per Unit	(Breakeven point)			
5	$2,000	$100	20	32[a]	36	40
6	$2,000	$120	25	40	45	50
7	$2,000	$150	40	64	72	80
8	$2,400	$100	24	36	40	44
9	$2,400	$120	30	45	50	55
10	$2,400	$150	48	72	80	88
11	$2,800	$100	28	40	44	48
12	$2,800	$120	35	50	55	60
13	$2,800	$150	56	80	88	96
14						
15	[a]Number of units required to be sold	$= \frac{\text{Fixed costs + Target operating income}}{\text{Contribution margin per unit}} = \frac{\$2{,}000 + \$1{,}200}{\$200 - \$100} = 32$				
16						

Breakeven (B/E) Planning

Determining the "breakeven point" is the starting point of many business plans:

- *Breakeven* is the point at which revenues equal total costs and profit is zero
- The breakeven (B/E) point can be determined in either of two ways:
  - Based on Units Sold (Q)
  - Based on Sales Dollars (Y)

B/E Planning (continued)

Breakeven in Units, Q (@ B/E, π_B = $0)

$$\$0 = (p \times Q) - (v \times Q) - F$$

$$\$0 = (p - v)Q - F$$

$$F = (p - v)Q$$

$$Q = F/(p - v)$$

That is, Q = Fixed costs ÷ contribution margin per unit

B/E Planning (continued)

Breakeven in Sales Dollars, Y (@ B/E, π_B = \$0)

Operating profit = Sales − total variable costs − Fixed costs

$$\$0 = (p \times Q) - (v \times Q) - F$$

$$\$0 = [p \times (Y/p)] - [v \times (Y/p)] - F$$

$$p \times (Y/p) = [v \times (Y/p)] + F$$

$$Y = [(v/p) \times Y] + F$$

$$Y = F \div (p - v)/p$$

= fixed costs ÷ contribution margin ratio

Example: Breakeven Planning

Household Furnishings, Inc. (HFI) wants to perform a B/E analysis given the following expected results for 2013 and 2014:

	Per Unit	2013	2014
Fixed cost (per year)		$60,000	$60,000
Selling price	$75		
Variable cost	35		
Planned production		2,400 units	2,600 units
Planned sales volume		2,400 units	2,600 units

	2013		2014			
	Amount	Percent	Amount	Percent	Change	Notes
Sales	$180,000	100.00%	$195,000	100.00%	$15,000	
Variable costs	84,000	46.67	91,000	46.67	7,000	
Total contribution margin	$ 96,000	53.33%	$104,000	53.33%	$ 8,000	53.33% is the contribution margin ratio
Fixed costs	60,000		60,000		0	
Operating profit	$ 36,000		$ 44,000		$ 8,000	$8,000 = 0.5333 × $15,000

Breakeven Example (continued)

Breakeven in units, Q :

$$\text{Operating profit} = \text{Sales} - \text{Total variable costs} - \text{Fixed cost}$$

$$\pi_B = (p \times Q) - (v \times Q) - F$$

$$= (\$75 \times Q) - (\$35 \times Q) - \$5{,}000/\text{month}$$

$$0 = [(\$75 - \$35) \times Q] - \$5{,}000/\text{month}$$

$$\$40 \times Q = \$5{,}000/\text{month}$$

$$Q = \$5{,}000/\text{month}/\$40 \text{ per unit}$$

$$Q = 125 \text{ units/month}$$

Breakeven Example (continued)

Breakeven in dollars, Y:

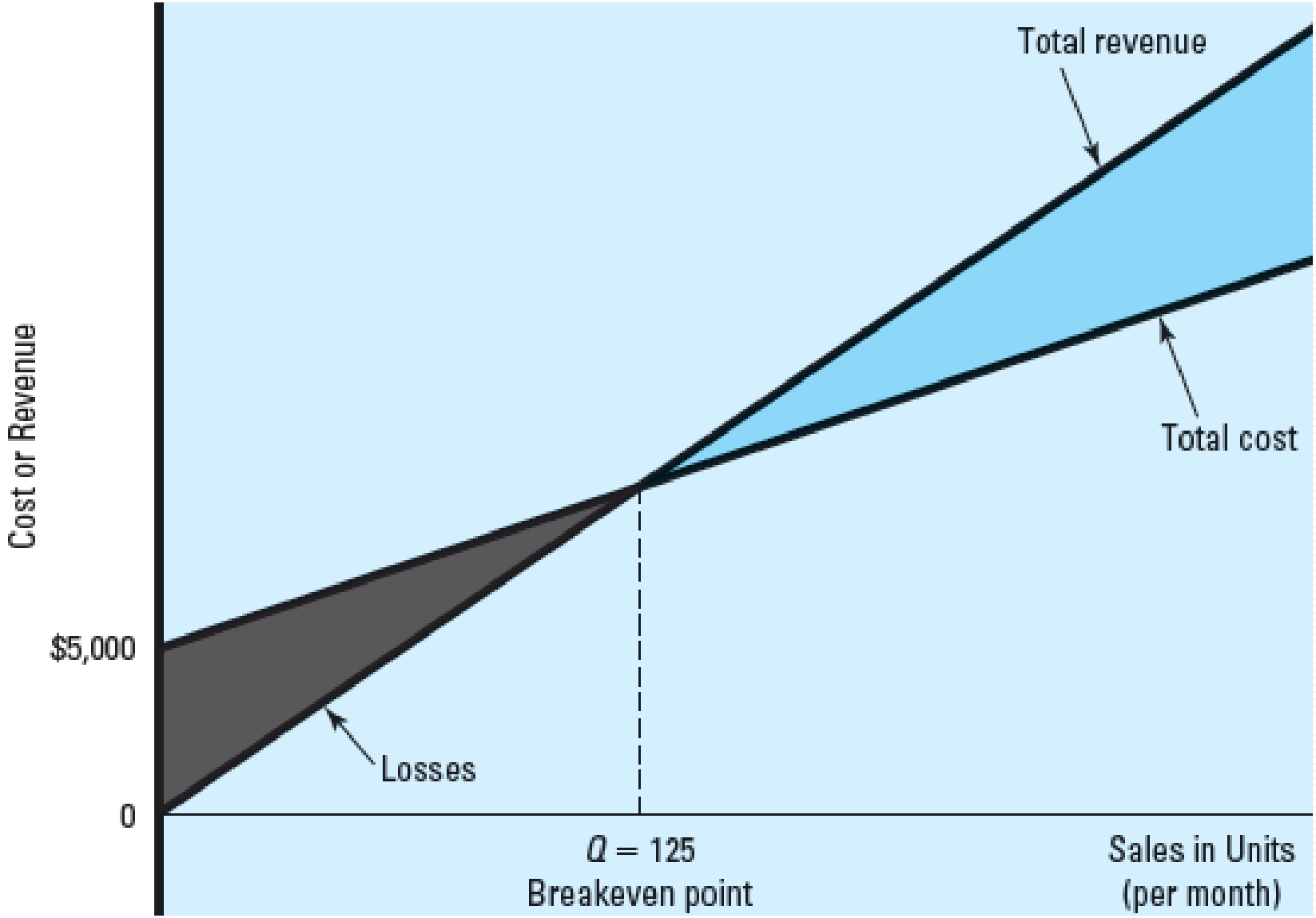
1. Breakeven in units, *Q*, times selling price per unit, *p*
   = 125 units/month × $75/unit = $9,375/month

2. Alternatively, breakeven point in sales dollars, Y
   = Fixed cost/month ÷ contribution margin ratio
   = $5,000/month ÷ ($75 – $35)/$75
   = $5,000/month ÷ 0.5333333= $9,375/month

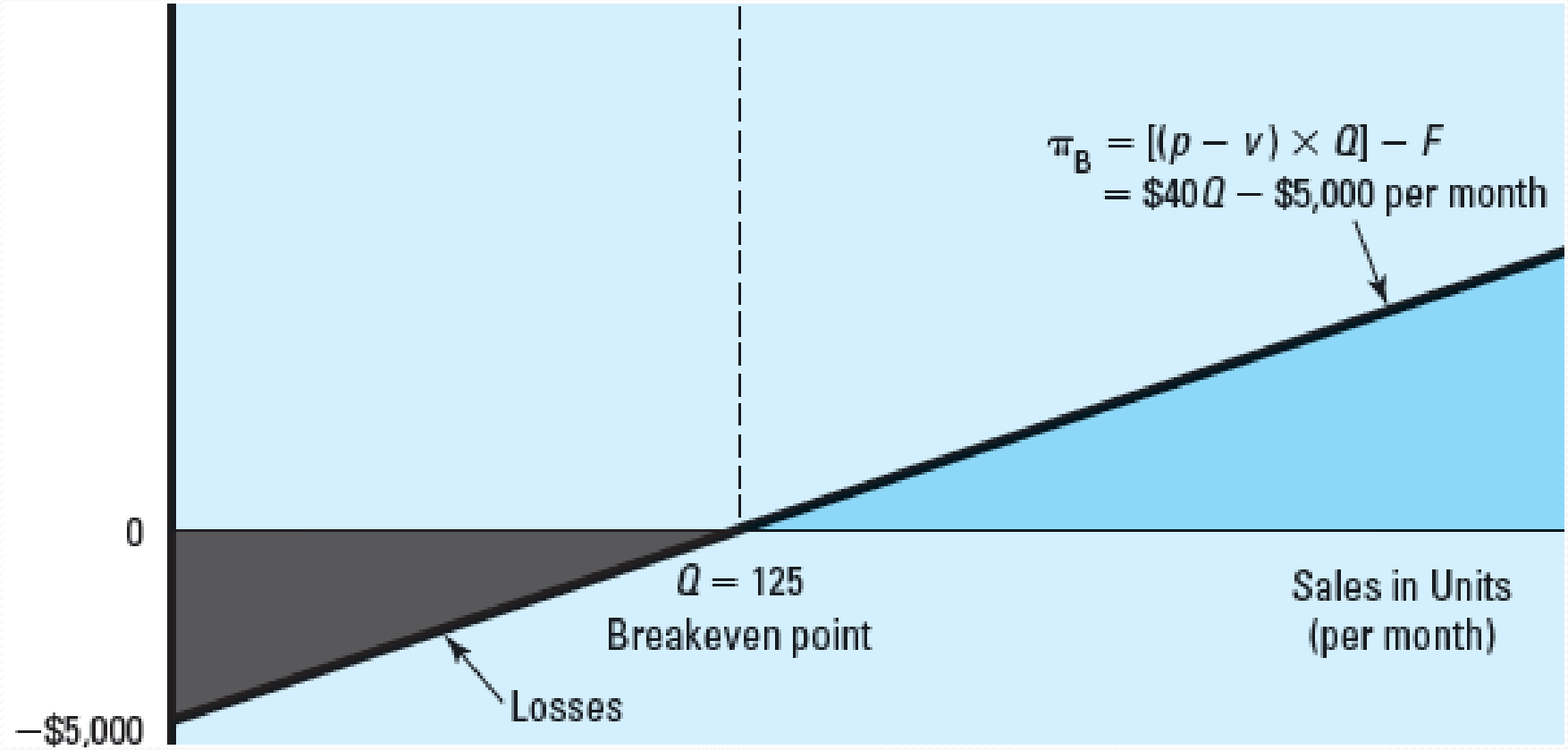
CVP Graph and Profit-Volume (PV) Graph

- The *CVP graph* illustrates how the levels of revenues and total costs change as output (sales volume) changes
- A *profit-volume (PV) graph* illustrates how the level of operating profit changes as output (sales volume) changes
  - This graph allows a person to clearly see how total contribution margin, and therefore profit, changes as the output level (i.e., volume) changes

CVP Graph


Total revenue
Total cost
Cost or Revenue
$5,000
0
Losses
Q = 125
Breakeven point
Sales in Units
(per month)

PV Graph


Operating profit, π_B
$\pi_B = [(p - v) \times Q] - F$
$= \$40Q - \$5{,}000$ per month
0
$-\$5{,}000$
$Q = 125$
Breakeven point
Losses
Sales in Units (per month)

CVP Analysis in Profit Planning

CVP analysis can be used to determine the sales volume needed to achieve a desired level of before tax profit:

$$Q = \frac{F + \pi_B}{p - v}$$

$$Q = \frac{\$60{,}000 + \$48{,}000}{(\$75 - \$35)/\text{unit}}$$

$$Q = 2{,}700 \text{ units per year}$$

In sales dollars the result is

$$p \times Q = \$75/\text{unit} \times 2{,}700 \text{ units/year}$$

$$p \times Q = \$202{,}500 \text{ per year}$$

CVP and Profit Planning

Assume that HFI has the option to choose between two machines that will complete the same operation with the same quality, but with different variable costs per unit (v) and different total fixed costs (F). B/E analysis can help HFI find the level of sales (called the "indifference point"), such that having sales > that this level will favor the option with the higher fixed costs, and having sales < this level will favor the low fixed cost option.

Which alternative should be chosen?

CVP and Profit Planning

Cost of Machine A	=	Cost of Machine B
$5,000 + ($10 × *Q*)	=	$15,000 + ($5 × *Q*)
Q	=	$10,000 ÷ $5/unit
Q	=	2,000 units

CVP and Profit Planning

Management decisions about costs and prices usually must include *income taxes* because taxes affect the amount of net profit at a given level of sales

In the HFI example, if we assume that the average income tax rate is 20 percent, to achieve the desired annual *after-tax* profit of $48,000, HFI must generate before-tax profits of ....

$$\text{Before-tax profit, } \pi_B = \text{After-tax profit, } \pi_A/(1 - \text{Tax Rate})$$

$$\pi_B = \pi_A \div (1 - t)$$

$$\pi_B = \$48{,}000 \div (1 - 0.2)$$

$$\pi_B = \$60{,}000$$

CVP and Profit Planning

Thus, when taxes are considered, the CVP model is as follows, with t = average tax rate

$$Q = \frac{F + \dfrac{\text{After-Tax Profit}}{(1 - t)}}{(p - v)}$$

$$Q = \frac{\$60{,}000 + [\$48{,}000 \div (1 - 0.20)]}{(\$75 - \$35)/\text{unit}}$$

$$Q = 3{,}000 \text{ units}$$

CVP Analysis and Activity-Based Costing (ABC)

The conventional approach to CVP analysis is to use a volume-based measure to forecast costs, but an ABC approach is also possible:

- If the assumption is made that total batch-level costs are fixed relative to the number of batches, both approaches will produce the same result
- On the other hand, if the activity cost pool is a mixed cost, the ABC approach will provide a more accurate estimate of cost because the volume-based approach treats all activity costs that do not vary with output volume, such as machine setup, materials handling, inspection, and engineering, as fixed

CVP Analysis and ABC

In the ABC approach, additional terms are needed to define the fixed cost element (HFI's results are in parentheses below):

- F^{VB} = the level of *volume-based fixed costs*, or the portion of fixed costs that do not vary with the activity cost driver, $50,000 ($60,000 – $10,000)
- F^{AB} = the portion of fixed costs that *does* vary with the activity cost driver ($10,000)
- v^{AB} = the cost per batch for the ABC driver ($100/batch)
- b = the number of units in a batch (30)
- v^{AB}/b = the cost per unit for batch-related costs when the batch is size b, $3.333 ($100/batch ÷ 30 units/batch)

CVP Analysis and ABC

The CVP model under ABC (for batch-related costs):

$$Q = \frac{F^{VB} + \pi_B}{p - v - (v^{AB}/b)}$$

Therefore, output quantity for HFI is:

$$Q = \frac{\$50{,}000 + \$48{,}000}{\$75 - \$35 - (\$100/30)} = 2{,}673 \text{ units } (2{,}673/30 = 89.1 \text{ batches})$$

There are no partial batches so \$9,000 (90 batches × \$100 per batch) must be figured into the equation

$$Q = \frac{\$50{,}000 + \$9{,}000 + \$48{,}000}{\$75 - \$35} = 2{,}675 \text{ units in 90 batches}$$

Dealing with Risk and Uncertainty

Sensitivity analysis is the name for a variety of methods that examine how an amount (e.g., B/E point) changes if factors involved in predicting that amount change (e.g., sales volume or unit variable cost). For CVP, three methods of *sensitivity analysis* are commonly employed:

(1) ***What-if analysis*** *(using the contribution margin and contribution margin ratio)*

(2) Construction of ***decision tables/decision trees***, and

(3) ***Monte Carlo Simulation*** (MCS)

Other Approaches to handling risk/uncertainty:

(1) Margin of safety and Margin of safety Ratio

(2) Degree of operating leverage (DOL)

Handling Risk and Uncertainty: What-if analysis

What-if analysis is the calculation of an amount given different levels of a factor that influences that amount

- Example: if contribution margin (cm) is $40 per unit and the cm ratio is 0.53333, each unit change in sales volume affects profit by $40 and each dollar change in sales affects profits by $0.53333

Sensitivity Analysis

- CVP provides structure to answer a variety of "what-if" scenarios.
- "What" happens to profit "if":
  - Selling price changes.
  - Volume changes.
  - Cost structure changes.
    - Variable cost per unit changes.
    - Fixed costs change.

As an example, if a company determines that an ad campaign costing $15,000 is expected to increase sales 25%, should they proceed? That question cannot be properly answered without doing this type of analysis.

COST STRUCTURE

- Managers make strategic decisions that affect the cost structure of the company.
- The cost structure is simply the relationship of fixed costs and variable costs to total costs.
- We can use CVP-based sensitivity analysis to highlight the risks and returns as fixed costs are substituted for variable costs in a company's cost structure.
- The risk-return trade-off across alternative cost structures can be measured as operating leverage.

Risk and Uncertainty: Some Useful Metrics

Margin of safety (MOS) is the dollar amount of sales above the B/E point (i.e., forecasted (or actual) sales level minus the B/E sales level):

MOS = planned (or actual) sales – breakeven sales (in units or in dollars)

Margin of safety ratio (MOS%) = MOS ÷ planned (or actual) sales volume = the percentage that sales could fall (from planned or actual levels) before losses occur

Margin of Safety-Defined

- The margin of safety calculation answers a very important question:
- If budgeted revenues are above the breakeven point, how far can they fall before the breakeven point is reached. In other words, how far can they fall before the company will begin to lose money.

Margin of Safety

- An indicator of risk, the margin of safety (MOS), measures the distance between budgeted sales and breakeven sales:
  - MOS = Budgeted Sales – BE Sales
- The MOS ratio removes the firm's size from the output, and expresses itself in the form of a percentage:
  - MOS Ratio = MOS ÷ Budgeted Sales

Handling Risk and Uncertainty: Degree of Operating Leverage

- Operating leverage refers to the extent of fixed costs in the cost structure of an organization. The greater the operating leverage, the greater the operating risk (i.e., not being able to cover fixed costs via operations).
- Degree of operating leverage (DOL), at any sales volume level, represents the sensitivity of operating income to changes in sales volume.

$$\text{DOL} = \text{CM} \div \text{operating profit}$$

Operating Leverage

- Operating leverage (OL) describes the effect that fixed costs have on changes in operating income as changes occur in units sold and contribution margin.
  - OL = $\frac{\text{Contribution Margin}}{\text{Operating Income}}$

Notice that the difference between the numerator and the denominator in our formula = our fixed costs.

USING OPERATING LEVERAGE TO ESTIMATE CHANGES IN OPERATING INCOME

The formula to estimate the change in operating income that will result from a percentage change in sales is:

Operating Leverage X % Change in Sales

If sales increase 50% and operating leverage is 1.67, you should expect operating income to increase 83.5%.

Effects of Sales Mix on CVP

- The formulae presented to this point have assumed a single product is produced and sold.
- A more realistic scenario involves multiple products sold, in different volumes, with different costs and different margins.
- In this case, we use the same formulae, but use average contribution margins for the multiple products.
- This technique assumes a constant mix at different levels of total unit sales.

CVP for SERVICE and Not-For-Profit organizations

- CVP isn't just for merchandising and manufacturing companies.
- Service and Not-for-Profit businesses need to focus on measuring their output which is different from the units sold that we've been dealing with.
- For example, a service agency might measure how many persons they assist or an airline might measure how many passenger miles they fly.

Alternative Income Statement Formats-especially significant in THE manufacturing sector

Contribution Income Statement Emphasizing Contribution Margin (in 000s)			Financial Accounting Income Statement Emphasizing Gross Margin (in 000s)	
Revenues		$1,000	Revenues	$1,000
Variable manufacturing costs	$250		Cost of goods sold (variable manufacturing costs, $250 + fixed manufacturing costs, $160)	410
Variable nonmanufacturing costs	270	520		
Contribution margin		480	Gross margin	590
Fixed manufacturing costs	160		Nonmanufacturing costs	
Fixed nonmanufacturing costs	138	298	(variable, $270 + fixed $138)	408
Operating income		$ 182	Operating income	$ 182

Multi-Product (or Service) CVP Analysis

- If all fixed costs are traceable to individual products, then the organization can develop a separate CVP model for each product
- Alternatively, the multi-product firm can make an assumption regarding a standard sales mix in which its products are sold
- Sales mix can be determined on the basis of sales dollars or unit sales
- The assumption of sales mix allows the firm to calculate and use a weighted-average contribution margin (cm) *per unit* and weighted average cm *ratio* to complete the multi-product CVP analysis

Example: Multi-Product CVP Analysis

Windbreakers, Inc. sells light-weight sports/recreational jackets and currently has three products: Calm, Windy, and Gale. Total (joint) fixed costs for the period are expected to be $168,000, and we assume the windbreakers' sales mix, measured by sales ***dollars***, will remain constant. Additional information is provided below. (Since sales mix is constant in $, we will use the contribution margin ratio in the analysis. See next slide…)

	Calm	Windy	Gale	Total
Last period's sales	$ 750,000	$ 600,000	$ 150,000	$ 1,500,000
Percent of sales	50%	40%	10%	100%
Price	$ 30	$ 32	$ 40	
Unit variable cost	24	24	36	
Contribution margin	$ 6	$ 8	$ 4	
Contribution margin ratio	0.20	0.25	0.10	

Example: Multi-Product CVP (continued)

From this information, we can calculate the wtd. avg. cm ratio:

Weighted-average CMR = 0.5(0.2) + 0.4(0.25) + 0.1(0.1) = 0.21

The breakeven point for all three products can be calculated as follows:

$$Y = \$168{,}000 \div 0.21$$

$$Y = \$800{,}000$$

This means that for Windbreakers to break even, $800,000 of all three products must be sold in the same proportion as last year's sales mix. The sales for each product need to be as follows:

For Calm	0.5($800,000) =	$400,000	(13,334 units)
For Windy	0.4($800,000) =	320,000	(10,000 units)
For Gale	0.1($800,000) =	80,000	(2,000 units)
		$800,000	

Assumptions of CVP Analysis

- The CVP model assumes revenues and costs are *linear* over a "relevant range" (even though the actual cost behavior may not be linear)
- Outside the *relevant range*, these calculations may not be accurate
- *Step costs* also make approximation via the relevant range unworkable; CVP analysis becomes much more cumbersome
- The basic model is *deterministic*.

CVP Summary

- CVP analysis is a method for analyzing how operating and marketing decisions affect profit
- CVP analysis depicts the relationship between variable costs, fixed costs, unit selling price, and output level (volume)
- CVP analysis can help a firm choose its strategic position and execute its strategy by providing an understanding of how changes in its volume of sales affect costs and profits

CVP Summary

The breakeven (B/E) point is the starting point of many business plans:

- B/E is the point at which total revenues equal total costs, i.e., point of sales at which operating profit is zero
- The B/E point can also be defined as the sales level at which total contribution margin = fixed costs, and profit is zero
- There are two methods, equation and contribution margin, that can be used for profit-planning (i.e., CVP analysis) purposes
  - In each method, sales volume can be expressed either on the basis of units or dollars

Summary

- *CVP analysis* can be used to determine the level of sales needed to achieve a desired level of profit through revenue planning, cost planning, and accounting for the effect of income taxes

- The conventional approach to CVP analysis is to use a volume-based measure, but an activity-based costing (ABC) approach to CVP analysis is preferred when batch-level cost behavior is significant

Summary

- Two general approaches for addressing risk/uncertainty in CVP analysis:
  - *Sensitivity analysis*
  - *Other approaches*
- *Sensitivity analysis* is the name for a variety of methods that examine how an amount changes if factors involved in predicting that amount change.

CVP Summary

- Three different approaches to sensitivity analysis:
  - What-if analysis
  - Decision tables/trees
  - Monte Carlo Simulation (MCS)
- Other approaches to dealing with risk/uncertainty:
  - Margin of safety (MOS) and Margin of Safety Ratio (MOS%)
  - Degree of Operating Leverage (DOL)

CVP Summary

CVP analysis can be used in the multi-product/service case, but it is often impractical to apply CVP analysis separately for each product

- The existence of joint/common (i.e., non-traceable) fixed costs complicates short-run profit planning through CVP analysis

- If the firm can assume that its sales mix (either in units or in dollars) remains relatively constant as total volume changes, then it can use for profit-planning purposes a *weighted-average cm per unit* (sales mix constant in units) or a *weighted-average cm ratio* (sales mix constant in dollars) for short-term profit-planning purposes.

CVP Summary

CVP analysis relies for its validity on a number of assumptions:

- For conventional CVP analysis, volume of sales (units) is the only important cost driver
- Costs, both variable and fixed, are linear within the relevant range of output
- The revenue function is linear within the relevant range (i.e., the firm's price is constant)

CVP Summary

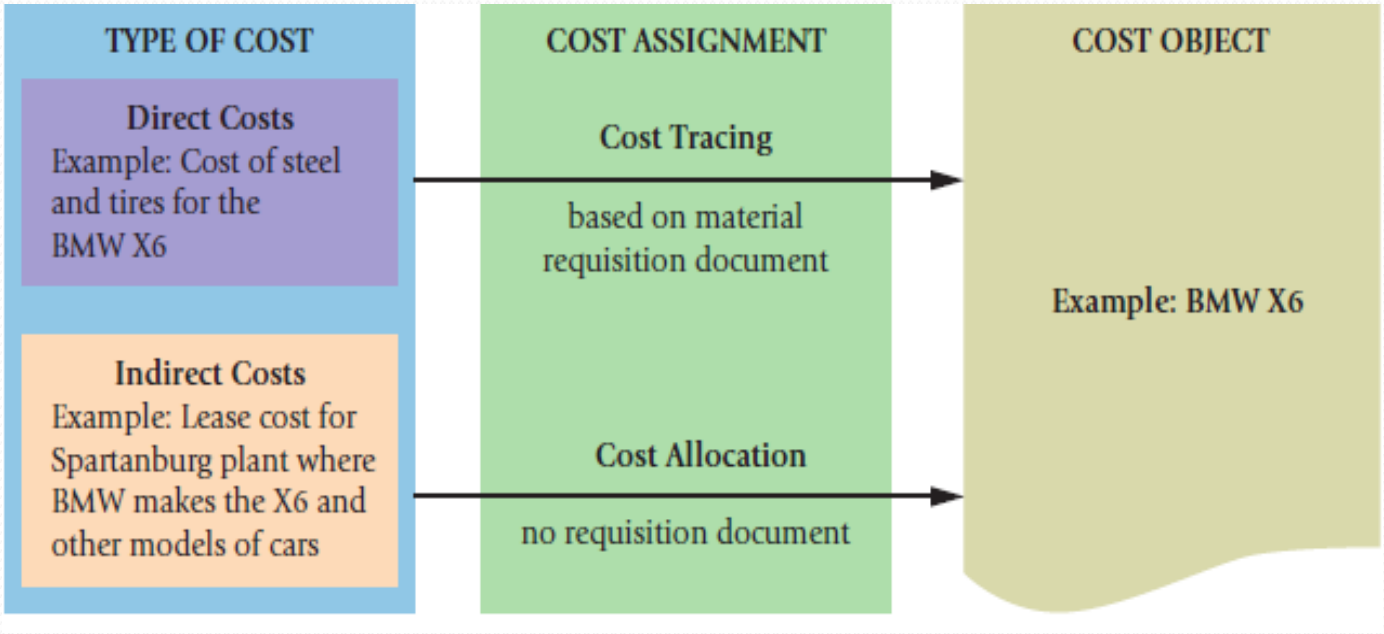
- Total costs can be reliably split into fixed and variable components
- The inputs in the CVP model are known with certainty; for this purpose, conventional CVP uses point estimates for the factors in the model
- For the multi-product firm, either fixed costs can be traced (or reliably allocated) to individual products OR the firm's products are sold in a constant sales-mix (expressed either in dollars or units)

Direct vs Indirect Costs

Direct and Indirect Costs

- Direct costs can be conveniently and economically traced (tracked) to a cost object.
- Indirect costs cannot be conveniently or economically traced (tracked) to a cost object. Instead of being traced, these costs are allocated to a cost object in a rational and systematic manner.

Cost assignment to a cost object (bmw example)



Cost Examples

- Direct Costs
  - Parts (steel or tires for a car, as an exampe)
  - Assembly line wages
- Indirect Costs
  - Electricity
  - Rent
  - Property taxes
  - Plant administration expenses

Under-costing and Over-costing problems

Factors Affecting Direct/Indirect Cost Classification

- The materiality of the cost in question.
- The available information-gathering technology.
- Design of operations.

- NOTE: a specific cost may be both a direct cost of one cost object and an indirect cost of another cost object.

Other Cost Concepts

- Cost driver—a variable, such as the level of activity or volume, that causally affects costs over a given time span.
- Relevant range—the band or range of normal activity level (or volume) in which there is a specific relationship between the level of activity (or volume) and the cost in question.
  - For example, fixed costs are considered fixed only within the relevant range.

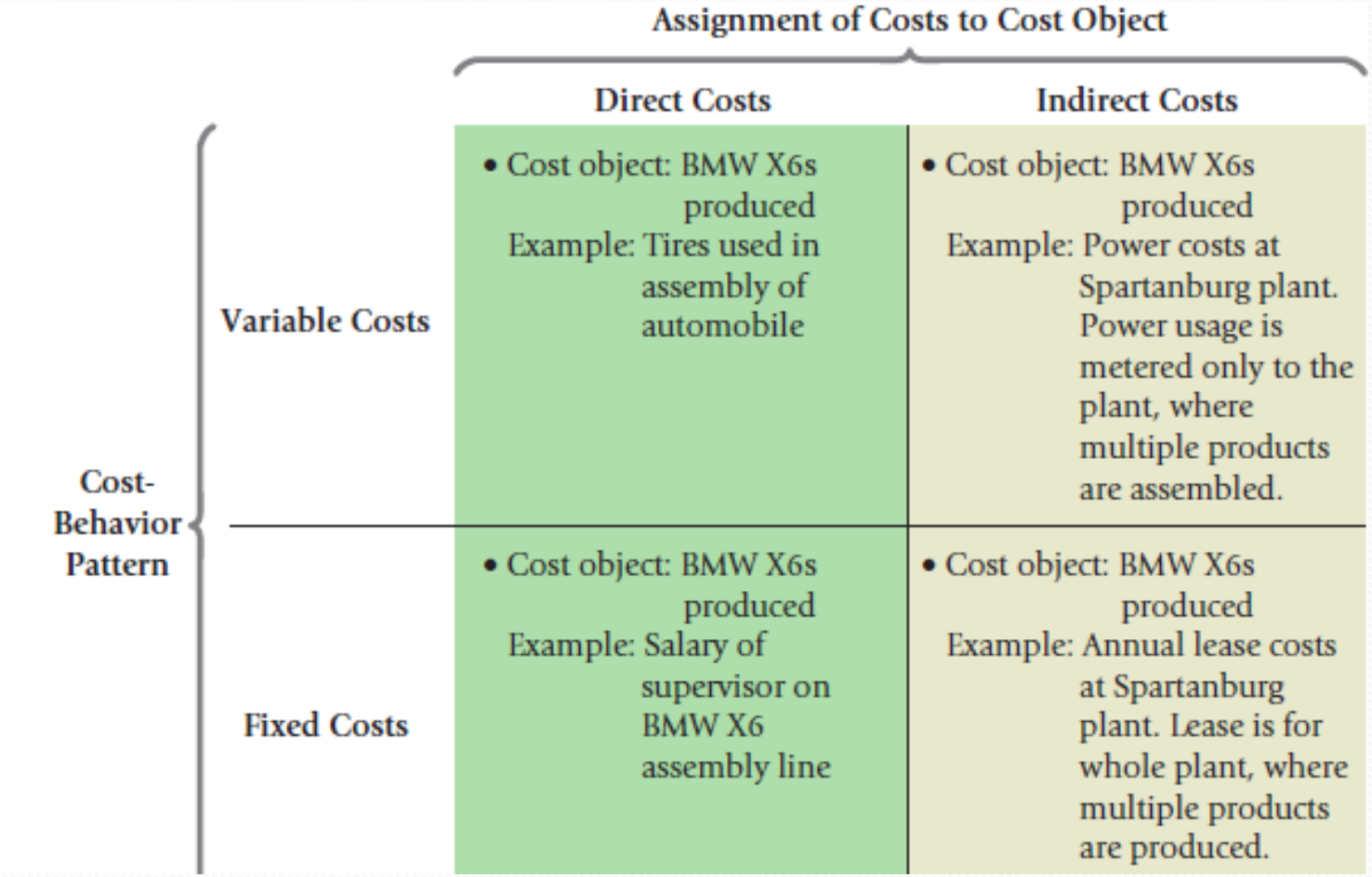
Multiple Classifications of Costs

- Costs may be classified as:
  - Direct/Indirect, and
  - Variable/Fixed
- These multiple classifications give rise to important cost combinations:
  - Direct and variable
  - Direct and fixed
  - Indirect and variable
  - Indirect and fixed

A Cost Caveat

- Unit costs should be used cautiously. Because unit costs change with a different level of output or volume, it may be more prudent to base decisions on a total cost basis.
  - Unit costs that include fixed costs should always reference a given level of output or activity.
  - Unit costs are also called average costs.
  - Managers should think in terms of total costs rather than unit costs for many decisions.

Examples of the Multiple Classifications of Costs



Cost-Behavior Pattern	Assignment of Costs to Cost Object: Direct Costs	Assignment of Costs to Cost Object: Indirect Costs
Variable Costs	• Cost object: BMW X6s produced Example: Tires used in assembly of automobile	• Cost object: BMW X6s produced Example: Power costs at Spartanburg plant. Power usage is metered only to the plant, where multiple products are assembled.
Fixed Costs	• Cost object: BMW X6s produced Example: Salary of supervisor on BMW X6 assembly line	• Cost object: BMW X6s produced Example: Annual lease costs at Spartanburg plant. Lease is for whole plant, where multiple products are produced.

Different Types of Firms

- Manufacturing-sector companies purchase materials and components and convert them into finished products.
- Merchandising-sector companies purchase and then sell tangible products without changing their basic form.
- Service-sector companies provide services (intangible products) like legal advice or audits.

Other Cost Considerations

- Prime cost is a term referring to all direct manufacturing costs (materials and labor).
- Conversion cost is a term referring to direct labor and indirect manufacturing costs.
- Overtime labor costs are considered part of indirect overhead costs.

Measuring costs requires judgment

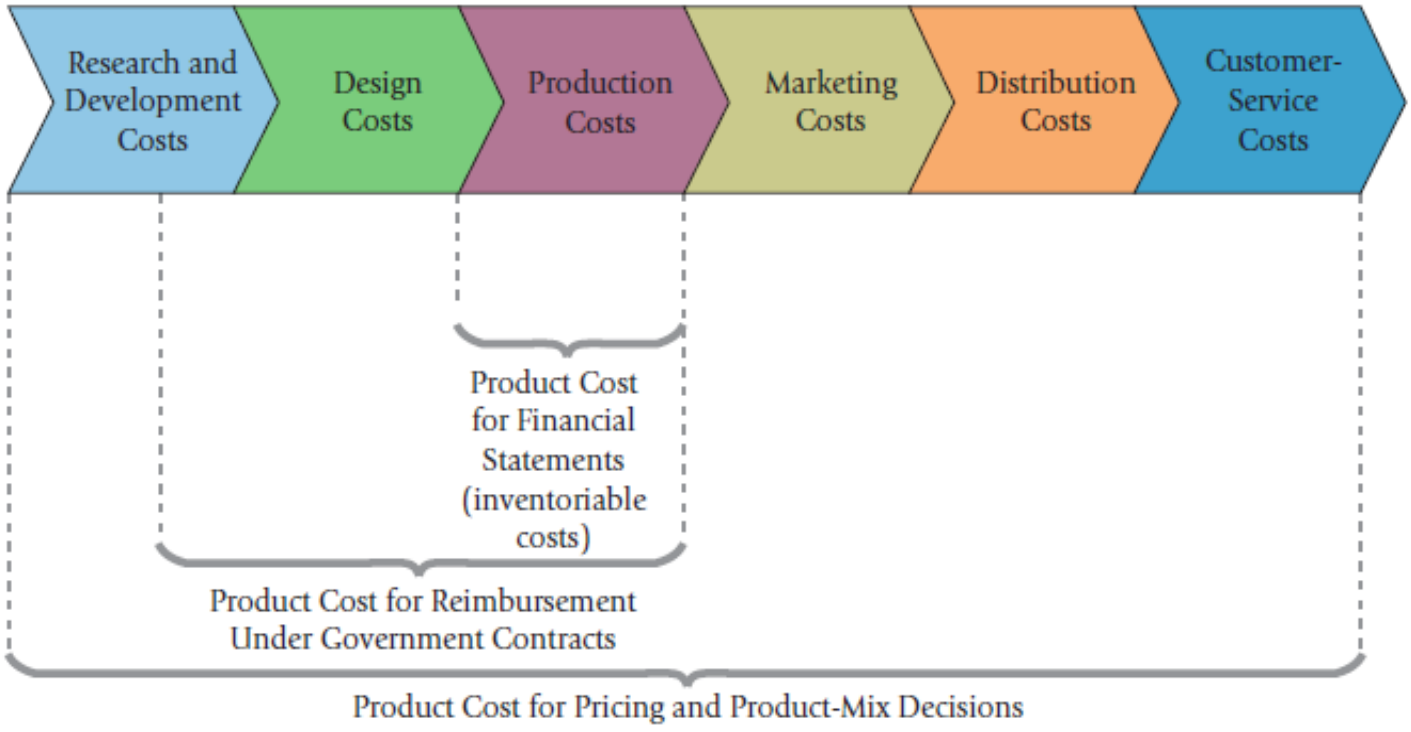
Because there are alternative ways for management to define and classify costs, judgment is required.

Managers, accountants, suppliers and others should agree on the classifications and meanings of the cost terms introduced in this section and throughout the course.

Different product Costs for Different purposes

- Pricing and product-mix decisions—decisions about pricing and maximizing profits
- Contracting with government agencies—very specific definitions of allowable costs for "cost plus profit" contracts
- Preparing external-use financial statements—GAAP-driven product costs only

Different product Costs for Different purposes



A framework for cost accounting and cost management

The following three features of cost accounting and cost management can be used for a wide range of applications (for helping managers make decisions):

1. Calculating the cost of products, services, and other cost objects
2. Obtaining information for planning and control, and performance evaluation
3. Analyzing the relevant information for making decisions

Under costing and over costing

- If we get the costing wrong it will affect:

1. Stock levels
2. Profit analysis
3. Affect decision making process

Qualitative Characteristics of Cost Information

- *Accuracy* (and the need to monitor internal accounting controls)
- *Cost and value of cost information* (the cost of information should be monitored by the management accountant to ensure that costs do not outweigh the associated benefits)
- *Timeliness* (often involves sacrificing in the other two areas)

Summary

- Cost assignment: the tracing (direct) or allocation (indirect) of costs to cost pools using cost drivers

- Four types of cost behavior (and cost drivers)
  - Volume based
    - Fixed cost
    - Variable cost
    - Mixed cost
    - Step cost
  - Activity based
  - Structural
  - Executional

Summary

- Product and service costing focuses on differentiating product costs from period costs
- Costs flow through three inventory accounts in a manufacturing firm(raw materials, work-in-process, finished goods inventory); merchandising firms have one inventory account (inventory held for sale)

Problems & Examples

Q1: Different Ways to Describe Costs

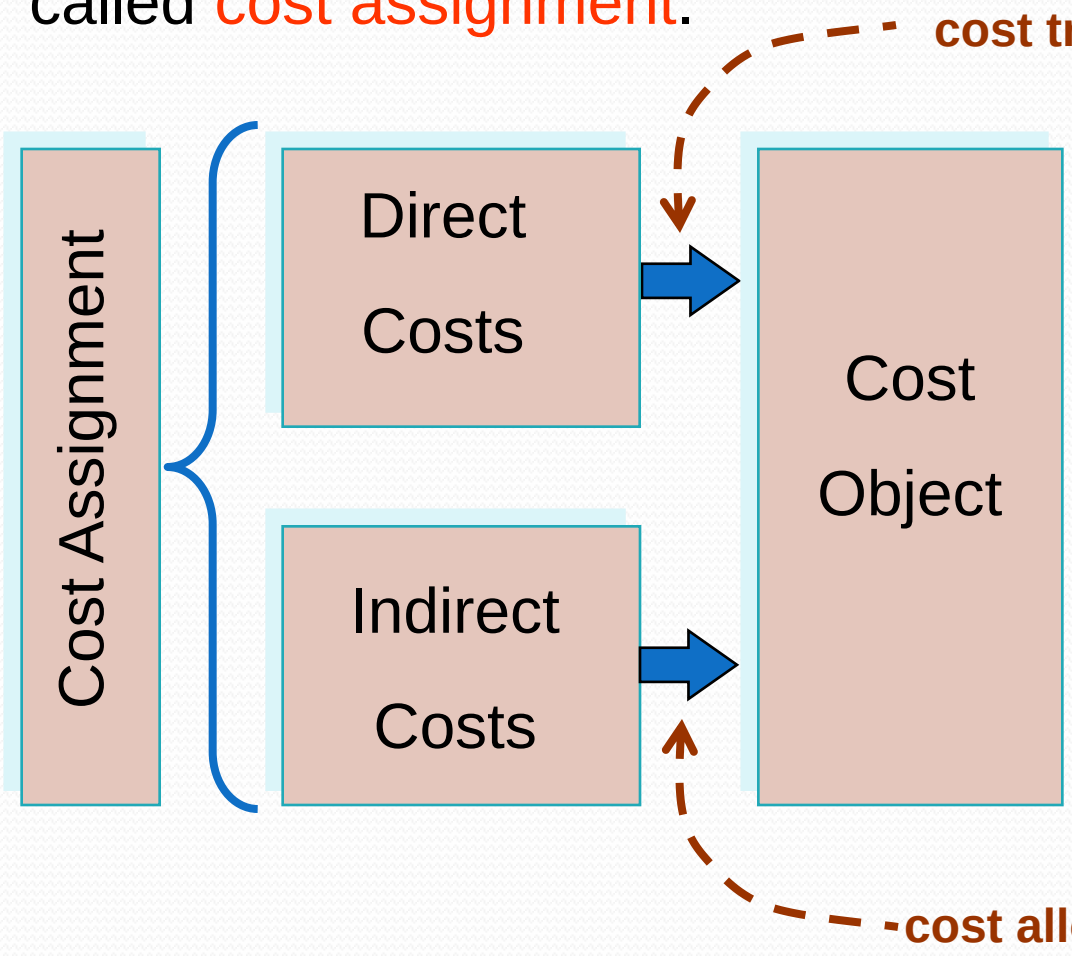
- Costs can be defined by how they relate to a cost object, which is defined as any thing or activity for which we measure costs.

- Costs can also be categorized as to how they are used in decision making.

- Costs can also be distinguished by the way they change as activity or volume levels change.

Q1: Assigning Costs to a Cost Object

Determining the costs that should attach to a cost object is called cost assignment.



Direct costs are easily traced to the cost object.

Indirect costs are not easily traced to the cost object, and must be allocated.

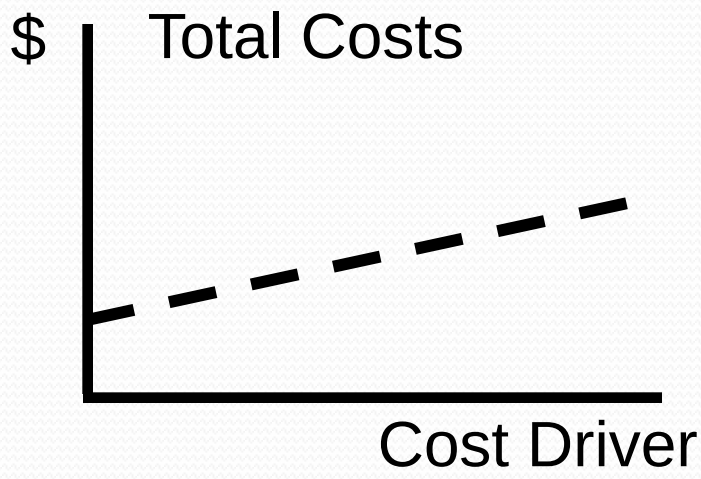
Q1: Direct and Indirect Costs

- In manufacturing:
  - all materials costs that are easily traced to the product are called direct material costs
  - all labor costs that are easily traced to the product are called direct labor costs
  - all other production costs are called overhead costs
- Whether or not a cost is a direct cost depends upon:
  - the definition of the cost object
  - the precision of the bookkeeping system that tracks costs
  - the technology available to capture cost information
  - whether the benefits of tracking the cost as direct exceed the resources expended to track the cost
  - the nature of the operations that produce the product or service

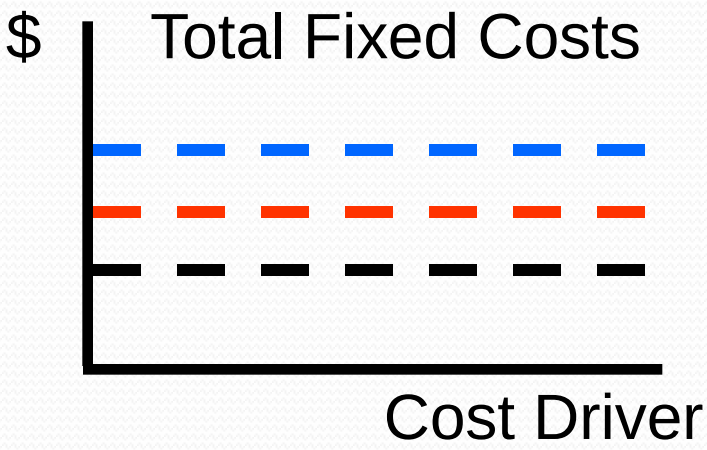
Q1: Linear Cost Behavior Terminology

- Total fixed costs are costs that do not change (in total) as activity levels change.
- Total variable costs are costs that increase (in total) in proportion to the increase in activity levels.
- Total costs equal total fixed costs plus total variable costs.
- The relevant range is the span of activity levels for which the cost behavior patterns hold.
- A cost driver is a measure of activity or volume level; increases in a cost driver cause total costs to increase.

Q1: Behavior of Total (Linear) Costs



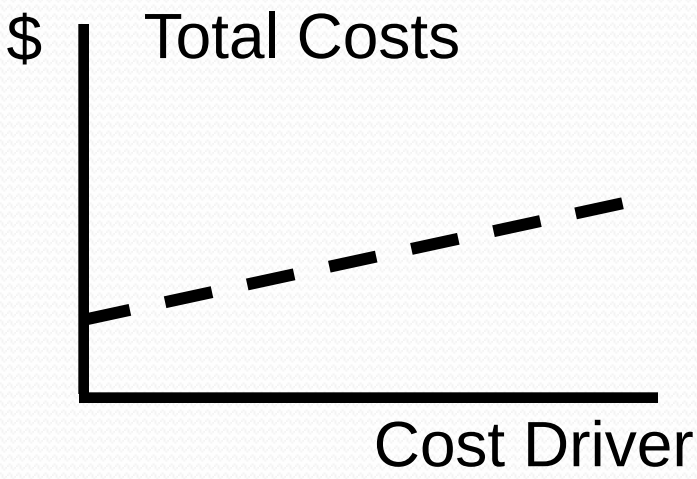
If costs are linear, then total costs graphically look like this.



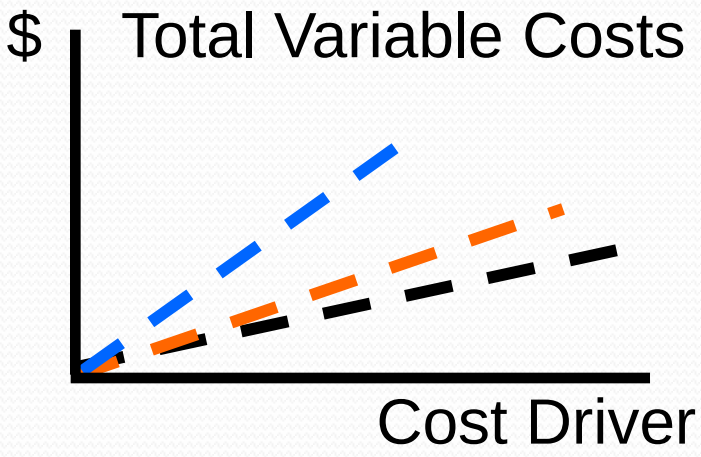
Total fixed costs do not change as the cost driver increases.

Higher total fixed costs are higher above the x axis.

Q1: Behavior of Total (Linear) Costs



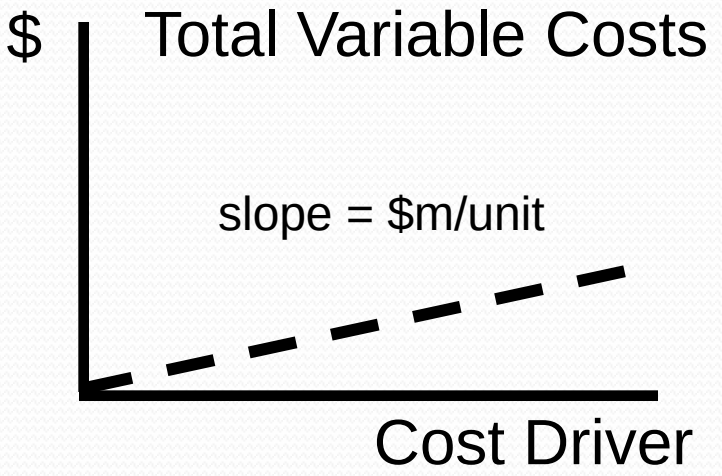
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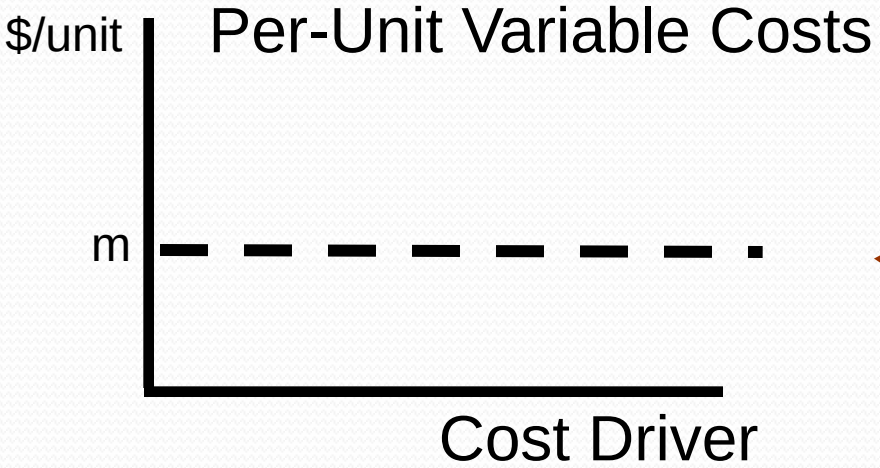
Total variable costs increase as the cost driver increases.

A steeper slope represents higher variable costs per unit of the cost driver.

Q1: Total Versus Per-unit (Average) Cost Behavior

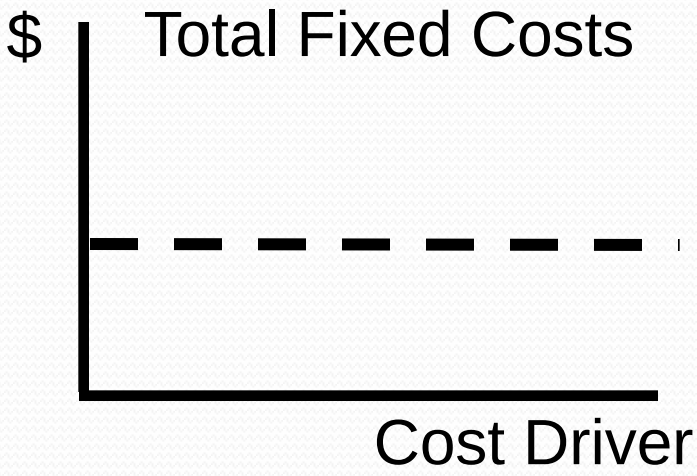


If total variable costs look like this . . .

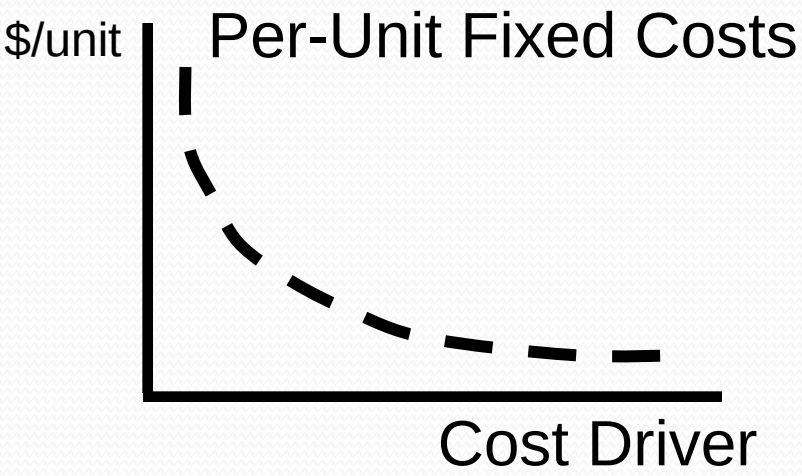


. . . then variable costs per unit look like this.

Q1: Total Versus Per-Unit (Average) Cost Behavior



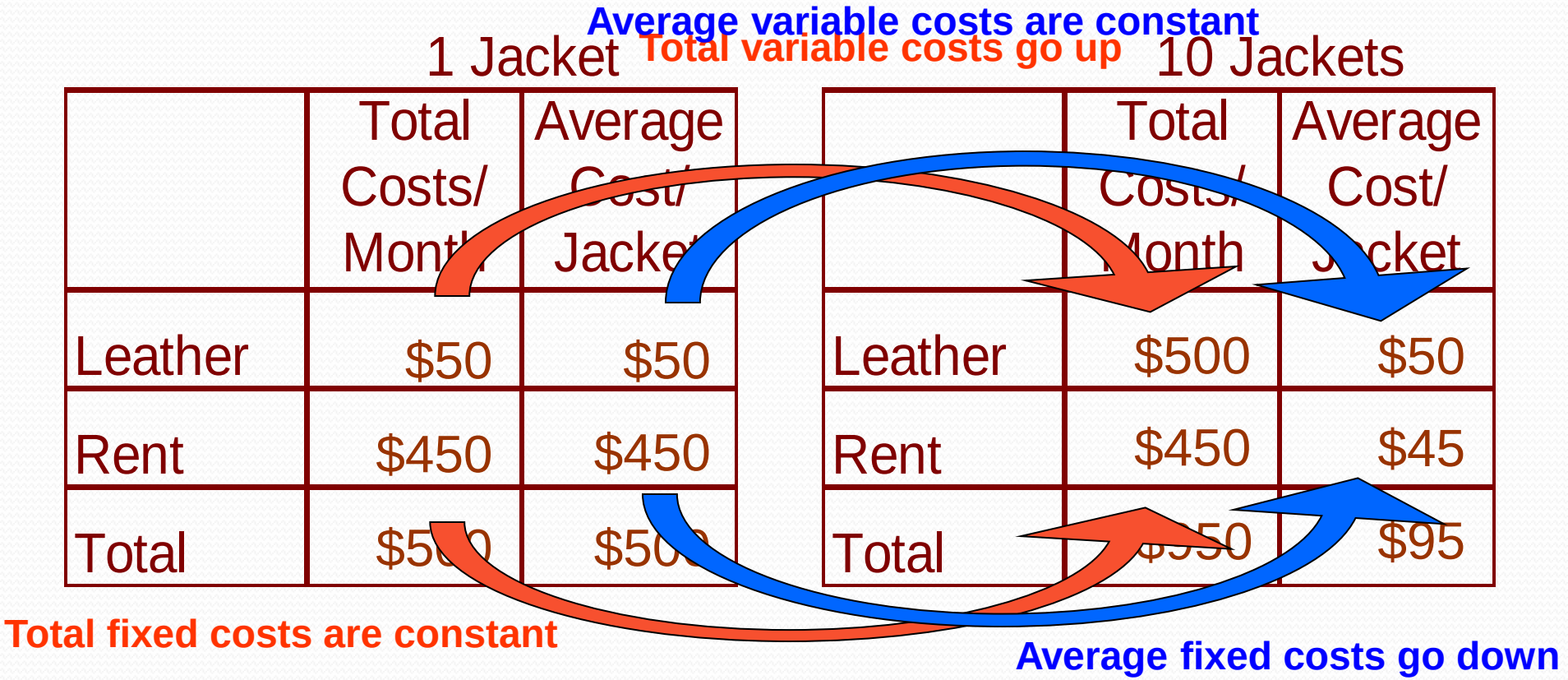
If total fixed costs look like this . . .



. . . then fixed costs per unit look like this.

Q1: Total Versus Per-Unit (Average) Cost Behavior

Lari's Leather produces customized motorcycle jackets. The leather for one jacket costs $50, and Lari rents a shop for $450/month. Compute the total costs per month and the average cost per jacket if she made only one jacket per month. What if she made 10 jackets per month?



	Total Costs/ Month	Average Cost/ Jacket
Leather	$50	$50
Rent	$450	$450
Total	$500	$500

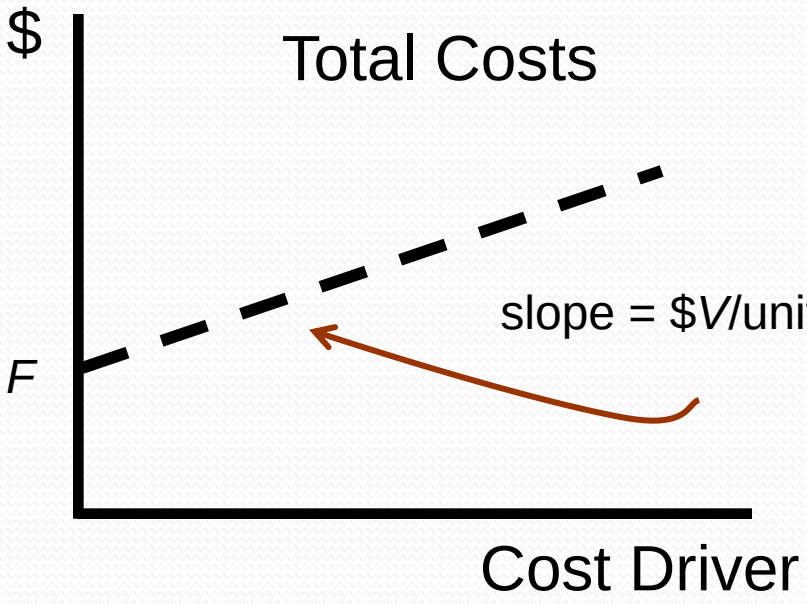
	Total Costs/ Month	Average Cost/ Jacket
Leather	$500	$50
Rent	$450	$45
Total	$950	$95

Q1: The Cost Function

When costs are linear, the cost function is:

$TC = F + V \times Q$, where

F = total fixed cost, V = variable cost per unit of the cost driver, and Q = the quantity of the cost driver.



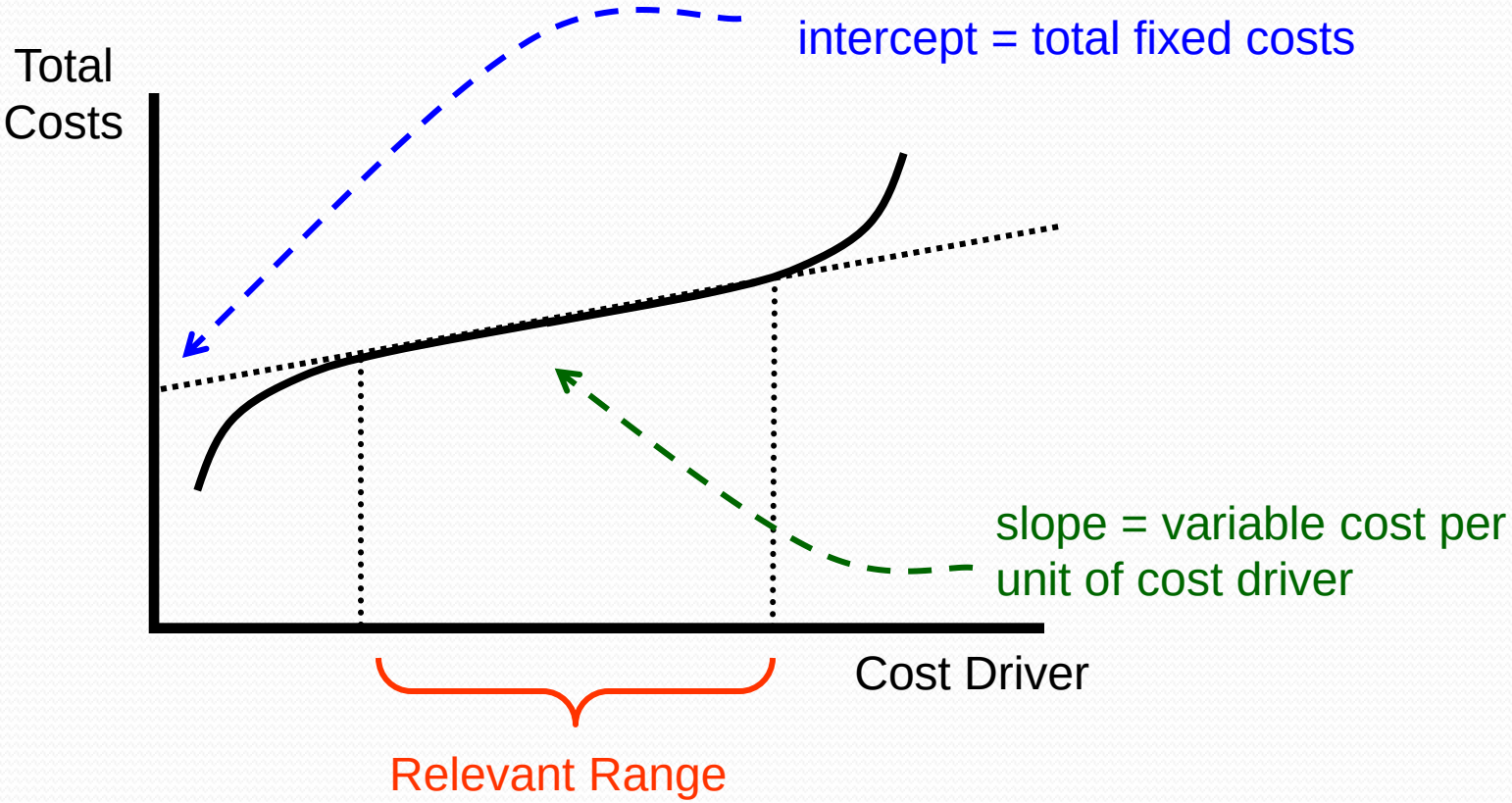
The intercept is the total fixed cost.

The slope is the variable cost per unit of the cost driver.

A cost that includes a fixed cost element and a variable cost element is known as a mixed cost.

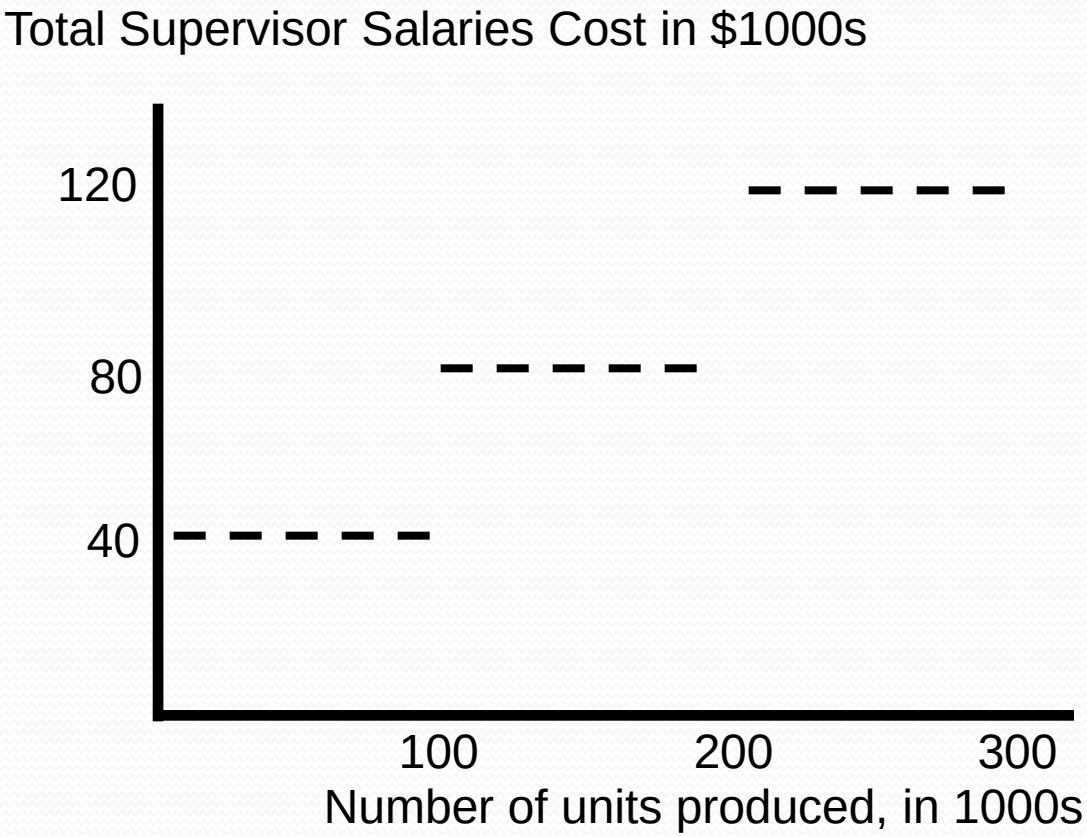
Q1: Nonlinear Cost Behavior

Sometimes nonlinear costs exhibit linear cost behavior over a range of the cost driver. This is the relevant range of activity.



Q1: Stepwise Linear Cost Behavior

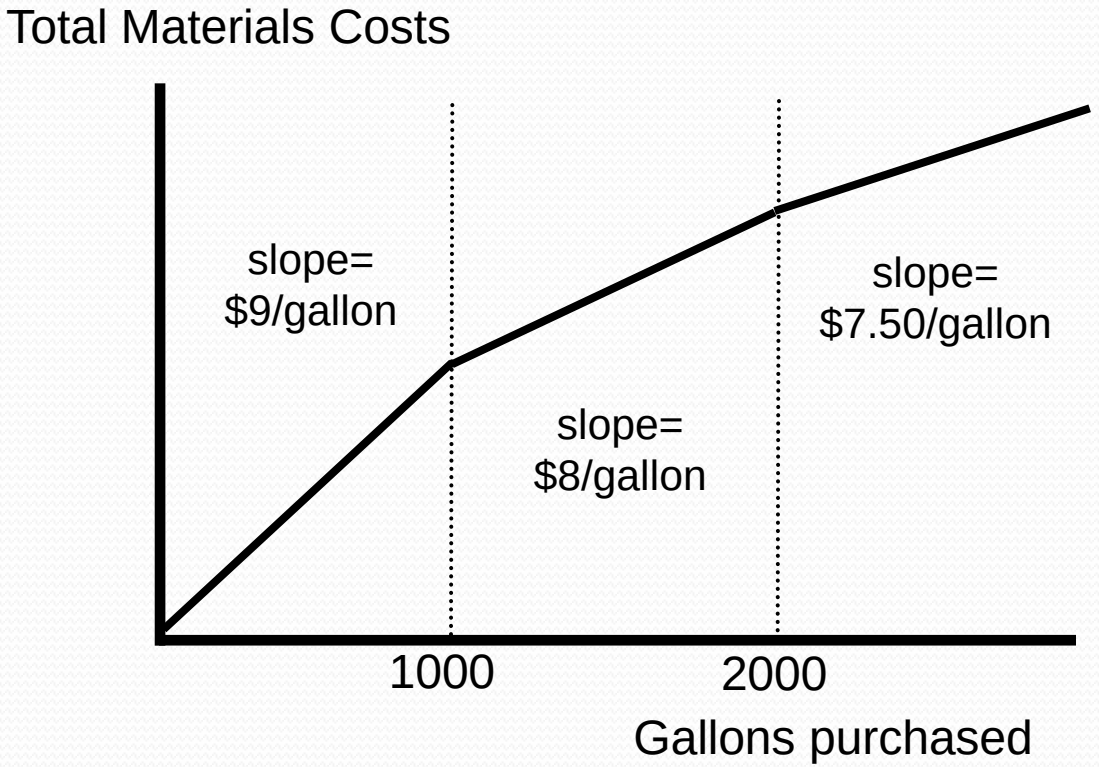
Some costs are fixed at one level for one range of activity and fixed at another level for another range of activity. These are known as stepwise linear costs.



Example: A production supervisor makes $40,000 per year and the factory can produce 100,000 units annually for each 8-hour shift it operates.

Q1: Piecewise Linear Cost Behavior

Some variable costs per unit are constant at one level for one range of activity and constant at another level for another range of activity. These are known as piecewise linear costs.



Example: A supplier sells us raw materials at $9/gallon for the first 1000 gallons, $8/gallon for the second 1000 gallons, and at $7.50/gallon for all gallons purchased over 2000 gallons.

Q1: Cost Terms for Decision Making

- We have learned the distinction between relevant and irrelevant cash flows.

- Opportunity costs are the benefits of an alternative one gives up when that alternative is not chosen.
  - Opportunity costs are difficult to measure because they are associated with something that did not occur.
  - Opportunity costs are always relevant in decision making.

- Sunk costs are costs that were incurred in the past.
  - Sunk costs are never relevant for decision making.

Q1: Cost Terms for Decision Making

- Discretionary costs are periodic costs incurred for activities that management may or may not determine are worthwhile.
  - These costs may be variable or fixed costs.
  - Discretionary costs are relevant for decision making only if they vary across the alternatives under consideration.
- Marginal cost is the incremental cost of producing the next unit.
  - When costs are linear and the level of activity is within the relevant range, marginal cost is the same as variable cost per unit.
  - Marginal costs are often relevant in decision making.

Q2: What Process is Used to Estimate Future Costs?

Past costs are often used to estimate future, non-discretionary, costs. In these instances, one must also consider:

- whether the past costs are relevant to the decision at hand
- whether the future cost behavior is likely to mimic the past cost behavior
- whether the past fixed and variable cost estimates are likely to hold in the future

Cost Functions

- Use accountants, engineers, employees, and/or consultants to analyze the resources used in the activities required to complete a product, service, or process.

- For example, a company making inflatable rubber kayaks would estimate some of the following:
  - the amount and cost of the rubber required
  - the amount and cost of labor required in the cutting department
  - the amount and cost of labor required in the assembly department
  - overhead costs and the best cost allocation base to use
  - the selling costs, including commissions and advertising
  - the distribution costs

Q3: Account Analysis Method of Estimating a Cost Function

- Review past costs in the general ledger and past activity levels to determine each cost's past behavior.

- For example, a company producing clay wine goblets might review its records and find:
  - the cost of clay is piecewise linear with respect to the number of pounds of clay purchased
  - skilled production labor is variable with respect to the number of goblets produced
  - unskilled production labor is mixed, and the variable portion varies with respect to the number of times the kiln is operated
  - production supervisors' salary costs are stepwise linear
  - distribution costs are mixed, with the variable portion dependent upon the number of retailers ordering goblets

Q3: Example - Account Analysis Method of Estimating a Cost Function

- The table on the right contains the expenditures for Scott Manufacturing during the last year.
- 100,000 units were produced and sold
- $500,000 of sales revenue was recorded

Required:

1. Determine the cost function using units produced as the driver
2. Repeat using sales dollars as the driver

Expense	Amount	Variable	Fixed
Direct Materials	$500,000		
Direct Labor	300,000		
Rent	25,000		
Insurance	15,000		
Commissions	200,000		
Property Tax	20,000		
Telephone	10,000		
Depreciation	85,000		
Power & Light	30,000		
Admin Salaries	100,000		
Total	1,285,000		

Q3: Example - Account Analysis Method of Estimating a Cost Function

- Steps in estimating a cost function using account analysis
  - Separate fixed and variable costs
  - Total the fixed costs
  - Total the variable costs
  - Calculate a variable cost per driver
  - Write out the cost function

Q3: Solution - Account Analysis Method of Estimating a Cost Function

Expense	Amount	Variable	Fixed
Direct Materials	$500,000	500,000	
Direct Labor	300,000	300,000	
Rent	25,000		25,0
Insurance	15,000		15,0
Commissions	200,000	200,000	
Property Tax	20,000		20,0
Telephone	10,000		10,0
Depreciation	85,000		85,0
Power & Light	30,000		30,000
Admin Salaries	100,000		100,000
Total	1,285,000	1,000,000	285,000

Cost Function on Units:

TC = FC + VC/Unit * Qty
TC = $285,000 + ($10/unit) * Qty

Cost Function on Dollars:

TC = FC + VC/Sales $ * Sales $
TC = $285,000 + ($0.20) * Sales $

Q3: Two-Point Method of Estimating a Cost Function

- Use the information contained in two past observations of cost and activity to separate mixed and variable costs.
- It is much easier and less costly to use than the account analysis or engineered estimate of cost methods, but:
  - it estimates only mixed cost functions,
  - it is not very accurate, and
  - it can grossly misrepresent costs if the data points come from different relevant ranges of activity

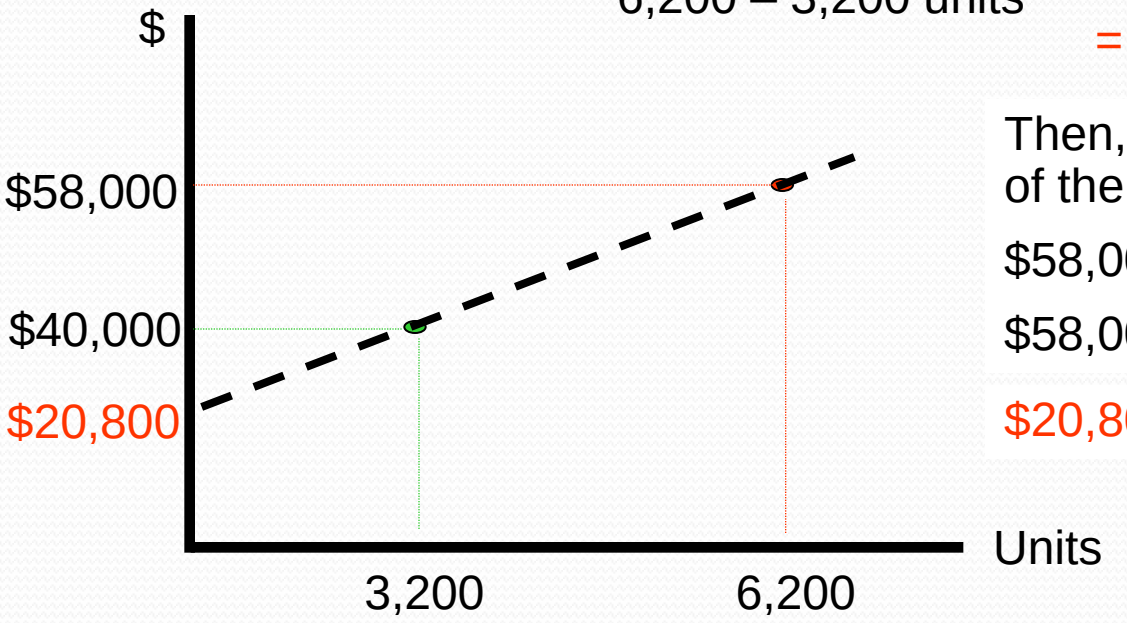
Q3: Example - Two-Point Method of Estimating a Cost Function

In July the Gibson Co. incurred total overhead costs of $58,000 and made 6,200 units. In December it produced 3,200 units and total overhead costs were $40,000. What are the total fixed factory costs per month and average variable factory costs?

We first need to determine *V*, using the equation for the slope of a line.

rise/run = $\frac{\$58,000 - \$40,000}{6,200 - 3,200 \text{ units}}$ = $18,000/3,000 units

= $6/unit



Then, using TC = *F* + *V* x *Q*, and one of the data points, determine F.

$58,000 = *F* + $6/unit x 6,200 units

$58,000 = *F* + $37,200

$20,800 = *F*

Q3: High-Low Method of Estimating a Cost Function

- The high-low method is a two-point method
  - the two data points used to estimate costs are observations with the highest and the lowest activity levels

- The extreme points for activity levels may not be representative of costs in the relevant range
  - this method may underestimate total fixed costs and overestimate variable costs per unit,
  - or vice versa.

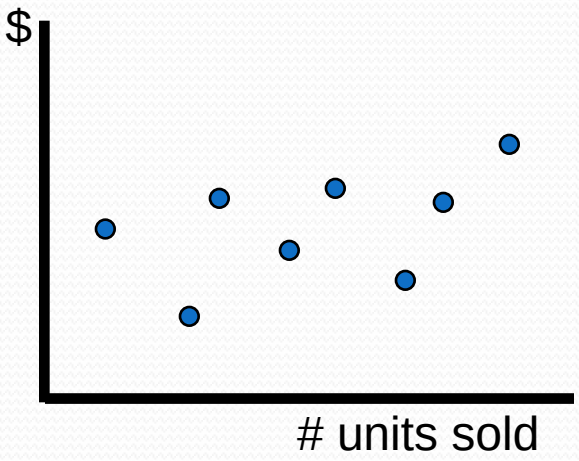
Q4: How Does a Scatterplot Assist with Categorizing a Cost?

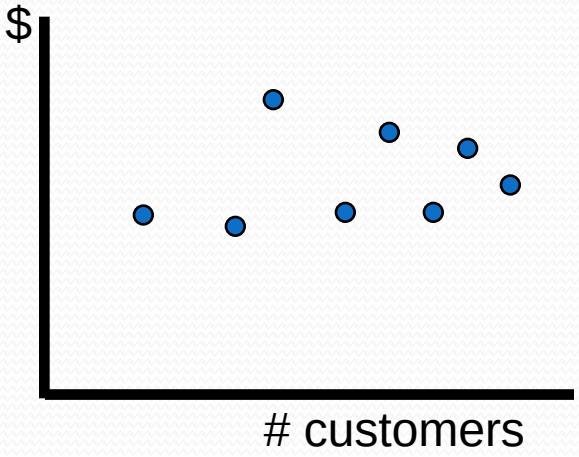
- A scatterplot shows cost observations plotted against levels of a possible cost driver.

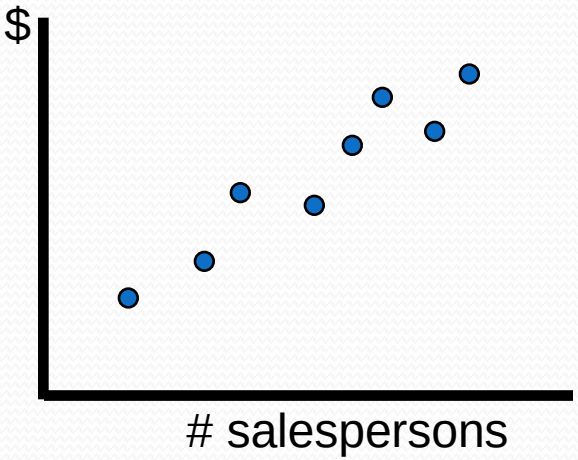
- A scatterplot can assist in determining:
  - which cost driver might be the best for analyzing total costs, and
  - the cost behavior of the cost against the potential cost driver.

Cause & Effect Relationship with Total Cost?

8 observations of total selling expenses plotted against 3 potential cost drivers

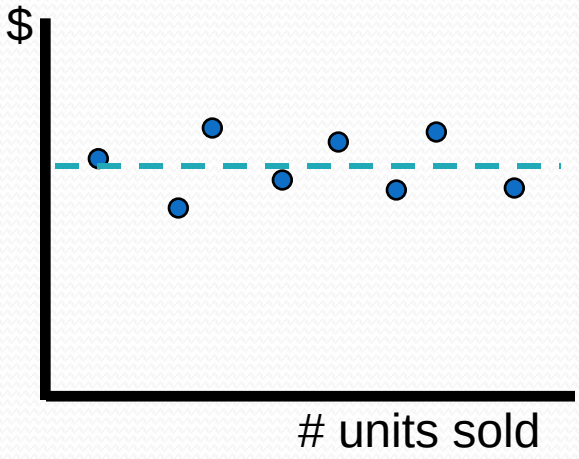






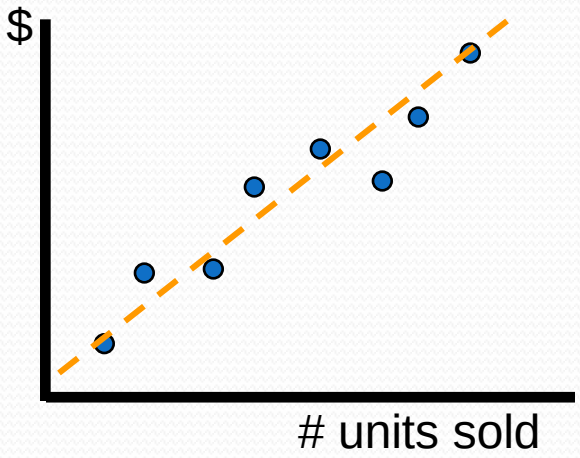
The number of salespersons appears to be the best cost driver of the 3.

Q4: What is the Underlying Cost Behavior?

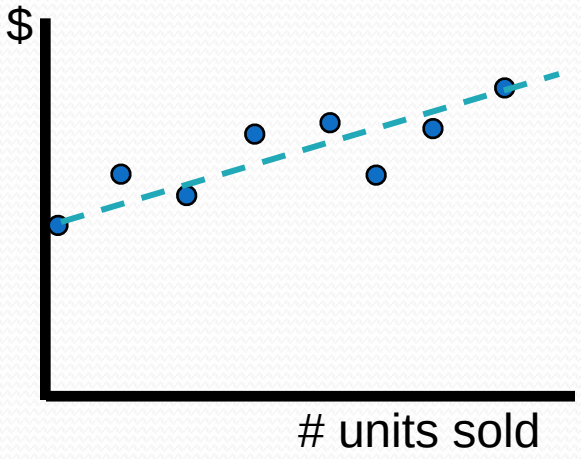


This cost is probably linear and fixed.

This cost is probably linear and variable.

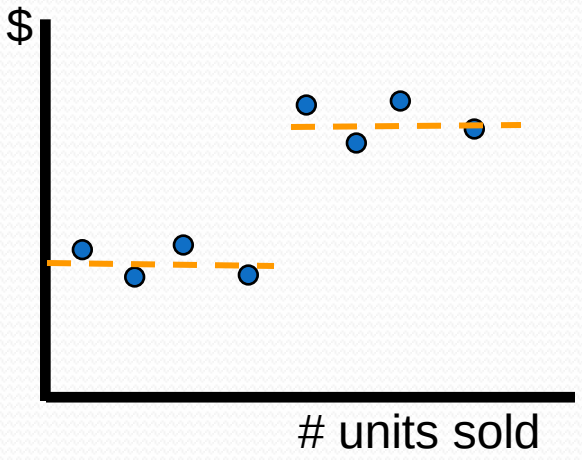


Q4: What is the Underlying Cost Behavior?

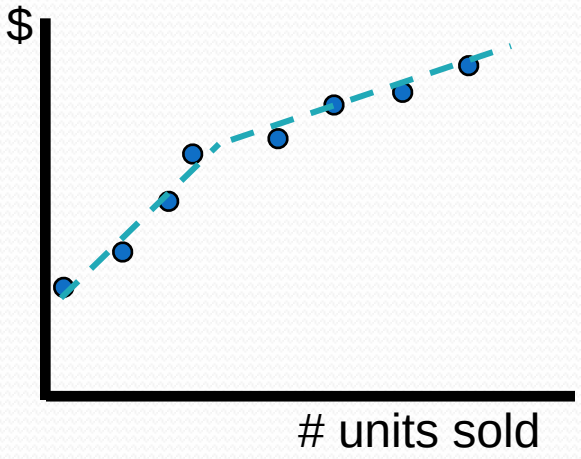


This cost is probably linear and mixed.

This is likely a stepwise linear cost.

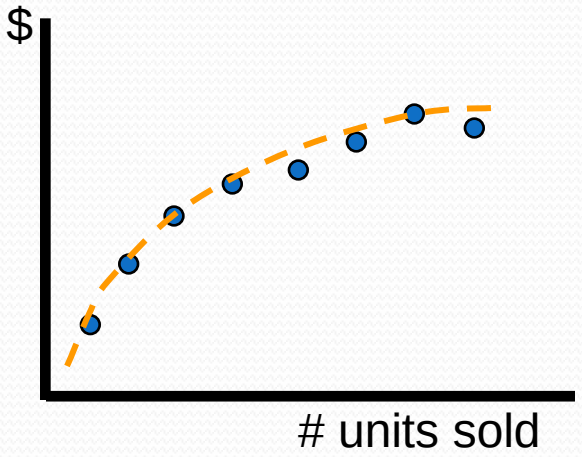


Q4: What is the Underlying Cost Behavior?



This cost may be piecewise linear.

This cost appears to have a nonlinear relationship with units sold.



Day 3

From cost accounting to management control

- Cost allocation: traditional costing and activity-based costing (ABC)
- From traditional budgeting to Activity-based budgeting (ABB)
- Activity-based management
- Decentralized organizations
- Cost/Profit/Investment centers
- Transfer-pricing issues
- Problems and Examples – Case study illustration

Traditional Cost allocation

The Strategic Role of Cost Allocation

1. Determine accurate departmental and product costs as a basis for evaluating the cost efficiency of departments and the profitability of different products

2. Motivate managers to exert a high level of effort to achieve the goals of top management

3. Provide the right incentive for managers to make decisions that are consistent with the goals of top management

4. Fairly determine the rewards earned by managers for their effort and skill and for the effectiveness of their decision-making

Cost Allocation Bases

- The most objective basis for cost allocation exists when a *cause-and-effect relationship* can be determined, such as the relationship between machine breakdowns and maintenance costs
- Other alternatives exist in the absence of cause-and-effect relationships, such as *ability-to-bear* and *benefit received*

Ethical Issues in Cost Allocation

- An ethical issue arises when costs are allocated to products or services that are produced for both a competitive market and a public or governmental entity
  - The latter often purchases on a cost-plus basis creating an incentive to shift costs from the competitive products to cost-plus-based products and contracts
- An equity or fair-share issue arises when a governmental unit reimburses the costs of a private institution or when it provides a service to the public for a fee–no single measure of equity exists

Ethical Issues in Cost Allocation (continued)

- A third ethical issue is the effect of the chosen allocation method on the costs of the products sold to or from foreign subsidiaries
  - By increasing the costs of products purchased in high-tax countries or in countries where the firm does not have favorable tax treatment, the firm can reduce its overall tax liability
  - International tax authorities watch the cost-allocation methods of multinational firms very closely for this reason

Overhead Allocations: Three General Approaches

Three general approaches for allocating overhead costs to products:

- The *volume-based approach* allocates overhead from a single cost pool
- The *departmental approach* allocates overhead to production departments, and then from production departments to products
- The *activity-based approach* allocates overhead to production activities, and then from production activities to products

The Departmental Approach

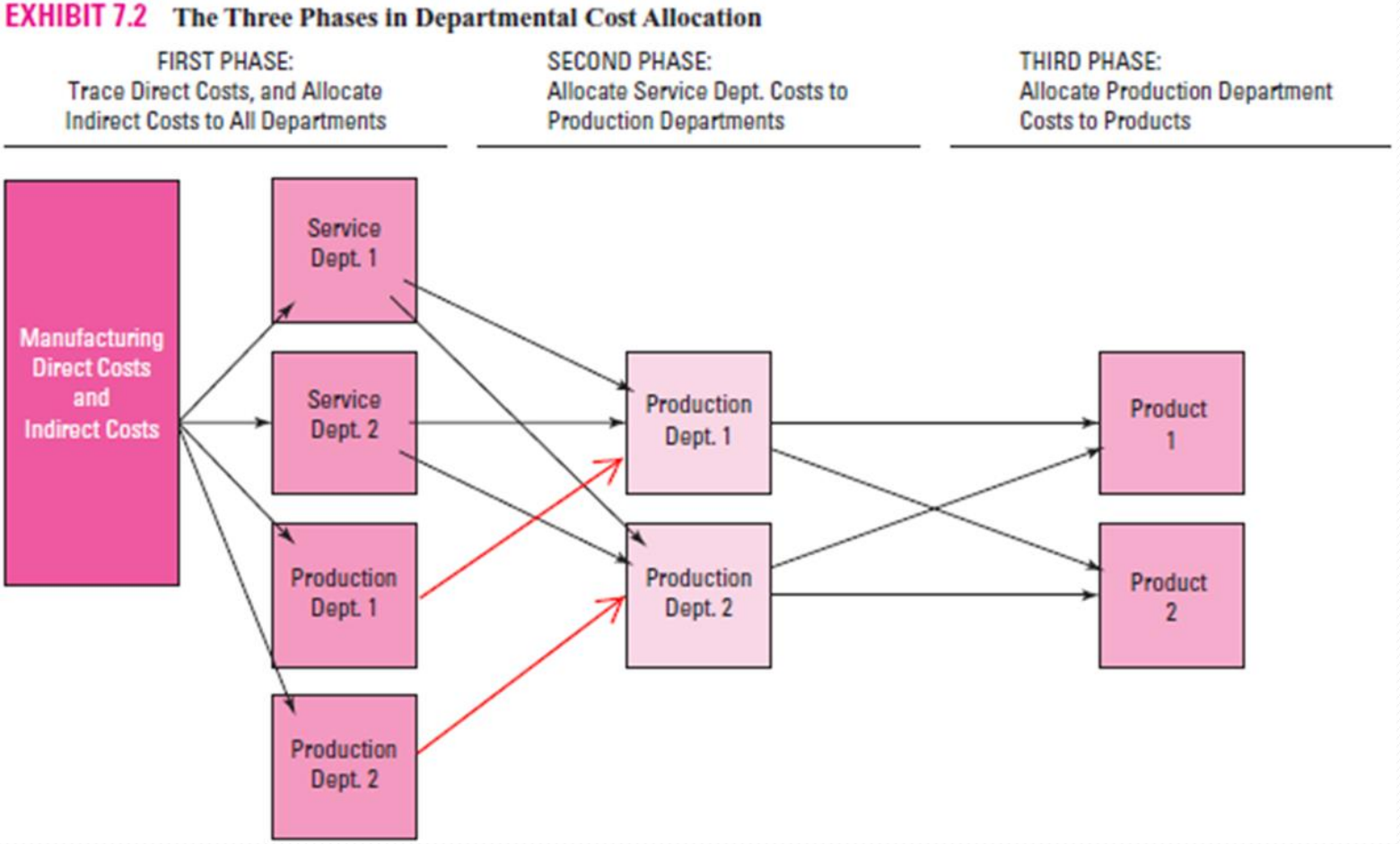
The departmental approach classifies manufacturing departments into production and service departments

This approach involves three phases:

1. Trace all direct overhead costs and allocate common overhead costs to both the various production and service departments
2. Allocate the service department costs to the production departments
3. Allocate production department costs to products

The Three Phases of Departmental Cost Allocation

EXHIBIT 7.2 The Three Phases in Departmental Cost Allocation



Departmental Approach Example

Beary Company manufactures two products and has two production departments (P-1 and P-2) and two service departments (S-1 and S-2). Beary uses labor-hours (DLH) to allocate indirect labor costs and machine-hours (MH) to allocate indirect materials costs.

	S-1	S-2	P-1	P-2	Total Hours	Total Amount
Labor-hours	1,800	1,200	3,600	5,400	12,000	
Machine-hours	320	160	1,120	1,600	3,200	
Direct costs	$ 1,600	$ 5,500	$15,500	$13,400		$ 36,000
Indirect labor						25,000
Indirect materials						5,000
						$ 66,000

Not Traceable

Departmental Approach: Phase 1

	S-1	S-2	P-1	P-2	Total
Direct labor-hours (DLH)	1,800	1,200	3,600	5,400	12,000
Percent	15%	10%	30%	45%	100%
Machine-hours	320	160	1,120	1,600	3,200
Percent	10%	5%	35%	50%	100%
Phase 1: Trace Direct Costs and Allocate Overhead Costs to Departments					
Direct costs	$ 1,600	$ 5,500	$15,500	$13,400	$ 36,000
OVH cost to departments:					
Indirect labor (DLH)	3,750	2,500	7,500	11,250	$ 25,000
Indirect materials (MH)	500	250	1,750	2,500	$ 5,000
Total for all departments	$ 5,850	$ 8,250	$24,750	$27,150	$ 66,000

Departmental Approach: Phase 2

Phase 2, allocation of service department costs: whether, and to what extent, **reciprocal cost flows** are recognized?

Three methods are used to allocate service department costs:

- The direct method
- The step method
- The reciprocal method

Phase 2: Direct Method

	P-1	P-2	Total
S-1			
Service % to production departments	30%	30%	
Allocation % per direct method	50%	50%	
Allocation amount	$ 2,925	$ 2,925	$ 5,850
S-2			
Service % to production departments	30%	60%	
Allocation % per direct method	33.33%	66.67%	
Allocation amount	$ 2,750	$ 5,500	8,250
Plus Phase 1 Allocation Amount	$ 24,750	$ 27,150	51,900
Total for Production Departments	$ 30,425	$ 35,575	$ 66,000

Phase 3: Direct Method

	Product 1	Product 2	Total
Labor-hours			
Hours	1,800	1,800	3,600
Percent	50%	50%	
Machine-hours			
Hours	400	1,200	1,600
Percent	25%	75%	
P-1 (labor-hour basis)	$ 15,212.50	$ 15,212.50	$ 30,425
P-2 (mahine-hour basis)	8,893.75	26,681.25	35,575
Totals for each product	$ 24,106.25	$ 41,893.75	$ 66,000

Phase 2: Step Method

	S-2	P-1	P-2	Total
Step 1--Allocation of S-1:				
Service percent	40%	30%	30%	
Amount	$ 2,340	$ 1,755	$ 1,755	$ 5,850
Step 2--Allocation of S-2:				
Service percent		30%	60%	
Alloc. % per direct method		33.33%	66.67%	
Amount	$ 10,590	$ 3,530	$ 7,060	8,250
Plus: First-Phase Allocation		24,750	27,150	51,900
Totals		$ 30,035	$ 35,965	$ 66,000

Phase 3: Step Method

	Product 1	Product 2	Total
Labor-hours			
Hours	1,800	1,800	3,600
Percent	50%	50%	
Machine-hours			
Hours	400	1,200	1,600
Percent	25%	75%	
P-1 (labor-hour basis)	$15,017.50	$15,017.50	$30,035
P-2 (mahine-hour basis)	8,991.25	26,973.75	35,965
Totals for each product	$24,008.75	$41,991.25	$66,000

Phase 2: Reciprocal Method

Step 1: Set up and Solve Simultaneous Equations

Allocated S1 Costs = Traceable Costs + Cost allocated from S2

S1 = $5,850 + (10% x S2)

Allocated S2 Costs = Initial allocation + Cost allocated from S1

S2 = $8,250 + (40% x S1)

The second equation is substituted into the first as follows:

S1 = $5,850 + 10% x [$8250 + (40% x S1)]

S1 = $6,953.13

Then the S1 figure is substituted into the second equation:

S2 = $8,250 + [40% x ($6,953.13)]

S2 = $11,031.25

Phase 2: Reciprocal Method (continued)

Second Step: Allocation from Service Depts. To Prod. Departments

	P-1	P-2	Total
S-1			
Service % to prod. depts.	30%	30%	
Allocated amount	$ 2,086	$ 2,086	
S-2			
Service % to prod. depts.	30%	60%	
Allocated amount	$ 3,309	$ 6,619	
Plus Phase-1 Allocation	$ 24,750	$ 27,150	
Totals	$ 30,145	$ 35,855	$ 66,000

Phase 3: Reciprocal Method

	Product 1	Product 2	Total
Labor-hours			
Hours	1,800	1,800	3,600
Percent	50%	50%	
Machine-hours			
Hours	400	1,200	1,600
Percent	25%	75%	
P-1 (labor-hour basis)	$ 15,072.50	$ 15,072.50	$ 30,145
P-2 (mahine-hour basis)	8,963.75	26,891.25	35,855
Totals	$ 24,036.25	$ 41,963.75	$ 66,000

Key Implementation Issues

- **Choosing the most accurate method is key**
  - Wide variations can occur in the product allocation amounts
- **Determining an appropriate allocation base** and a percentage amount for service provided by the service departments is often difficult
- **Variable costs can be traced easily, but fixed costs are difficult to allocate to departments**
  - Ideally, firms would use *dual allocation*, which separates variable and fixed costs and traces the variable costs directly to the departments that caused the cost

Key Implementation Issues (continued)

- **Using budgeted vs. actual amounts?**
  - Budgeted (predetermined) amounts can be more difficult to determine but are more motivating for the allocation of fixed costs
  - Using budgeted amounts makes the allocation of fixed costs more predictable and less dependent upon the usage of other departments
- **Allocated costs can exceed external purchase cost**
  - Occasionally the cost a department is allocated exceeds the cost of purchasing that service from an outside supplier

Joint Product Costing

- Some manufacturing plants yield more than one product from a common resource input; this is called a joint production process

- *Joint products* are products from a joint production process that have relatively substantial sales values

- Products whose total sales values are minor in comparison to the sales value of the joint products are classified as *by-products*

Joint Product Costing

- **Joint products** and by-products start their manufacturing life as part of the same raw material, so up until a certain point, no distinction can be made between the products
  - **By-products** differ from joint products in that the sales value of the by-product is somewhat lower than that of the joint products
- The point in a joint production process at which individual products can be identified for the first time is called the *split-off point*
- *Joint costs* include all manufacturing costs incurred prior to the split-off point

Joint Product Costing

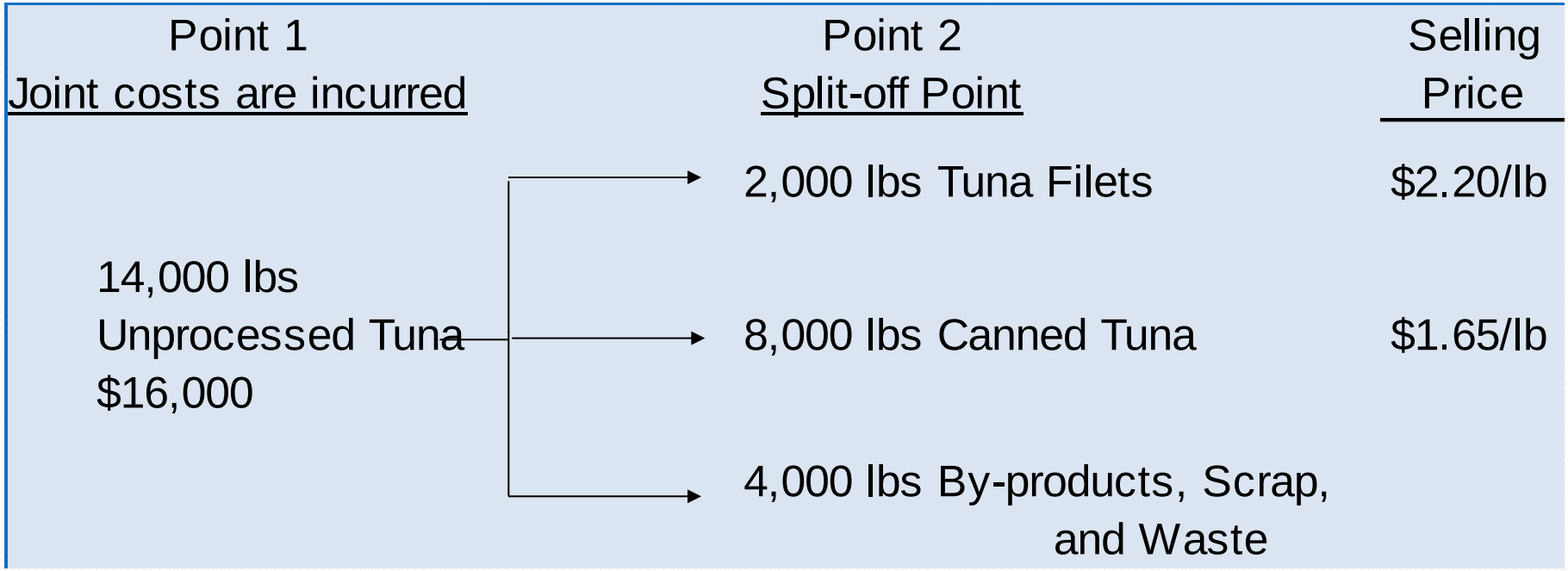
- **Costs incurred after the split-off point are called *separable processing costs***
- **Three methods are commonly used to allocate joint product costs**
  - Relative physical units (measures) produced
  - Relative sales values of the products
  - Relative net realizable values (NRV) of the products

Relative Physical Units

- **The *physical units method* uses a physical measure such as pounds, gallons, or units or volume to allocate the joint costs to joint products**
  - The greater the output (however measured), the greater the share of joint costs allocated to the product
- **This method is also called the *average cost method* when units of output are used in the costing procedure**

The Physical Units Method: Example

Assume Johnson Seafood produces tuna filets and canned tuna for distribution to restaurants and supermarkets:



The Physical Units Method

Product	Phys. Units (lbs.)	Proportion	Allocation of Joint Cost	Cost per Pound
Tuna filets	2,000	20%	$ 3,200	$ 1.60
Canned tuna	8,000	80%	12,800	$ 1.60
Total	10,000	100%	$ 16,000	

The Physical Units Method: Summary

Advantages	Disadvantages
❶Easy to use	❶ Ignores the revenue-producing capability of individual products
❷ The criterion for the allocation of the joint costs is objective	❷ Each product can have its own unique physical measure

Relative Sales Values at Split-off Method

- The sales value at split-off method allocates joint costs to joint products on the basis of their *relative sales values at the split-off point*
- This method can only be used when joint products can be sold at the split-off point

Sales Value at Split-off Point Method: Example

Using the same example, the sales value at split-off point method produces the following results:

Product	Units (in lbs.)	Price per unit	Sales Value	Proportion	Alloc. Of Joint Cost	Cost per Pound
Tuna filets	2,000	$2.20	$4,400	25%	$ 4,000	$ 2.00
Canned tuna	8,000	$1.65	$13,200	75%	12,000	$ 1.50
Total	10,000		$17,600	100%	$ 16,000	

Point Method: Summary

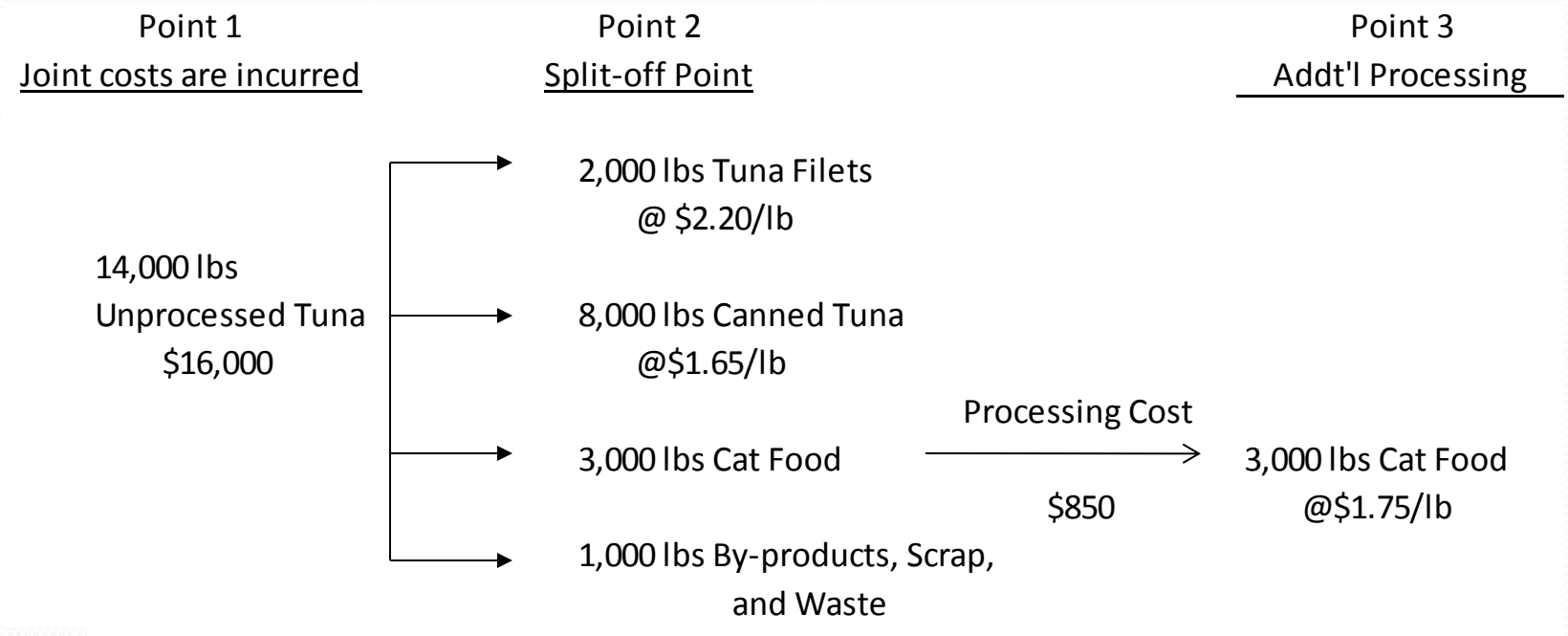
Advantages	Disadvantages
❶Easy to calculate	❶Market prices for some industries change constantly
❷ Costs are allocated according to the individual product's revenue	❷ Sales price at split-off might not be available because additional processing is necessary for sale

The Net Realizable Value (NRV) Method

- The NRV method can be used when joint products cannot be sold at split-off
- The net realizable value (NRV) of a product is the product's *estimated* sales value at the split-off point
- NRV is determined by subtracting additional processing and selling costs beyond the split-off point from the estimated ultimate sales value of the product

Value (NRV) Method: Example

Assume Johnson Seafood also produces cat food from the raw, unprocessed tuna



The NRV Method: Example (continued)

Product	Pounds	Price	Sales Value	Additional Processing
Tuna filets	2000	$2.20	$4,400	$0.00
Canned tuna	8000	$1.65	$13,200	$0.00
Cat food	3000	$1.75	$5,250	$850.00
Total	13,000		$22,850	$850.00

Product	NRV	Percent of NRV	Allocated Cost	Total Cost	Cost per Pound
Tuna filets	$4,400	20%	$3,200	$3,200	$1.60
Canned tuna	$13,200	60%	$9,600	$9,600	$1.20
Cat food	$4,400	20%	$3,200	$4,050	$1.35
Total	$22,000	100%	$16,000	$16,850	

By-Product Costing

Four Methods: Two based on assets, two based on revenues:

- **Asset Recognition Methods:**
  - Net Realizable Value (NRV) Method
  - Other Income at Production Point Method
- **Revenue Methods:**
  - Other Income at Selling Point Method
  - Manufacturing Cost Reduction at Selling Point Method
- The main difference between these methods is the former grouping records by-product *produced* as inventory at NRV, while the latter grouping recognizes by-product revenue in the period *sold*

Summary

- *Cost allocation* is strategically important in determining accurate departmental and product costs, for evaluating the cost efficiency of departments, and for assessing the profitability of different products
- *Ethical issues* arise when costs are allocated to products or services
  - What method is being used to allocate the costs?
  - Is the market competitive or on a cost-plus basis?
  - Is the allocation method equitable?

Summary

There are three methods of overhead allocation:

- The *volume-based approach* allocates overhead costs from a single cost pool, directly to products and services
- The *departmental approach* allocates overhead to production departments, and then from production departments to products
- The *activity-based approach* allocates overhead to production activities, and then from production activities to products

Summary

This session focused on the departmental approach, which has three phases:

- *Assign* total overhead costs to production and service departments by tracing direct overhead costs to production and service departments and by allocating common (joint) overhead costs to service and production departments
- *Allocate* service department costs to production departments (using either the direct, step, or reciprocal method)
- *Allocate* overhead costs from production department costs to products, customers, jobs, etc.

Summary

- **Methods Used for Departmental Cost Allocation**
  - Direct Method (ignores reciprocal service between service departments
  - Step Method (assigns reciprocal service costs in steps)
  - Reciprocal Method (accounts for all reciprocal service between service departments)

Summary

- Joint production processes - two different types of output:
  - Joint products
  - By-products
- Two types of costs associated with a joint production process:
  - Joint costs
  - Separable processing costs
- Three methods commonly used to allocate joint costs:
  - Relative physical units
  - Relative sales values at the split-off point
  - Relative NRVs (estimated sales values at the split-off)

Summary

There are four by-product costing alternatives:

–Asset Recognition Methods (i.e., by-product benefits recognized in period of *production*):

- Net Realizable Value (NRV) Method
- Disclosure of By-Product Benefits as "Other Income"

–Revenue Methods (i.e., by-product benefits recognized in period of *sale*):

- Disclosure of By-Product Benefits as "Other Income"
- Disclosure of By-Product Benefits as a Reduction in Manufacturing Costs Associated with Joint Products

Basic Costing Terminology…

- Several key points from prior sessions:
  - Cost objects are anything for which a measurement of cost is desired
  - Direct costs of a cost object are costs that can be traced to that cost object in an economically feasible way
  - Indirect costs of a cost object are costs that cannot be traced in an economically feasible way

And some new terms

- Cost pool—a grouping of individual indirect cost items
- Cost-allocation base—a systematic way to link an indirect cost or group of indirect costs to cost objects

Costing Systems

- In a JOB COSTING SYSTEM, the cost object is a unit or multiple units of a distinct product or service which we call a job. Each job generally uses different amounts of resources.
- In a PROCESS COSTING SYSTEM, the cost object is masses of identical or similar units of a product or service. In this type of system, we divide the total cost of producing an identical or similar product or service by the total number of units produced to obtain a per-unit cost.

Costing Systems Illustrated

	Service Sector	Merchandising Sector	Manufacturing Sector
Job Costing Used	• Audit engagements done by Price Waterhouse Coopers • Consulting engagements done by McKinsey & Co. • Advertising-agency campaigns run by Ogilvy and Mather • Individual legal cases argued by Hale & Dorr • Computer-repair jobs done by CompUSA • Movies produced by Universal Studios	• L. L. Bean sending individual items by mail order • Special promotion of new products by Wal-Mart	• Assembly of individual aircrafts at Boeing • Construction of ships at Litton Industries
Process Costing Used	• Bank-check clearing at Bank of America • Postal delivery (standard items) by U.S. Postal Service	• Grain dealing by Arthur Daniel Midlands • Lumber dealing by Weyerhauser	• Oil refining by Shell Oil • Beverage production by PepsiCo

Costing Approaches

- Actual costing—allocates:
  - Indirect costs based on the *actual* indirect-cost rates times the actual activity consumption.
- Normal Costing—allocates:
  - Indirect costs based on the *budgeted* indirect-cost rates times the actual activity consumption.
- Both methods allocate direct costs to a cost object the *same way*: by using actual direct-cost rates times actual consumption.

Costing Approaches Summarized

	Actual Costing	Normal Costing
Direct Costs	*Actual direct-cost rates* × actual quantities of direct-cost inputs	*Actual direct-cost rates* × actual quantities of direct-cost inputs
Indirect Costs	*Actual indirect-cost rates* × actual quantities of cost-allocation bases	*Budgeted indirect-cost rates* × actual quantities of cost-allocation bases

Seven-Step Job Costing

1. Identify the job that is the chosen cost object.
2. Identify the direct costs of the job.
3. Select the cost-allocation base(s) to use for allocating indirect costs to the job.
4. Identify the Indirect costs associated with each cost-allocation base. (Determine the appropriate cost pools that are necessary.)

seven-Step Job Costing, cont'd

5. Compute the Rate per Unit of each cost-allocate base used to allocate indirect costs to the job (normal costing so use budgeted values)

$$\text{Budgeted Manufacturing Overhead Rate} = \frac{\text{Budgeted Manufacturing Overhead Costs}}{\text{Budgeted Total Quantity of Cost-Allocation Base}}$$

6. Compute the indirect costs allocated to the job:

Budgeted Allocation Rate x

Actual Base Activity For the Job

Seven-Step Job Costing, concluded

7. Compute total job costs by adding all direct and indirect costs together.

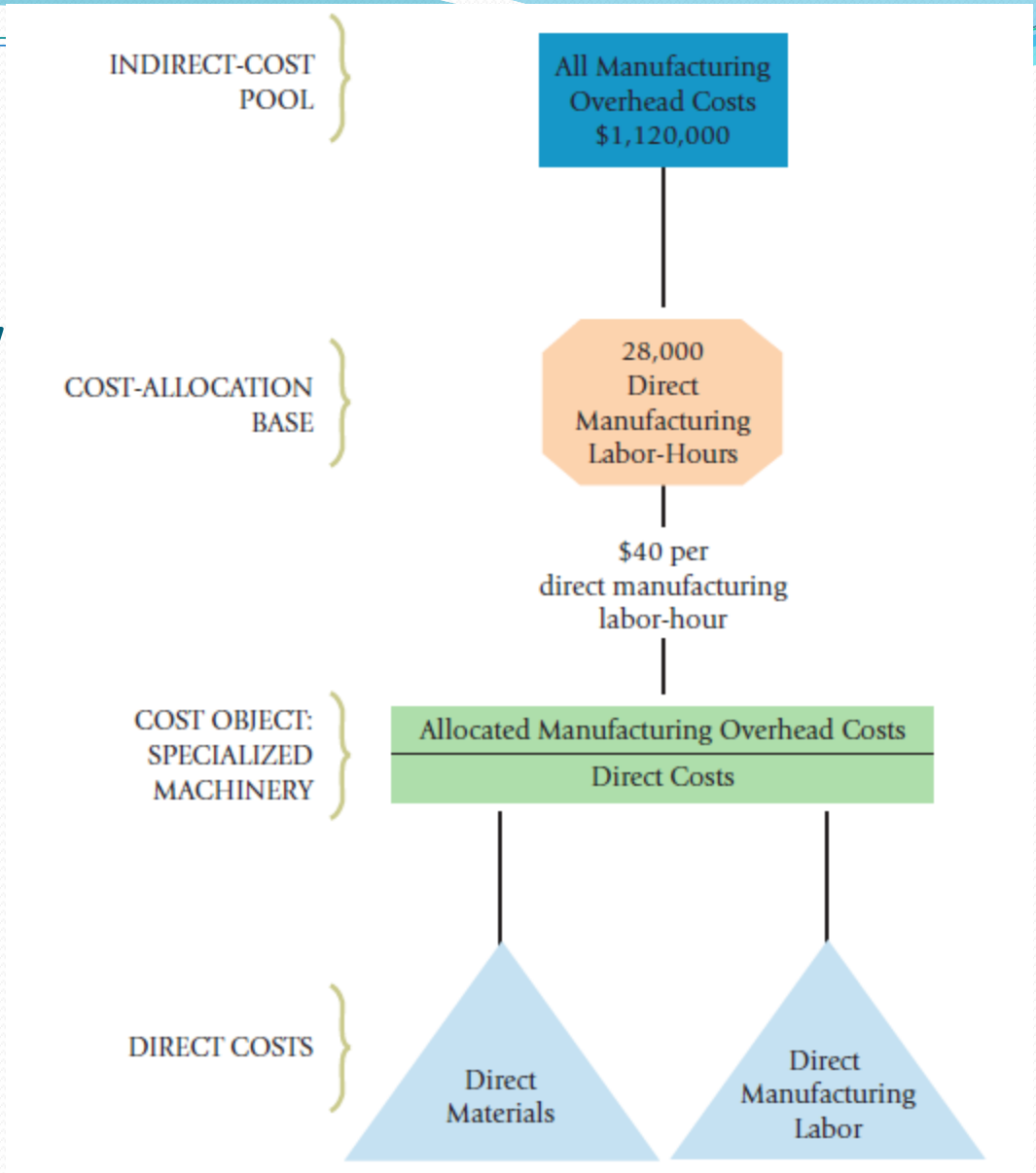
Direct Manufacturing Costs		
Direct Materials	xxxx	
Direct Labor	xxxx	xxxx
Manufacturing Overhead (Indirect Costs)		xxxx
Total Mfg Costs of Job XYZ		xxxx

Contrasting Actual Costing

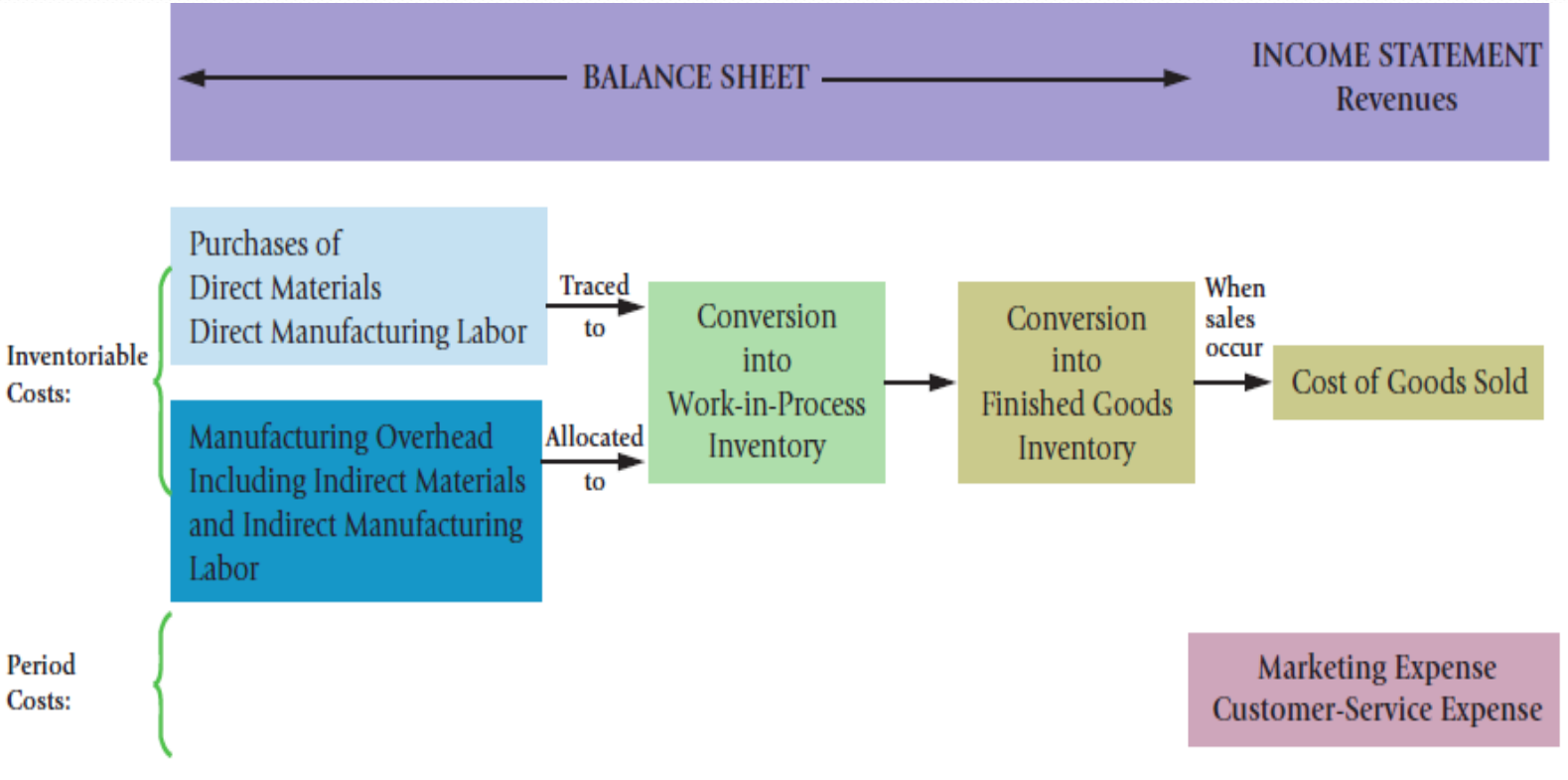
Both actual costing and normal costing trace direct costs to jobs in the same way because source documents identify the actual quantities and actual rates of direct materials and direct manufacturing labor for a job as the work is being done.

The only difference between costing a job with normal costing and actual costing is that normal costing uses BUDGETED indirect-cost rates where actual costing using ACTUAL indirect-cost rates calculated annually at the end of the year.

Job Costing Overview



FLOW OF COSTS IN JOB COSTING



Journal Entries

- Journal entries are made at each step of the production process.
- The purpose is to have the accounting system closely reflect the actual state of the business, its inventories, and its production processes.

Journal Entries, cont'd

- All product costs are accumulated in the work-in-process control account.
  - Direct materials used
  - Direct labor incurred
  - Factory overhead *allocated or applied*
- *Actual* indirect costs (overhead) are accumulated in the manufacturing overhead control account.

Journal Entries, cont'd

1. Purchase of materials (direct & indirect) on credit:

- Materials Control XX
  Accounts Payable Control XX

2. Usage of direct and indirect (OH) materials into production:

- Work-in-Process Control XX
  Manufacturing Overhead Control XX
  Materials Control XX

Journal Entries, cont'd

3.Manufacturing Payroll (direct & indirect)

- Work-in-Process Control (direct) XX
  Manufacturing Overhead Control
  (indirect) XX
  Cash Control XX

Journal Entries, cont'd

4. Other manufacturing overhead costs incurred during the period:

- Manufacturing Overhead Control XX
  Cash Control XX
  Accumulated Depreciation Control XX

Journal Entries, cont'd

5. Allocation (or application) of indirect costs (overhead) to the work-in-process account is based on a predetermined overhead rate.

- Work-in-Process Control XX
  Manufacturing Overhead Allocated XX

- Note: Actual overhead costs are *never* posted directly into work-in-process.

Journal Entries, cont'd

6. Products are completed and transferred out of production (Work-in-Process) to Finished Goods (in preparation for being sold).

- Finished Goods Control XX
  Work-in-Process Control XX

Journal Entries, cont'd

7. The associated costs are transferred to an expense (cost) account.

- Cost of Goods Sold XX
  Finished Goods Control XX

Note: The difference between the sales and cost of goods sold amounts represents the gross margin (profit) on this particular transaction.

Journal Entries, cont'd

8. When marketing or customer-service costs are incurred, the appropriate expense account is increased and Cash Control is decreased (or Accounts payable Control would be increased, if the items/services are purchased on account)

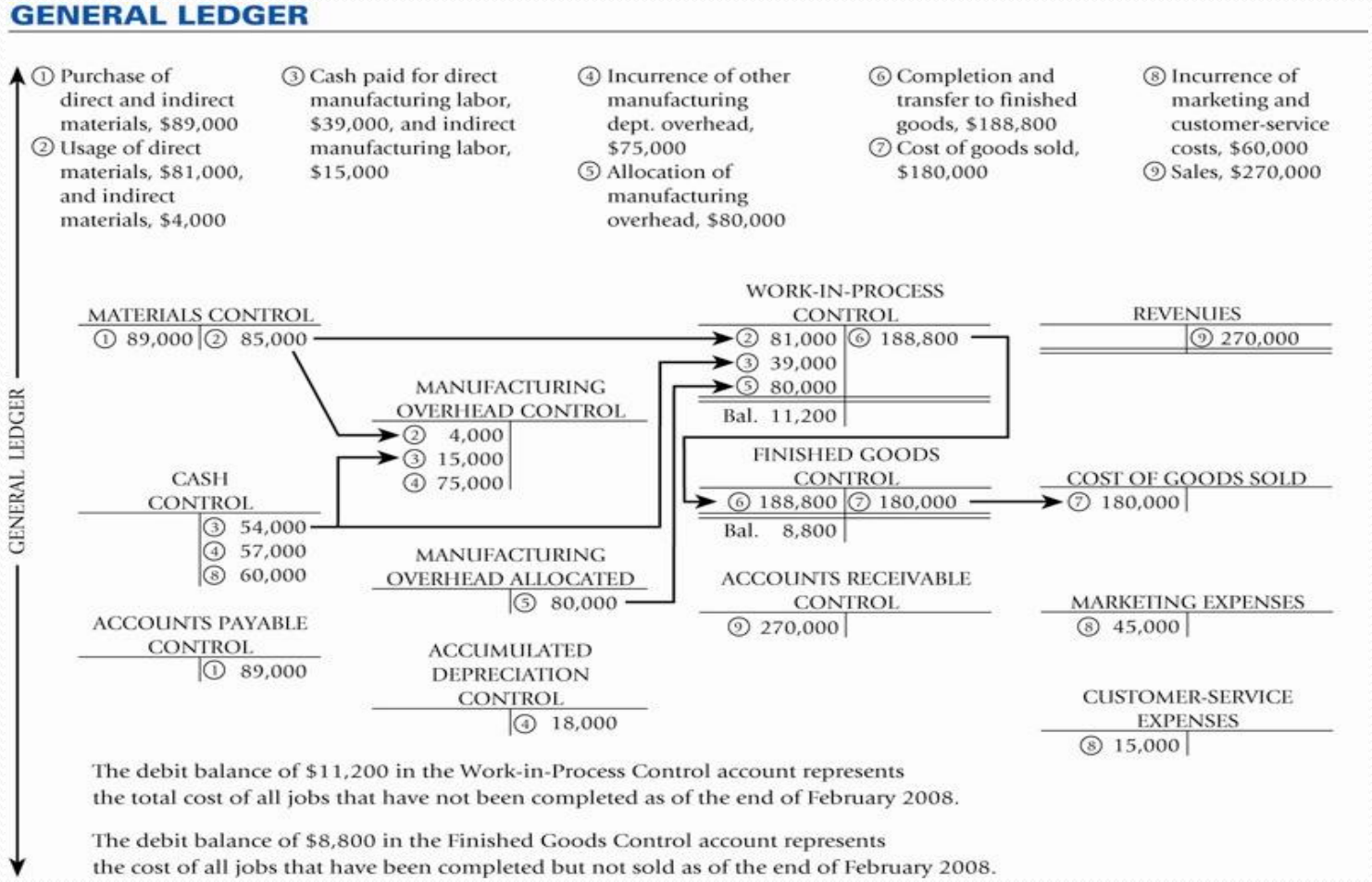
• Marketing Expense	XX		
• Customer-Service Expense	XX		Cash Control
	XX		

Journal Entries, concluded

9. Products are sold to customers on credit.

Accounts Receivable Control	XX	
Sales		XX

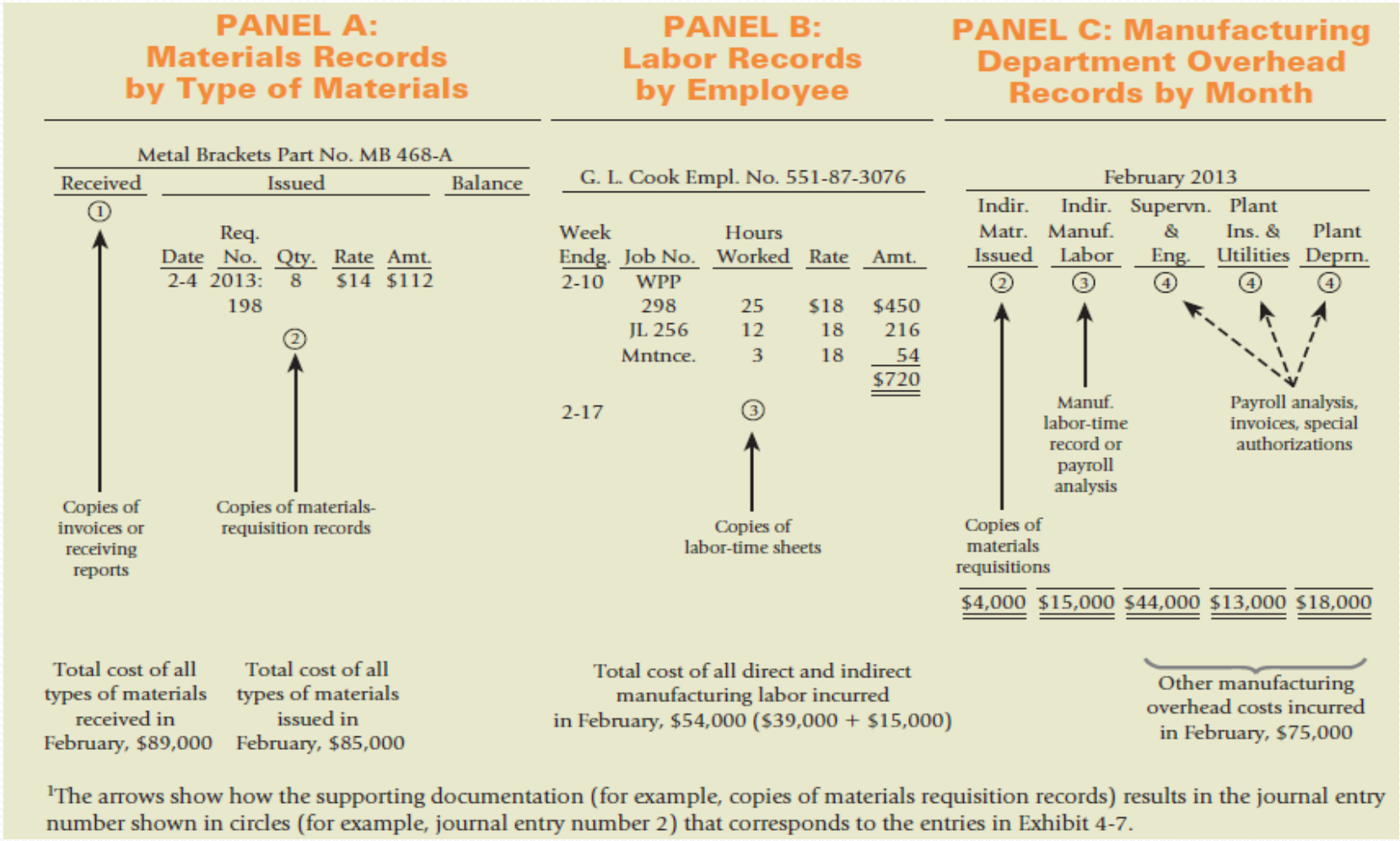
Illustrated General Ledger in a Job Cost Environment



The debit balance of $11,200 in the Work-in-Process Control account represents the total cost of all jobs that have not been completed as of the end of February 2008.

The debit balance of $8,800 in the Finished Goods Control account represents the cost of all jobs that have been completed but not sold as of the end of February 2008.

Illustrated Subsidiary Ledger in a Job Cost Environment



[1]The arrows show how the supporting documentation (for example, copies of materials requisition records) results in the journal entry number shown in circles (for example, journal entry number 2) that corresponds to the entries in Exhibit 4-7.

Accounting for Overhead

- Recall that two different overhead accounts were used in the preceding journal entries:
  - Manufacturing overhead control was debited for the actual overhead costs incurred.
  - Manufacturing overhead allocated was credited for estimated (budgeted) overhead applied to production through the work-in-process account.

Accounting for Overhead

- Actual costs will almost never equal budgeted costs. Accordingly, an imbalance situation exists between the two overhead accounts.
  - If Overhead Control > Overhead Allocated, this is called Underallocated Overhead
  - If Overhead Control < Overhead Allocated, this is called Overallocated Overhead

Accounting for Overhead

- This difference will be eliminated in the end-of-period adjusting entry process, using one of three possible methods.

Three Methods for Adjusting Over/Underapplied Overhead

- Adjusted allocation rate approach—all allocations are recalculated with the actual, exact allocation rate.
- Proration approach—the difference is allocated between cost of goods sold, work-in-process, and finished goods based on their relative sizes.
- Write-off approach—the difference is simply written off to cost of goods sold.

Choosing among approaches

- When management is deciding between approaches, they should consider the following:
  - the purpose of the adjustment
  - The size of the amount that was over- or underallocated
  - Whether the variance was over- or underallocated
- The choice of method should be based on such issues as materiality, consistency, and industry practice.

Job costing in the service sector

- Job costing is often associated with the manufacturing sector but it is also very useful in service organizations such as auto repair shops, advertising agencies, hospitals and accounting firms.
- In an accounting firm, for example, management may wish to determine the cost for each audit. In that case, each audit would be a job and costs would be traced or properly allocated to it.

Cost allocation: traditional costing and activity-based costing (ABC)

Background

- Plant overhead is applied to production in a rational systematic manner, using some type of averaging. There are a variety of methods to accomplish this goal.
- These methods often involve trade-offs between simplicity and realism.



Simple Methods	Complex Methods
Can be inaccurate	Usually more accurate

Plantwide & Department OVERHEAD CALCULATIONS

- Plantwide Overhead Rate:
- Total Estimated Overhead* /Total Estimated Base**

  *Obtain total of all overhead costs to be allocated.

  ** Determine best "base" – direct labor hours, machine hours, etc.

  This rate is used to allocate overhead costs to all products.

- Dept Overhead Rate: Similar concept except overhead cost pools and selected base are obtained by department.

Example of plantwide & department overhead calculations

For our example, let's say we have Department A and Department B with overhead costs of $300,000 and $450,000, respectively. We might also use different bases for each department. In our example, we will use DLH for Department A and Machine Hours for Dept B.

Example, cont'd

	Dept A	Dept B
O/H	$300,000	$450,000
DLH	8000	7000
MH	750	1200

- Overhead allocation in Department A would be $300,000 / 8000 (DLH) or $37.50 per DLH
- Overhead allocation in Department B would be $450,000 / 1200 (MH) or $375.00 per MH

Example, cont'd

- Contrast this with a single Plantwide Rate which would be calculated as follows:

Based on DLH: $750,000 / 15,000 or $50.00/DLH

Based on MH: $750,000 / 1,950 or $384.62/MH

- From this simple comparison we see that a product using more Dept A resources would be severely overcosted, especially if we were basing the single rate on Machine Hours and a product using more Dept B resources would be severely undercosted if we used DLH as the base for the single rate.

Broad Averaging

- Historically, firms produced a limited variety of goods and at the same time, their indirect costs were relatively small.
- Allocating overhead costs was simple: use broad averages to allocate costs uniformly regardless of how they are actually incurred.
  - Generally known as “Peanut-butter costing” (perhaps because it is spread evenly??)
- The end-result:
  - Products using fewer resources are overcosted and products using more resources are undercosted.

Over and Undercosting-defined

- Overcosting—a product consumes a low level of resources but is allocated high costs per unit.
- Undercosting—a product consumes a high level of resources but is allocated low costs per unit.

Cross-subsidization

- If one product is undercosted then at least one other product must be overcosted.
- The overcosted product absorbs too much cost, making it seem less profitable than it really is.
- The undercosted product is left with too little cost, making it seem more profitable than it really is.

Cross-subsidization, cont'd

CONSIDER THIS:

- If you were using cost to determine price, what affect would this have?
- If you were looking at product profitability to determine marketing focus, what result?

Let's take a closer look using our previous example.

Cross-subsidization, example

You recall that in our previous plantwide vs. departmental example, Dept A had a rate of $37.50/DLH; Dept B had a rate of $375/MH and the plantwide rate would be $50.00/DLH or $384.62/MH.

Job 457 incurs 1,000 DLH in each department, 40 MH in Dept A and 75 MH in Dept B.

Let's compare the costs of the job based on different allocation methods.

Cross-subsidization, example, cont'd- Allocating to Job 457

Explanation	Dept A/DLH	Dept B/MH	Total	Single Rate
1000*37.50	$37,500			
75*375		$28,125		
Total by Dept			**$65,625**	
PW/DLH				
2000*$50				**$100,000**
PW/MH				
125*$384.62				**$48,077.50**

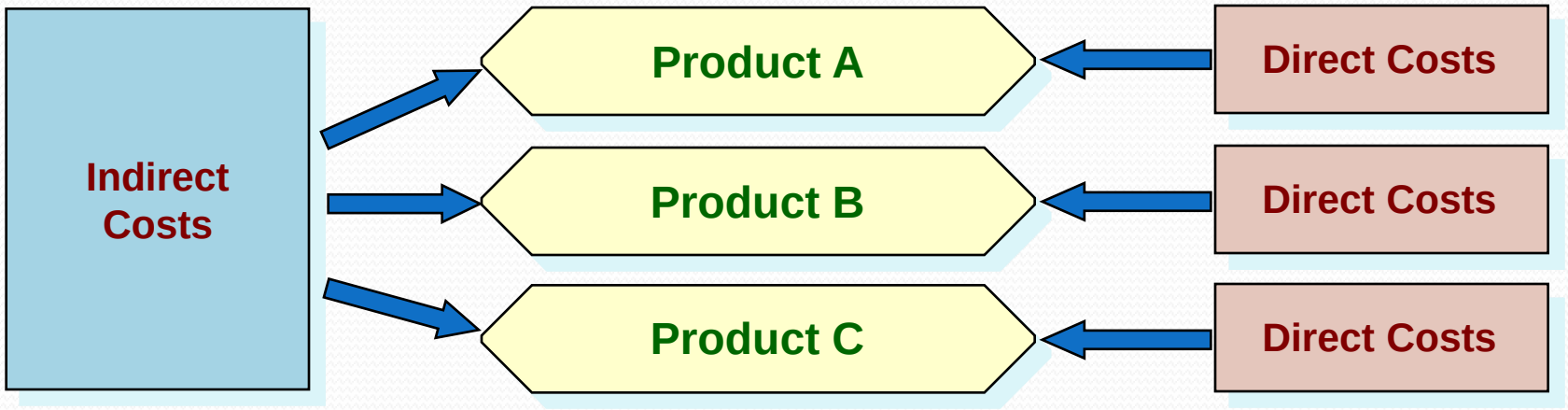
Activity-Based Costing (ABC)

- ABC is a method of cost system refinement.

- Indirect costs are divided into “sub-pools” of costs of activities.
- Activity costs are then allocated to the final cost objects using a cost allocation base (more commonly called cost drivers in ABC).
- Activities are measurable, making it more likely that cost drivers can be found so that a final cost object will absorb indirect costs in proportion to its use of the activity.

Traditional Costing vs. ABC

Traditional costing systems:

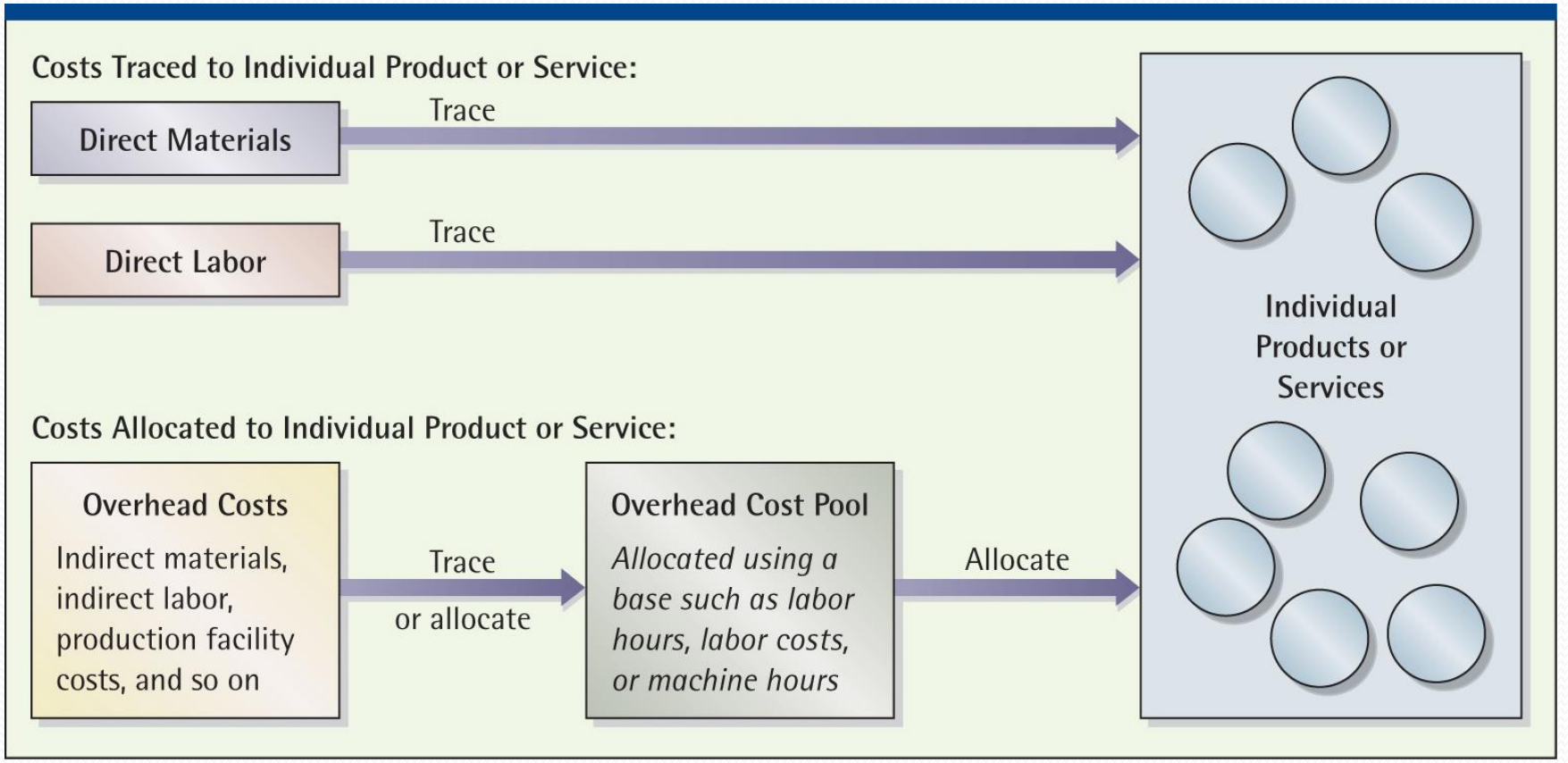


Indirect costs are grouped into one (or a small number) of cost pools; a cost allocation base assigns costs to the individual products

The individual products are the final cost objects.

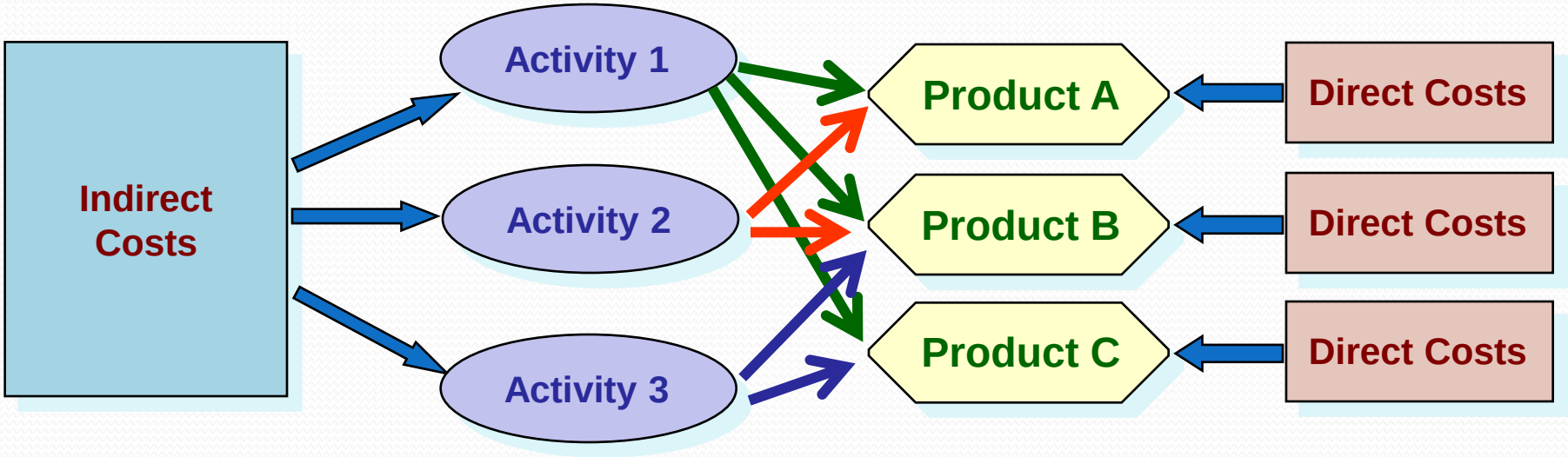
Direct costs are traced to the individual products.

Traditional Costing Systems



Traditional Costing vs. ABC

Activity-based costing systems:

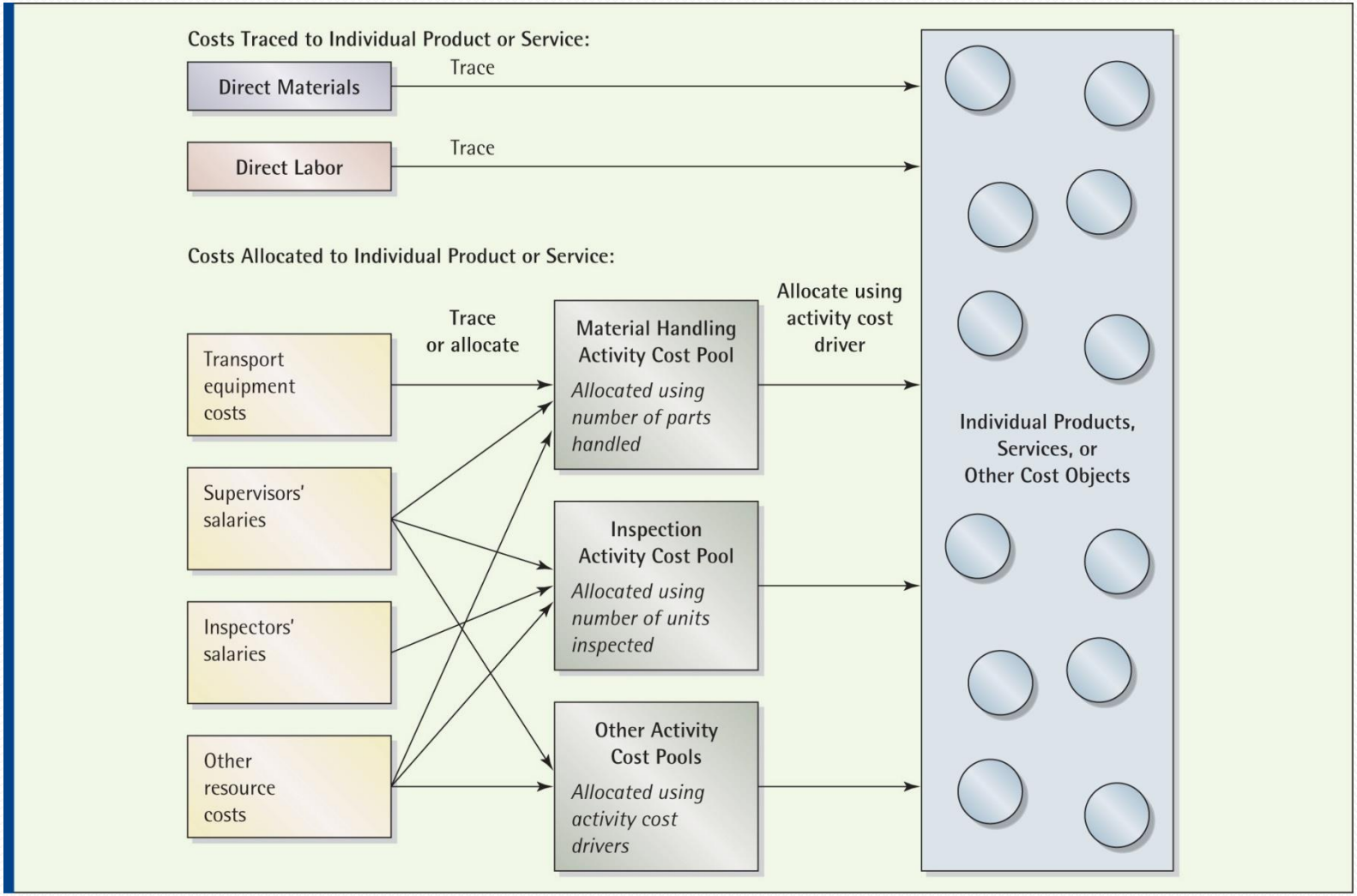


Indirect costs are assigned (traced & allocated) to various pools of activity costs.

Activity costs are allocated to products

The individual products are the final cost objects & direct costs are traced to the individual products.

ABC Costing Systems



What are Activities and How are They Identified?

The ABC cost hierarchy includes the following activities:

- organization-sustaining – associated with overall organization
- facility-sustaining – associated with single manufacturing plant or service facility
- customer-sustaining – associated with a single customer
- product-sustaining – associated with product lien or single product
- batch-level – associated with each batch of product
- unit-level – associated with each unit produced

ABC Cost Hierarchy Example

Some of the costs incurred by the Dewey Chargem law firm are listed below. This firm specializes in immigration issues and family law. For each cost, identify whether the cost most likely relates to a(n) (1) organiz-ation-sustaining, (2) facility-sustaining, (3) customer-sustaining, (4) product-sustaining, (5) batch-level, or (6) unit-level activity and explain your choice.

Cost	Cost Hierarchy Level
Bookkeeping software	
Salary for partner in charge of family law	
Office supplies	
Subscription to family law update journal	
Telephone charges for local calls	
Long distance telephone charges	
Window washing service	
Salary of receptionist	

What Process is Used to Assign Costs in an ABC system?

1. Identify the relevant cost object.
2. Identify activities and group *homogeneous activities*.
3. Assign costs to the activity cost pools.
4. Choose a cost driver for each activity cost pool.
5. Calculate an allocation rate for each activity cost pool.
6. Allocate activity costs to the final cost object.

How Are Cost Drivers Selected for Activities?

- For each activity, determine its place in the ABC cost hierarchy.

- Look for drivers that have a good cause-and-effect relationship with the activities' costs.

- Use a reasonable driver when there is no cause-and-effect relationship.

ABC in Manufacturing Example

Alphabet Co. makes products A & B. Product A is a low-volume specialty item and B is a high-volume item. Estimated factory- wide overhead is $800,000, and the number of DL hours for the year is estimated to be 50,000 hours. DL costs are $10/hour. Each product uses 2 DL hours. Compute the traditional cost of each product if Products A & B use $25 and $10 in direct materials, respectively.

First, compute the estimated overhead rate:

Estimated overhead rate = $800,000/50,000 hours = $16/hour.

	Product A	Product B
Direct materials	$25	$10
Direct labor (2hrs @ $10)	20	20
Overhead (2 hrs @ $16)	32	32
	$77	$62

ABC in Manufacturing Example

Alphabet Co. is implementing an ABC system. It estimated the costs and activity levels for the upcoming year shown below.

	Estimated	Estimated Activity Levels			
	Costs	Prod. A	Prod. B	Total	Cost Driver
Machine set-ups	$200,000	3,000	2,000	5,000	# set-ups
Inspections	140,000	500	300	800	# inspections
Materials handling	80,000	400	400	800	# mat'l requistions
Machining dep't	320,000	12,000	28,000	40,000	# machine hours
Quality control dep't	60,000	600	150	750	# tests
	$800,000				

First, compute the estimated overhead rate for each activity:



ABC in Manufacturing Example

	Estimated Costs	Estimated Activity		Overhead Rate
Machine set-ups	$200,000	5,000	set-ups	$40 /setup
Inspections	140,000	800	inspections	$175 /inspection
Materials handling	80,000	800	mat'l requistions	$100 /requisition
Machining dep't	320,000	40,000	machine hours	$8 /mach hr
Quality control dep't	60,000	750	tests	$80 /test
	$800,000			

ABC in Manufacturing Example

Alphabet recently completed a batch of 100 As and a batch of 100 Bs. Direct material and labor costs were as budgeted. Information about each batch's use of the cost drivers is given below. Compute the overhead allocated to each unit of A and B.

	100 As	100 Bs
Machine set-ups	60	10
Inspections	10	2
Materials handling	4	2
Machining dep't	240	120
Quality control dep't	3	1

Overhead allocated:	100 As	100 Bs
Machine set-ups	$2,400	$400
Inspections	1,750	350
Materials handling	400	200
Machining dep't	1,920	960
Quality control dep't	240	80
Overhead for batch	$6,710	$1,990
Overhead per unit	$67.10	$19.90

ABC in Manufacturing Example

Compute the total cost of each product and compare it to the costs computed under traditional costing.

	Prod A	Prod B
Direct material	$25.00	$10.00
Direct labor	20.00	20.00
Overhead	67.10	19.90
Total	$112.10	$49.90

Traditional costing assigned $77 to a unit of Product A and $62 to a unit of Product B.

- The only difference between the two costing systems is that Product A is assigned more overhead costs under ABC.
- The additional overhead assigned to Product A reflects Product A's consumption of resources.

Activity-Based Management (ABM)

- ABM is the process of using ABC information to evaluate opportunities for improvements in an organization.

- Examples include managing & monitoring
  - customer profitability
  - product and process design
  - environmental costs
  - quality
  - constrained resources

ABM & Customer Profitability

- Activities can be defined so that different costs of servicing customers are accumulated.

- Examples include
  - analyzing the types of bank transactions used by various categories of customers
  - comparing the costs of servicing insurance contracts sold to married versus single individuals
  - comparing the costs of different distribution channels

ABM & Product/Process Improvements

- Activities can be defined so that the costs of stages of production or of a business process are accumulated.

- Examples include
  - determining the costs of non-value-added activities so the most costly can be reduced or eliminated
  - changing the steps in the accounts payable function to reduce the number of personnel
  - determining the most costly stages of product development so that the time to market is reduced

ABM & Environmental Costs

- Activities can be defined so that types of environmental costs are accumulated.

- Examples include
  - capturing the costs of contingent liabilities for waste disposal site remediation
  - comparing the cost of recycling packaging to the cost of disposal
  - computing the costs of treating different kinds of emissions

ABM & Quality Costs

- Activities can be defined so that categories of costs of managing quality are accumulated.

- Common categories of quality costs are
  - costs of prevention activities
  - costs of appraisal activities
  - costs of production activities
  - costs of postsales activities

What are GPK and RCA?

- Costing approaches similar to ABC because they involve multiple pools and multiple drivers
- GPK can be described as marginal planning and cost accounting (Grenzplankostenrechnung GPK)
  - Each cost is traced to a cost center (smaller than a department) which performs a single repetitive activity, and is the responsibility of one manager)
  - Output measures tracks the volume of resource use
  - Costs are segregated into proportional (change with volume in resource use) and fixed
  - *Practical* capacity is used for estimated allocation rate volumes

Capacity Definitions

- Theoretical capacity – maximum assuming continuous, uninterrupted operations 365 days/year
- Practical capacity – typical operating conditions
- Budgeted capacity – expected volume for the upcoming time period
- Idle/excess capacity – difference between activity capacity used and one of the above measures of capacity

What are GPK and RCA?

- Resource Consumption Accounting (RCA)
- Builds on GPK and ABC principles
- Each cost is assigned to a resource cost pool
  - Labor and machinery are often placed in different cost pools since they are different types of resources
  - RCA involves a significantly larger number of cost pools than traditional accounting
  - Like GPK, segregates proportional and fixed costs
  - Utilizes *theoretical* rather than practical capacity for allocating fixed costs
    - More likely to focus manager attention on reducing idle and non-productive resource time

Benefits/Drawbacks to GPK/RCA

- Benefits
  - Generates multi-level internal income statements useful for short terms decisions because it focuses on marginal cost
  - Increases cause & effect awareness among managers
  - Categorizes costs (and generates profit margin) at the product, product group, division, and company level
  - Avoids arbitrary allocations of fixed costs
- Drawbacks
  - Can be costly to implement
  - Can result in a large number of variances to analyze

Comparison of ABC, GPK, and

	ABC	GPK	RCA
Character of cost accounting system	Full costing	Marginal costing	Full and marginal costing
Location of data	Database separate from general ledger	Comprehensive accounting system	Comprehensive accounting system
Primary decision relevance	Mid- to long-term	Short-term	Short-, Mid-, and Long term
Allocation of overhead based on	Activities	Cost Centers	Resources and/or activities
Cost Drivers	Activity –Based	Resource Output related	Resource output or activity related
Fixed cost allocation rate denominator	Actual, budgeted, or practical capacity	Budgeted or practical capacity	Theoretical capacity

Decision Making with ABC, GPK, and RCA

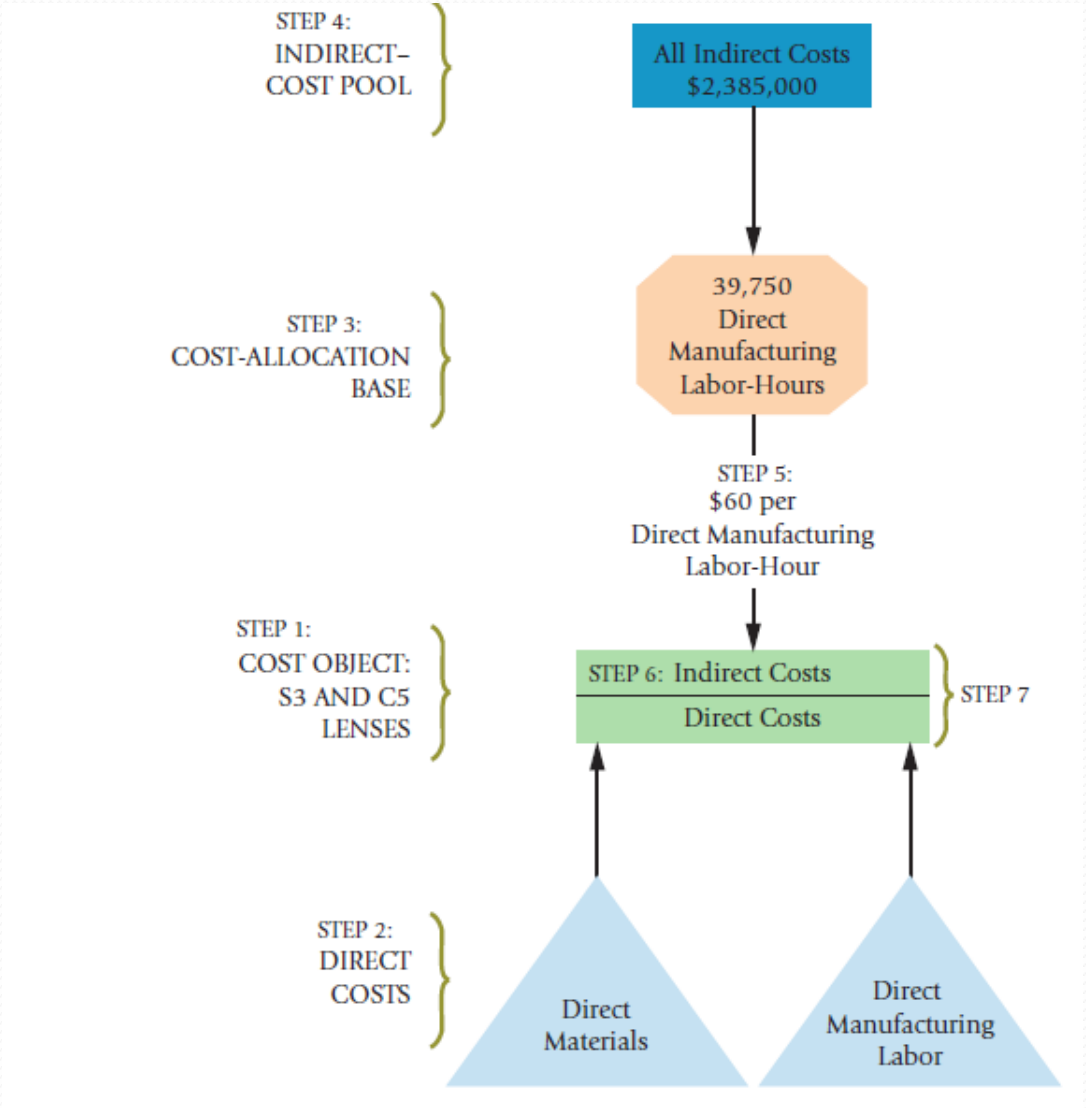
- Benefits
  - more accurate and relevant product cost information
  - employees focus attention on activities
  - measurement of the costs of activities and business processes
  - identify non-value-added activities and reduce costs

- Costs
  - systems can be difficult to design and maintain
  - more information must be captured
  - decision makers may not use the information appropriately

Uncertainties in ABC and ABM Implementation

- Judgment is required when determining activities.
- Judgment is required when selecting cost drivers.
- Denominator levels for cost drivers are estimates.
- ABC information includes unitized fixed costs, so decision makers must use ABC information correctly.

An Example: Plastim



Plastim and Simple Costing

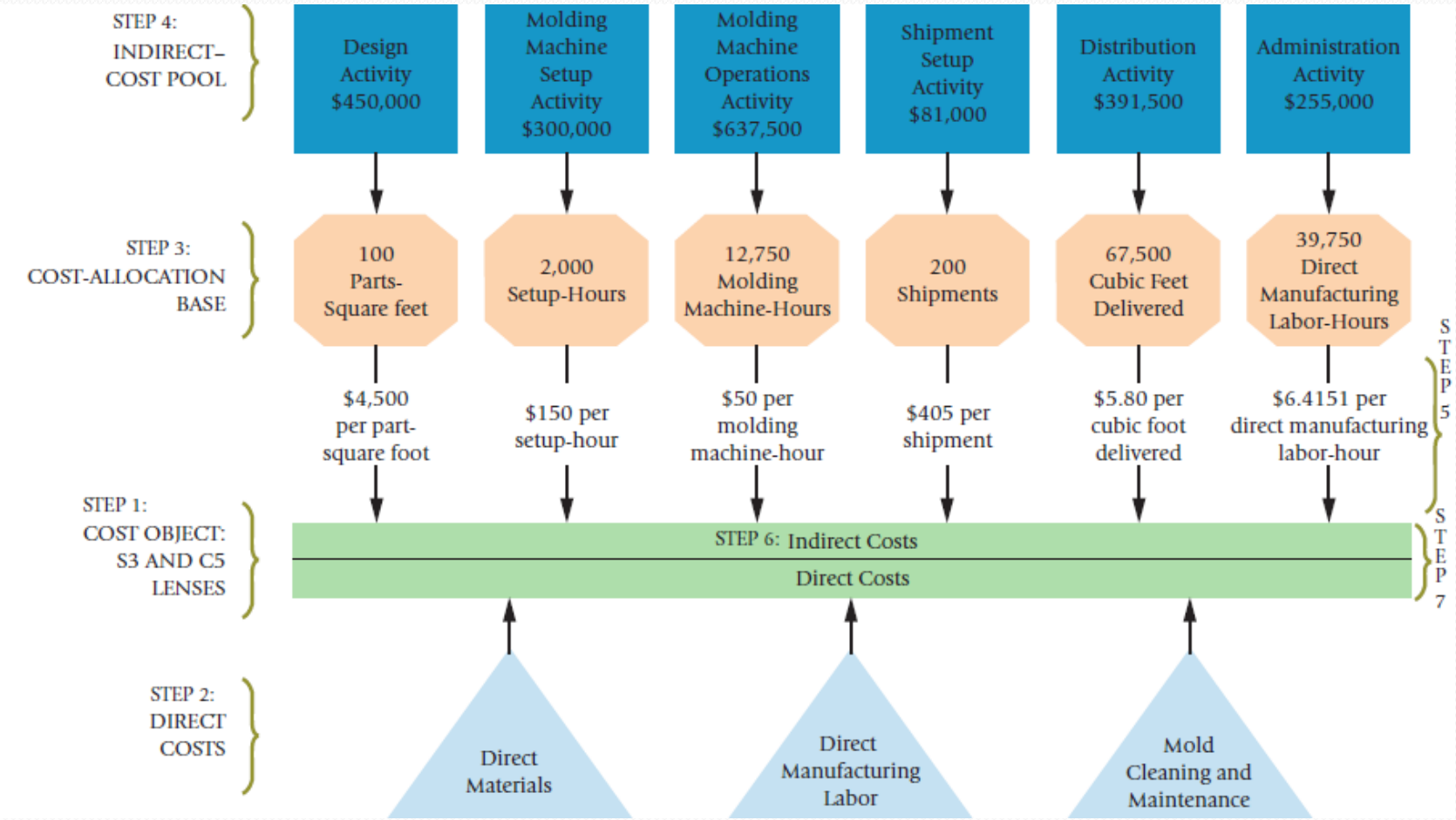
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	A	B	C	D	E	F	G
1		60,000			15,000		
2		Simple Lenses (S3)			Complex Lenses (CL5)		
3		Total	per Unit		Total	per Unit	Total
4		(1)	(2) = (1) ÷ 60,000		(3)	(4) = (3) ÷ 15,000	(5) = (1) + (3)
5	Direct materials	$1,125,000	$18.75		$ 675,000	$45.00	$1,800,000
6	Direct manufacturing labor	600,000	10.00		195,000	13.00	795,000
7	Total direct costs (Step 2)	1,725,000	28.75		870,000	58.00	2,595,000
8	Indirect costs allocated (Step 6)	1,800,000	30.00		585,000	39.00	2,385,000
9	Total costs (Step 7)	$3,525,000	$58.75		$1,455,000	$97.00	$4,980,000
10							

Using the 5-Step Decision Making Process

1. Identify the Problems & Uncertainties. (Possible loss of Giovanni business)
2. Obtain Information.(Analyze and evaluate the design, manufacture, and distribution operations for the S3 lens.)
3. Make Predictions about the future. (obtain a better cost estimate for the S3)
4. Make Decisions by Choosing among alternatives. (should they bid and if yes, at what price)
5. Implement the Decision, Evaluate Performance and Learn.

Plastim and ABC Illustrated



Plastim and ABC Rate Calculation

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	A	B	C	D	E	F	G	H
1			(Step 4)	(Step 3)		(Step 5)		
2	Activity	Cost Hierarchy Category	Total Budgeted Indirect Costs	Budgeted Quantity of Cost-Allocation Base		Budgeted Indirect Cost Rate		Cause-and-Effect Relationship Between Allocation Base and Activity Cost
3	(1)	(2)	(3)	(4)		(5) = (3) ÷ (4)		(6)
4	Design	Product-sustaining	$450,000	100	parts-square feet	$ 4,500	per part-square foot	Design Department indirect costs increase with more complex molds (more parts, larger surface area).
5	Setup molding machines	Batch-level	$300,000	2,000	setup-hours	$ 150	per setup-hour	Indirect setup costs increase with setup-hours.
6	Machine operations	Output unit-level	$637,500	12,750	molding machine-hours	$ 50	per molding machine-hour	Indirect costs of operating molding machines increases with molding machine-hours.
7	Shipment setup	Batch-level	$ 81,000	200	shipments	$ 405	per shipment	Shipping costs incurred to prepare batches for shipment increase with the number of shipments.
8	Distribution	Output-unit-level	$391,500	67,500	cubic feet delivered	$ 5.80	per cubic foot delivered	Distribution costs increase with the cubic feet of packages delivered.
9	Administration	Facility sustaining	$255,000	39,750	direct manuf. labor-hours	$6.4151	per direct manuf. labor-hour	The demand for Administrative resources increases with direct manufacturing labor-hours.

Plastim and ABC Product Costs

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	A	B	C	D	E	F	G
1		60,000			15,000		
2		Simple Lenses (S3)			Complex Lenses (CL5)		
3		Total	per Unit		Total	per Unit	Total
4	**Cost Description**	(1)	(2) = (1) ÷ 60,000		(3)	(4) = (3) ÷ 15,000	(5) = (1) + (3)
5	Direct costs						
6	Direct materials	$1,125,000	$18.75		$ 675,000	$ 45.00	$1,800,000
7	Direct manufacturing labor	600,000	10.00		195,000	13.00	795,000
8	Direct mold cleaning and maintenance costs	120,000	2.00		150,000	10.00	270,000
9	Total direct costs (Step 2)	1,845,000	30.75		1,020,000	68.00	2,865,000
10	Indirect Costs of Activities						
11	Design						
12	S3, 30 parts-sq.ft. x $4,500	135,000	2.25				} 450,000
13	CL5, 70 parts-sq.ft. x $4,500				315,000	21.00	
14	Setup of molding machines						
15	S3, 500 setup-hours x $150	75,000	1.25				} 300,000
16	CL5, 1,500 setup-hours x $150				225,000	15.00	
17	Machine operations						
18	S3, 9,000 molding machine-hours x $50	450,000	7.50				} 637,500
19	CL5, 3,750 molding machine-hours x $50				187,500	12.50	
20	Shipment setup						
21	S3, 100 shipments x $405	40,500	0.67				} 81,000
22	CL5, 100 shipments x $405				40,500	2.70	
23	Distribution						
24	S3, 45,000 cubic feet delivered x $5.80	261,000	4.35				} 391,500
25	CL5, 22,500 cubic feet delivered x $5.80				130,500	8.70	
26	Administration						
27	S3, 30,000 dir. manuf. labor-hours x $6.4151	192,453	3.21				} 255,000
28	CL5, 9,750 dir. manuf. labor-hours x $6.4151				62,547	4.17	
29	Total indirect costs allocated (Step 6)	1,153,953	19.23		961,047	64.07	2,115,000
30	Total Costs (Step 7)	$2,998,953	$49.98		$1,981,047	$132.07	$4,980,000
31							

Plastim: Simple and ABC Compared

	Simple Costing System Using a Single Indirect-Cost Pool (1)	ABC System (2)	Difference (3) = (2) − (1)
Direct-cost categories	2 Direct materials Direct manufacturing labor	3 Direct materials Direct manufacturing labor Direct mold cleaning and maintenance labor	1
Total direct costs	$2,595,000	$2,865,000	$270,000
Indirect-cost pools	1 Single indirect-cost pool allocated using direct manufacturing labor-hours	6 Design (parts-square feet)[1] Molding machine setup (setup-hours) Machine operations (molding machine-hours) Shipment setup (number of shipments) Distribution (cubic feet delivered) Administration (direct manufacturing labor-hours)	5
Total indirect costs	$2,385,000	$2,115,000	($270,000)
Total costs assigned to simple (S3) lens	$3,525,000	$2,998,953	($526,047)
Cost per unit of simple (S3) lens	$58.75	$49.98	($8.77)
Total costs assigned to complex (CL5) lens	$1,455,000	$1,981,047	$526,047
Cost per unit of complex (CL5) lens	$97.00	$132.07	$35.07

[1]Cost drivers for the various indirect-cost pools are shown in parentheses.

Conclusions

- Each method is mathematically correct.
- Each method is acceptable.
- Each method yields a different cost figure, which will lead to different gross margin calculations which may lead to differences in other decisions such as pricing.
- Only overhead is involved. Total costs for the entire firm remain the same—they are just allocated differently to the cost objects within the firm.
- Selection of the appropriate method and drivers should be based on experience, industry practices, as well as a cost-benefit analysis of each option under consideration.

ABC vs. Simple Costing Schemes

- ABC is generally perceived to produce superior costing figures due to the use of multiple drivers across multiple levels.
- ABC is only as good as the drivers selected, and their actual relationship to costs. Poorly chosen drivers will produce inaccurate costs, even with ABC.
- Using ABC does not guarantee more accurate costs!

Signals that Suggest that ABC Implementation Could Help a Firm:

- Significant amounts of indirect costs are allocated using only one or two cost pools.
- All or most indirect costs are identified as output unit-level costs.
- Products make diverse demands on resources because of volume, process steps, batch size or complexity.
- Products that a company is well-suited to make show small profits whereas products that a company is less suited to make show large profits.

Behavioral Issues in Implementing ABC

- Gain the support of top management and create a sense of urgency.
- Create a guiding coalition of managers throughout the value chain for the ABC effort.
- Educate and train employees in ABC as a basis for employee empowermen.t
- Seek small short-run success as proof that the ABC implementation is yielding results.
- Recognize that ABC is not perfect. (better costs but complex system)

ABC and Service/Merchandising Firms

- ABC implementation is widespread in a variety of applications outside manufacturing, including:
  - Health Care
  - Banking
  - Telecommunications
  - Retailing
  - Transportation

Food for Thought!

You are the owner/manager of a dance studio and are considering offering a beginner's jazz dance class for a reduced rate. You believe that once your students start "jazz-dancing", they'll be hooked and will continue with the classes at your regular prices. You aren't sure how to price the discounted beginner's class and have gathered the following information:

Direct cost per class:	$95.00
Indirect studio costs/annual:	$140,000
Anticipated # of classes (all):	20/week; 50 weeks
Anticipated # of jazz intro classes:	5/week; 50 weeks
Anticipated # of students for jazz class:	20

Food for Thought, cont'd

- You were able to determine that the indirect costs ($140,000) consisted of the following:
  - Studio Rental $70,000
  - Your salary $40,000
  - Utilities $ 5,000
  - Office Staff $12,000
  - Instructor Benefits $ 6,000
  - Cleaning services $ 6,000
  - Refreshments $ 1,000

From traditional budgeting to Activity-based budgeting (ABB)

From traditional budgeting to activity based budgeting (ABB)

- Activity-based budgeting (ABB). Budgeting approach that focuses on the budgeted cost of the activities necessary to produce and sell products and services.

- For some industries ABC will give accurate information and results which are clearer than traditional budgeting.

Activity-based management

Activity-Based Management

- A method of management that uses ABC as an integral part in critical decision-making situations, including:
  - Pricing and product-mix decisions
  - Cost reduction and process improvement decisions
  - Design decisions
  - Planning and managing activities

Activity-Based Management (ABM)

ABM manages activities to improve the value of products or services to customers and increase the firm's competitiveness and profitability:

- Focuses on the efficiency and effectiveness of key business processes and activities
- Improves management's focus on the firm's critical success factors thereby enhancing the firm's competitive advantage
- ABC is its major source of information

Activity-Based Management (ABM)

ABM applications can be classified into two categories:

- ***Operational ABM*** enhances operational efficiency and asset utilization and lowers costs; it focuses on doing things right and performing activities more efficiently
- ***Strategic ABM*** attempts to alter the demand for activities and increases profitability through improved activity efficiency

ABC/M Tools

Some key ABC/M tools:

- In *activity analysis* an organization assesses each of its activities based on its need by the product or the customer, its efficiency, and its value content

- *Value-added analyses* are performed in an effort to eliminate activities that add little or no value to the customer; resource consumption can be reduced and the firm can focus on activities that increase customer satisfaction

ABC/M Tools (continued)

High-value-added activities:

- Increase significantly the value of the product or service
- Are necessary to meet customer requirements
- Enhance purchased materials or components
- Contribute to customer satisfaction
- Are critical steps in a business process

In short, removal would reduce the value of the product or service

ABC/M Tools (continued)

Low-value-added activities:

- Consume time, resources, or space but add little or nothing to satisfying customer needs
- Can be eliminated without affecting the form/fit/function of the product or service

Customer Profitability Analysis

ABC/M can be used to estimate customer-related costs and in therefore in assessing the profitability of a specific customer or group of customers

- *Customer profitability analysis* identifies customer service activities and cost drivers and determines profitability for each customer or group; this process allows the firm to chose its customer mix, determine an appropriate offering of after-sale services, decide what discounts to offer, etc.

- *Customer cost analysis* is the first step in a customer profitability analysis; it identifies activities and cost drivers to service customers before and after sales

Customer Profitability Analysis (continued)

Customer-related costs can be classified into the following categories:

- Customer unit-level costs - resources consumed for each unit sold to a customer, such as sales commissions and shipping costs based on units sold or shipped
- Customer batch-level costs - resources consumed for each sales transaction, such as order-processing costs or invoicing costs
- Customer-sustaining costs -resources consumed to service a customer regardless of the number of units or batches sold, such as monthly statement processing costs and collection costs for late payments

Customer Profitability Analysis (continued)

Customer costs can be classified into the following categories (continued):

- Distribution-channel costs are resources consumed in each distribution channel the firm uses to service customers, such as the cost of operating a regional warehouse or centralized distribution center

- Sales-sustaining costs are resources consumed to sustain sales and service activities that cannot be traced to an individual unit, batch, customer, or distribution channel, such as general corporate marketing expenditures

Customer Profitability Analysis (continued)

- **Customer Profitability Analysis** combines customer revenues and customer costs to assess customer profitability and helps identify actions to improve customer profitability
- Some companies quantify customer value in what is called **Customer Lifetime Value** (CLV), which is equal to the net present value (NPV) of all estimated future profits from the customer for a specified period of time

Customer Profitability Analysis (continued)

Customer profitability analysis helps to assess a customer's value to the company:

- What is the growth potential of the customer and the customer's industry?
- What is its "cross-selling" potential?
- What are the possible reactions of the customer to changes in sales terms or services?
- How important is this customer as a future sales reference?

ABC/M Implementation Issues

- A successful ABC/M implementation requires close cooperation among management accountants, engineers, and manufacturing and operating managers

- There are three important issues to consider in ABC/M implementation:
  - Multiple-Stage ABC
  - Time-Driven ABC (TDABC)
  - Resource Consumption Accounting

ABC/M Implementation Issues (continued)

- **Multiple-stage ABC** takes into account that some activities are cost objects for other activities

- **Time-driven ABC (TDABC)** simplifies some of the complexity involved in large ABC systems

ABC/M Implementation Issues (continued)

- Time-driven ABC (TDABC)
- Is based on the idea that the common element in the utilization of many activities is the unit of time
- Assigns resource costs directly to cost objects using the cost per time unit of supplying the resource
- Requires the total activity cost be divided by the number of minutes available to that activity to provide a cost per unit of time

Resource Consumption Accounting

- Emphasis is on being able to attribute costs, both fixed and proportional, to cost objects for decision support
- Three foundational concepts for RCA:
  - The view of resources – resources are the suppliers of capacity, meaning that capacity is a function of the resources available.
  - The quantity-based model – an operational view of the organization based on the concept that there is a causal relationship that can be expressed in terms of input and output units.
  - Cost behavior – the characteristics of the cost are inherent to the underlying resource and the consumption of those resources by value creating operations.

TDABC Example

- Assume 2 clerical workers paid $45,000 annually perform a certain activity that is expected to require 17 minutes. TDABC calculates the total cost as $45,000 × 2 = $90,000; TDABC then calculates the total time available for the activity as 180,000 minutes (assuming 30 hours per week with two weeks vacation: 2 workers × 50 weeks × 30 hours × 60 minutes per hour = 180,000 minutes per year).

- The TDAC rate for the activity is $0.50 per minute ($90,000 ÷ 180,000). The cost of a unit of activity is $0.50 × 17 min = $8.50.

Strategic Role of ABC

Activity-based costing (ABC) vs. volume-based costing:

- Volume-based costing results may be distorted because indirect costs do not always occur in proportion to output volume
- Volume-based costing generally causes cross-subsidization of outputs (i.e., some products will be overcosted and others undercosted)
- Activity-based costing uses detailed information about the activities that make up indirect costs so that outputs are charged only for resources consumed by the activities needed to perform them

Volume-Based Costing

- **May be a good strategic choice for some firms**
  - When the costs to be allocated are relatively small versus the directly traceable costs
  - When the activities supporting production are relatively homogeneous across different product/service lines
- **Volume-based costing is often used by paper product manufacturers, producers of agricultural products, other commodity firms, and professional service firms**

ABC Terms

- ***Activity*** **- a specific task or action of work done, such as production set-up**
- ***Resource*** **- an economic element needed or consumed in performing activities, such as salaries and supplies**
- **Cost driver - either a *resource consumption cost driver* or an *activity consumption cost driver***

ABC Terms

- **Resource consumption cost drivers** measure the amount of resources consumed by an activity, such as the number of items in a purchase or sales order
- **Activity consumption cost drivers** measure the amount of activity performed for an object, such as the number of batches used to manufacture a product

Cost Assignment

- ***The two-stage cost assignment* approach for indirect (support) costs: resource costs such as factory overhead are assigned to activity cost pools and then to cost objects (jobs, clients, products, patients, etc.)**
  - Volume-based systems assign factory overhead to a single plant or departmental cost pool first and then to products or services using a volume-based rate
  - ABC systems assign factory overhead costs to activities or activity cost pools using resource consumption cost drivers and then assign these costs to cost objects using activity consumption cost drivers

Summary: ABC vs. volume-based costing

ABC systems differ from volume-based costing systems in two ways:

- ABC system defines cost pools as activities rather than production plant or department cost centers
- Cost drivers
  - ABC systems use drivers based on an activity or activities performed for the cost object
  - Volume-based approaches use a volume-based cost driver that often bears little or no relationship to the consumption of resources by the cost objects

Activity Analysis

Through activity analysis, a firm identifies the work it performs to carry out its operations by

- Gathering data from existing documents and records
- Collecting additional data using questionnaires, observations, or interviews of key personnel
- Sample questions include:
  - What work or activities do you do?
  - How much time do you spend performing these activities?
  - What resources are required to perform these activities?
  - What value does the activity have for the product, service, customer, or organization?

Activity Analysis

To identify resource costs for various activities, a firm classifies all activities according to the way in which the activities consume resources

- A *unit-level* activity is performed on each individual unit of product or service of the firm (e.g., direct materials)
- A *batch-level* activity is performed for each batch or group of units of products or services (e.g., setting up machines or placing purchase orders)
- A *product-level* activity supports the production of a specific product or service (e.g., engineering changes to modify parts for a product)
- A f*acility-level* activity supports overall operations (e.g., property taxes and insurance)

Unit Level Costs

Performed for each unit of product or service

Examples include:

- Units of production related depreciation of factory machinery
- Energy costs for machinery used for individual units of production (e.g., A drill press that drills holes in pieces of metal)

Batch Level Costs

Performed for each batch of product or service produced

Examples include:

- Machine setup costs
- Quality control costs
- Wages for works that move products within the factory
- Energy costs for machinery that is used for multiple units of product at the same time (e.g., an oven that bakes a batch of cookies for a commercial baker)

Product Level Costs

Support production of a specific product or service line

Examples include:

- Salaries for product line purchasing managers
- Quality control costs
- Product development costs
- Depreciation and maintenance for specialized machinery dedicated to the production od a single product or service line

Facility Level Costs

Support overall operations

Examples include:

- Factory depreciation
- Security costs for the factory
- Insurance and property taxes for a factory
- Salary of a plant manager

Developing an ABC System

There are three steps in the development of an ABC system:

1. Identify resource costs and activities
   - An activity analysis is performed to identify key activities and the way in which the activities consume resources
2. Assign resource costs to activities
   - Use resource consumption cost drivers based on cause-and-effect relationships, such as the number of labor hours, setups, moves, machine-hours, employees, or square feet to assign resource costs
3. Assign activity costs to cost objects
   - Use activity consumption cost drivers, such as purchase orders, receiving reports, parts stored, direct labor-hours, or manufacturing cycle time to assign activity costs

Benefits of ABC Systems

1. Better profitability measures due to more accurate costs
2. Better decision making: identification of value-added vs. non-value-added activities and associated costs
3. Information for process improvement
4. Improved cost planning
5. Helps identify and control the cost of unused capacity

Volume-Based vs. ABC Example

Haymarket BioTech, Inc. (HBT) produces and sells two secure communication systems, AW (Anywhere) and SZ (SecureZone). HBT has the following operating data for the two products:

	AW	SZ
Production volume	5,000	20,000
Selling price	$400.00	$200.00
Unit direct materials and labor	$200.00	$80.00
Direct labor-hours	25,000	75,000
Direct labor-hours per unit	5	3.75

Volume-Based vs. ABC

The **traditional volume-based costing system** assigns factory overhead (OH) based on direct labor-hours (DLH). The firm has a total budgeted overhead of $2,000,000. Since the firm budgeted 100,000 DLHs for the year, the overhead rate per DLH is $20 ($2,000,000÷100,000 DLH).

Therefore……

Volume-Based vs. ABC

The factory overhead assigned to AW is $500,000 (25,000 DLH × $20) in total and $100 ($500,000÷5,000 units) per unit, since the firm used 25,000 direct labor hours to manufacture 5,000 units of AW

and

The factory overhead assigned to SZ is $1,500,000 (75,000 DLH × $20) in total and $75 ($1,500,000÷20,000 units) per unit, since the firm used 75,000 direct labor hours to manufacture 20,000 units of SZ

Volume-Based vs. ABC

Product profitability analysis per unit using volume-based costing:

	AW		SZ	
Unit selling price		$400.00		$200.00
Unit-level manufacturing costs				
Direct materials and labor	$200.00		$80.00	
Factory overhead	100.00		75.00	
Cost per unit		300.00		155.00
Profit margin		100.00		45.00

Volume-Based vs. ABC

In an attempt to use an ABC system, HBT has identified the following activities, budgeted costs, and activity consumption cost drivers:

Activity	Budgeted Cost	Activity Consumption Cost Driver
Engineering	$ 125,000	Engineering hours
Setups	300,000	Number of setups
Machine operations	1,500,000	Machine hours
Packing	75,000	Number of packing orders
Total	$ 2,000,000	

Volume-Based vs. ABC

HBT also has gathered the following operating data pertaining to each of its products:

	AW	SZ	Total
Engineering hours	5,000	7,500	12,500
Number of setups	200	100	300
Machine hours	50,000	100,000	150,000
Number of packing orders	5,000	10,000	15,000

Volume-Based vs. ABC

Using the operating data, the activity rate for each activity consumption cost driver is calculated as follows:

(1)	(2)	(3)	(4) = (2) ÷ (3)
Consumption Cost Driver	Budgeted Cost	Budgeted Activity Consumption	Activity Consumption Rate
Engineering hours	$ 125,000	12,500	$ 10 per hour
Number of setups	300,000	300	1,000 per setup
Machine hours	1,500,000	150,000	10 per hour
Number of packing orders	75,000	15,000	5 per order

Volume-Based vs. ABC

Factory overhead costs for AW at 5,000 units of production:

(1)	(2)	(3)	(4) = (2) × (3)	(5)
Consumption Cost Driver	Activity Consumption Rate	Activity Consumption	Total Overhead	Overhead per Unit
Engineering hours	$ 10	5,000	$ 50,000	$ 10
Number of setups	1,000	200	200,000	40
Machine hours	10	50,000	500,000	100
Number of packing orders	5	5,000	25,000	5
Total			$ 775,000	$ 155

Volume-Based vs. ABC

Factory overhead costs for SZ at 20,000 units of production:

(1)	(2)	(3)	(4)=(2)×(3)	(5)
Consumption Cost Driver	Activity Consumption Rate	Activity Consumption	Total Overhead	Overhead per Unit
Engineering hours	$ 10	7,500	$ 75,000	$ 3.75
Number of setups	1,000	100	100,000	5.00
Machine hours	10	100,000	1,000,000	50.00
Number of packing orders	5	10,000	50,000	2.50
Total			$ 1,225,000	$ 61.25

Volume-Based vs. ABC Example

Product profitability analysis per unit using ABC:

	AW	SZ
Unit selling price	$ 400	$200.00
Unit-level manufacturing costs		
Direct materials and labor	$ 200	$ 80.00
Engineering	$ 10	3.75
Setups	40	5.00
Machine running	100	50.00
Packing	5	2.50
Factory overhead	155.00	61.25
Cost per unit	355.00	141.25
Profit margin	$ 45	$ 58.75

Volume-Based vs. ABC

The following chart compares the results of the two costing systems:

	AW	SZ
Unit overhead cost		
Volume-based	$ 100	$ 75.00
Ativity-based	155	61.25
Difference	$ 55	$ 13.75
Profit margin		
Volume-based	$ 100	$ 45.00
Ativity-based	45	58.75
Difference	$ 55	$ 13.75

Can you guess which is the high-volume and which is the low-volume product?

Keep in mind that volume-based costing tends to undercost low-volume products and overcost high-volume products, a situation often referred to as product cost cross-subsidization

Cost of Capacity for the HBT Example

- Suppose that instead of a budgeted activity consumption of 12,500 hours, HBT were to use the practical capacity of the engineering staff, which is 15,625 hours.
- Using practical capacity, the activity consumption rate would be $8 per engineering hour (=$125,000÷15,625). If only 12,500 hours were used, as shown in the HBT example, then the overhead cost charged to AW and SZ would be reduced because of the lower rate ($8 instead of the original rate of $10).
- AW overhead would be reduced by $10,000 (5,000 hours × $2) and SZ overhead would be reduced by $15,000 (7,500 hours × $2).
- The total reduction for the two products, $25,000 (=$10,000 + $15,000) is the **cost of unused capacity.**

Five Steps of Strategic Decision Making in the HBT Example

1. **Determine the Strategic Issues Surrounding the Problem:** ***HBT competes on differentiation***
2. **Identify the Alternative Actions:** ***focus on AW or SZ?***
3. **Obtain Information and Conduct Analyses of the Alternatives:** ***cost analysis based on ABC costing***
4. **Based on Strategy and Analysis, Choose and Implement the Desired Alternative:** ***do not promote AW over SZ, but instead focus on SZ to improve overall profitability***
5. **Provide an On-going Evaluation of the Effectiveness of implementation in Step 4.**

Summary

- Activity-based costing (ABC) is a costing approach that assigns resource costs to cost objects such as products, services, or customers based on activities performed for the cost objects

- Volume-based costing is often inadequate because indirect costs do not always occur in proportion to output volume; the use of volume-based costing can cause costing inaccuracies and product cost cross-subsidization

Summary

- Among other benefits, ABC yields information that can be used by management to guide strategic decision-making; the use of ABC data for decision-making purposes is referred to as ABM

- ABM manages activities to improve the value of products or services to customers and increase the firm's competitiveness and profitability

Summary

- ABC/M can be applied to customer-related costs and therefore for conducting customer profitability analysis; as such, ABC data become a powerful tool for increasing customer profitability
- A successful ABC/M implementation requires close cooperation among management accountants, engineers, and manufacturing and operating managers
- Implementation of ABC sometimes includes recent advances such as Multiple-Stage ABC, Time-Driven ABC, and Resource Consumption Accounting

Decentralized organizations

Management Control Systems

- A management control system is a means of gathering and using information to aid and coordinate the planning and control decisions throughout an organization and to guide the behavior of its managers and other employees.
- Some companies design their management control system around the concept of the balanced scorecard.
- Well-designed management control systems use information from both within the company and from outside the company.

Management Control Systems, cont'd

- Consist of formal and informal control systems:
  - The formal management control system of a company includes explicit rules, procedures, performance measures, and incentive plans that guide the behavior of its managers and other employees. The formal control system is composed of several systems such as:
    - The management accounting system for information about the firm's costs, revenues and income.
    - The human resources system for information about the recruiting and training of employees, absenteeism and accidents.
    - The quality system for information about yields, defective products and late deliveries to customers.

Management Control Systems, concluded

- Consist of formal and informal control systems:
  - The informal management control system includes the shared values, loyalties, and mutual commitments among members of the organization, the company's culture, and the unwritten norms about acceptable behavior for managers and other employees.

Effective Management Control

- To be effective, management control systems should be closely aligned to the firm's strategies and goals.
- Management control systems should also be designed to support the organizational responsibilities of individual managers.
- Management control systems must be aligned with an organization's structure. An organization with a decentralized structure will have different issues to consider when designing its management control system than a firm with a centralized structure.

Effective Management Control, cont'd

- Effective management control systems should motivate managers and other employees.
- Motivation is the desire to attain a selected goal (goal-congruence aspect) combined with the resulting pursuit of that goal (effort aspect).

Two Aspects of Motivation

- Goal congruence exists when individuals and groups work toward achieving the organization's goals—managers working in their own best interest take actions that align with the overall goals of top management.
- Effort is the extent to which managers strive or endeavor in order to achieve a goal. Effort goes beyond physical exertion to include mental actions as well.

Decentralization

- Decentralization is an organizational structure that gives managers at lower levels the freedom to make decisions.
- Autonomy is the degree of freedom to make decisions. The greater the freedom, the greater the autonomy.
- Subunit refers to any part of an organization. It may be a large division or a small group.

Benefits of Decentralization

- Creates greater responsiveness to the needs of a subunit's customers, suppliers, and employees.
- Leads to gains from faster decision making by subunit managers.
- Assists management development and learning.
- Sharpens the focus of subunit managers and broadens the reach of top management.

Costs of Decentralization

- Leads to suboptimal decision making, which arises when a decision's benefit to one subunit is more than offset by the costs or loss of benefits to the organization as a whole.
  - Also called incongruent decision making or dysfunctional decision making.

- Leads to unhealthy competition.
- Results in duplication of output.
- Results in duplication of activities.

Comparing benefits and costs

- Top managers must compare the benefits and costs of decentralization when choosing an organizational structure.
- Decisions related to the type and source of long-term financing are made least frequently at the decentralized level.
- Centralizing its income tax strategies allows an organization to optimize across subunits by offsetting the income in one subunit with losses in others.

Decentralization and Multinational Firms

- Multinational firms, companies that operate in multiple countries, are often decentralized because centralized control of a company with subunits around the world is often physically and practically impossible.
- Decentralization enables managers in different countries to make decisions that exploit their knowledge of local business and political conditions and to deal with uncertainties in their individual environments.
- Biggest drawback to international decentralization: loss or lack of control and the resulting risks.
- Multinational corporations that implement decentralized decision making usually design their management control systems to measure and monitor the performance of divisions.

Choices about Responsibility Centers

A responsibility center is a segment or subunit of the organization whose manager is accountable for a specified set of activities.

- To measure the performance of subunits in centralized or decentralized companies, the management control system uses one or a mix of the four types of responsibility centers:
  - Cost center
  - Revenue center
  - Profit center
  - Investment center

Cost/Profit/Investment centers

Agency Theory

- In agency theory, a principal contracts with an agent to act on his or her behalf.
- The principal can observe the outcome of the agent's actions, but cannot observe the agent's behavior or effort level.
- The costs or lost benefits the principal suffers when the agent does not act in the best interests of the principal are called agency costs.

Agency Costs

- Agency Costs include:
  - Losses from poor decisions
  - Losses from incongruent goals
  - Monitoring costs
  - Goal alignment costs
  - Contracting costs
- The principal must design plan to minimize agency costs.
  - Utilize well designed compensation schemes
  - Assign responsibility for decision making
  - Establish appropriate transfer prices

- In a centralized organization, decision making authority and responsibility resides with top management.
- In a decentralized organization, decision making authority and responsibility is given to lower levels of management.
- Usually, top management has general knowledge about the operations of business segments and the business segment managers have specific knowledge.

Centralized Organizations

- The advantages of a centralized organizational structure include:
  - reduced monitoring costs, and
  - increased assurance that lower managers act in the best interests of the organization.
- The disadvantages of a centralized organizational structure include:
  - increased time to make decisions while top management gathers information about business segments, and
  - increased potential for lower quality decisions

Decentralized Organizations

- The advantages of a decentralized organizational structure include:
  - more timely decisions,
  - increased potential for higher quality decisions, and
  - top management is free to concentrate on organization's strategic goals.
- The disadvantages of a decentralized organizational structure include:
  - the possibility that the business segments are duplicating each others' efforts, and
  - segment managers may make decisions incongruent with the goals of the organization.

- Responsibility accounting assigns costs and revenues to business segments based on the areas over which the segment managers have decision making authority and responsibility.

- The revenues and costs assigned to a responsibility center are based on the elements over which the center's manager has control.

- Managers of cost centers have responsibility only for managing the center's costs.
- Many support departments are cost centers, for example:
  - Human resource department
  - Accounting department
- These managers may only have responsibility for some of the center's costs and not for others.

- Managers of revenue centers have responsibility for generating revenues.
- These managers usually have the authority to determine the prices of goods sold.
- Revenue center managers are held responsible for the volume of sales.
- A marketing department or a geographical sales region are examples of revenue centers.

- Managers of profit centers have responsibility for generating revenues and controlling costs.

- These managers usually have the authority to determine prices, the sales mix of goods sold, and the inputs used.

- A manufacturing division is an example of a profit center, and it will have both revenue and cost centers within the division.

Investment Centers

- Managers of investment centers have responsibility for generating revenues and controlling costs.
- These managers usually have the same authority as do profit center managers, in addition to the authority to make asset acquisition and disposition decisions.
- A manufacturing division with a manager allowed to purchase large machinery and perhaps build more factory space is an example of an investment center.

Performance Evaluation of Investment Centers

- Return on investment (ROI) shows the percentage return the center made on the investment level chosen.
- Residual income (RI) shows the dollar amount the center earned above the minimum required for the center's investment level.
- Economic value added (EVA®) is a specific type of residual income calculation.
- ROI can be used to compare the performance of different-sized business segments, but RI and EVA® can not.

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Return on Investment (ROI)

- ROI is simply calculated as “earnings” over “investment”.
- “Earnings” and “investment” must be defined; often, earnings is defined as operating income and investment is defined as average operating assets, so that

$$\text{ROI} = \frac{\text{Operating income}}{\text{Average operating assets}}$$

- Operating assets include cash, A/R, inventory, and the property and equipment used in producing the revenue.

DuPont Analysis

- DuPont analysis is a particularly useful decomposition of ROI.

ROI = Investment turnover x Return on sales

where: $$\text{Investment turnover} = \frac{\text{Revenue}}{\text{Average operating assets}}$$

and $$\text{Return on sales} = \frac{\text{Operating income}}{\text{Revenue}}$$

- DuPont analysis can be used to determine ways that ROI can be improved.

ROI Example

Altus Industries has two divisions, North and South. Given the information below, compute the ROI for each division.

	North	South
Operating income	$180,000	$40,000
After-tax operating income	120,000	24,000
Average operating assets	2,000,000	200,000
Average current liabilities	400,000	36,000
Net sales	2,600,000	100,000

North ROI = $180,000/$2,000,000 = 9%

South ROI = $40,000/$200,000 = 20%

ROI and DuPont Analysis Example

Altus Industries has two divisions, North and South. Use DuPont analysis to decompose the ROI for each divisions and discuss.

	North	South
Operating income	$180,000	$40,000
After-tax operating income	120,000	24,000
Average operating assets	2,000,000	200,000
Average current liabilities	400,000	36,000
Net sales	2,600,000	100,000

	North	South
Return on sales (ROS)	6.92%	40.00%
Investment turnover (ITO)	1.30	0.50
ROI (ROS x ITO)	9.0%	20.0%

North does a better job of using its asset base to generate sales than does South. However, South does a better job of turning sales dollars into operating income than does North.

ROI and New Projects Example

Suppose that Altus has a minimum required rate of return for all investments of 10%. Each division is considering a new project. The expected return and initial investment of each project is shown below. If ROI is used to evaluate division performance, will each division accept or reject the new project? Are these decisions in line with the best interests of Altus?

	North	South
Project income	$7,500	$2,250
Project investment	$80,000	$15,000
Project ROI	9.38%	15.00%

North will decide to accept the project because it will increase division ROI. However, this is not in line with the organization's best interests because investments with an ROI less than 10% should not be accepted.

South will decide to reject the project because it will decrease division ROI. However, this is not in line with the organization's best interests because investments with an ROI exceeding 10% should be accepted.

Residual Income (RI)

- RI is operating income less the minimum required operating income given the segment's investment in assets.

$$\text{RI} = \text{Operating income} - \left(\text{Required rate of return} \times \text{Average operating assets}\right)$$

- RI removes the incentive for business segment managers to make project investment decisions based on a comparison of segment ROI and project ROI.

RI Example

Altus Industries has two divisions, North and South. Given the information below, compute the RI for each division. Suppose that Altus has a minimum required rate of return of 10%. How is this related to ROI?

	North	South
Operating income	$180,000	$40,000
After-tax operating income	120,000	24,000
Average operating assets	2,000,000	200,000
Average current liabilities	400,000	36,000
Net sales	2,600,000	100,000

North RI = $180,000 – 10% x $2,000,000 = ($20,000)

South RI = $40,000 – 10% x $200,000 = $20,000

North had an ROI less than the 10% minimum required, which translates to a negative residual income. South's ROI exceeded the 10% minimum, so it had a positive RI.

RI and New Projects Example

If RI is used to evaluate division performance, will each division accept or reject the new project? Are these decisions in line with the best interests of Altus? The minimum required rate of return for all investments of 10%.

	North	South
Project income	$7,500	$2,250
Project investment	$80,000	$15,000
Project ROI	9.38%	15.00%

North would reject the project because $7,500 – 10% x $80,000 < 0. If North accepted the project, its new RI would be:

[$180,000 + $7,500] – 10% x [$2,000,000 + $80,000] = ($20,500).

South would accept the project because $2,250 – 10% x $15,000 > 0. If South accepted the project, its new RI would be:

[$40,000 + $2,250] – 10% x [$200,000 + $15,000] = $20,750.

Each division's decision is in line with Altus' best interest.

Economic Value Added (EVA®)

- EVA® is a residual income calculation with specific definitions of income, investment and rate of return.
- Income is defined as “adjusted” after-tax operating income.
- The required rate of return is defined as the weighted average cost of capital (WACC).
- Operating assets is defined as “adjusted” total assets less current liabilities.
- EVA®’s “adjustments” are specific to the organization’s structure and goals.

Weighted Average Cost of Capital (WACC)

- WACC is a weighted average of the after-tax cost of debt and the cost of equity.

- WACC is the after-tax cost of all long-term financing for the business segment.

- Business segments in riskier industries will have a higher WACC.

EVA® Example

Altus Industries has two divisions, North and South. Given the information below, compute the EVA® for each division. Assume that the North Division has a WACC of 5% and that South Division has a WACC of 18%.

	North	South
Operating income	$180,000	$40,000
After-tax operating income	120,000	24,000
Average operating assets	2,000,000	200,000
Average current liabilities	400,000	36,000
Net sales	2,600,000	100,000

North EVA® = $120,000 – 5% x [$2,000,000 - $400,000] = $40,000

South EVA® = $24,000 – 18% x [$200,000 - $36,000] = ($5,520)

Using Compensation to Motivate Performance

- Base salaries plus bonuses based on operating income focuses manager attention on short-term goals.
- Base salaries plus stock options may focus manager attention on longer-term goals.
- Stock options are used frequently in the U.S. but are discouraged from use in some other countries.

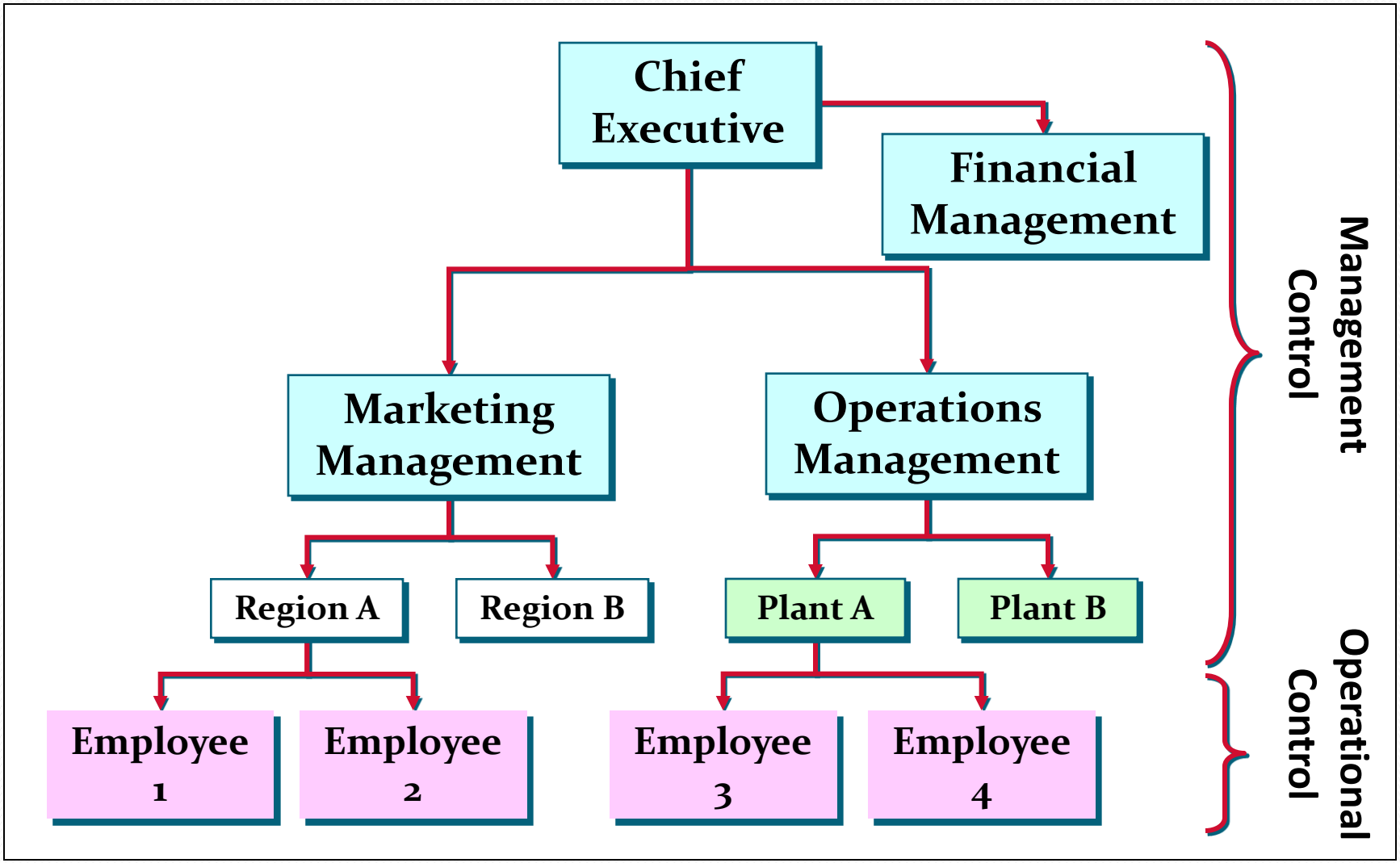
Performance Measurement and Control

- ***Performance measurement* is the process** by which managers at all levels gain information about the performance of tasks within the firm and judge that performance against pre-established criteria as set out in budgets, plans, and goals
  - Top management, middle management, and operating-level personnel should be evaluated
- ***Management control*** refers to the evaluation by upper-level managers of the performance of mid-level managers

Performance Measurement and Control

- *Operational control* means the evaluation of operating-level employees by mid-level managers
- *Management control* focuses on higher-level managers and long-term strategic issues (a broader objective), while *operational control* focuses on detailed short-term performance
- Operational control is a *management-by-exception* approach while management control is more consistent with the *management-by-objectives* approach

Performance Measurement and Control



Management-by-Objectives

- In a management-by-objectives approach, top management assigns a set of responsibilities to each mid-level manager depending on the functional area involved and the scope of authority of the mid-level manager

- Areas of responsibility are often called *strategic business units* (SBUs)

- An SBU consists of a well-defined set of controllable operating activities over which the SBU manager is responsible

Objectives of Management Control

- ***Motivate*** managers to exert a high level of effort to achieve the goals set by top management

- Provide the right ***incentive*** for managers to make decisions consistent with the goals set by top management (that is, to align managers' efforts with the desired strategic goals)

- ***Determine fairly*** *the rewards* earned by managers for their efforts and skill and the effectiveness of their decision making

Achieving Management Control Objectives

- A common mechanism for achieving these multiple objectives is to develop an *employment contract* between the manager and top management
- A contract promotes *goal congruence*: the contract specifies the manager's desired behaviors and the compensation to be awarded for achieving specific outcomes by using these behaviors
- Contracts can be written or unwritten, explicit or implied

Employment Contracts

- **An economic model, the *principal-agent model,*** is a prototype that contains the key elements that a contract must have to achieve the desired objectives

- **There are two important aspects** of management performance that affect the contracting relationship, ***uncertainty* and *lack of observability***

  - Managers operate in an environment that is influenced by factors beyond the manager's control; there is some degree of uncertainty **(continued…)**

Employment Contracts

- Many efforts and decisions made by the manager are not observable to top management, and the manager often possesses information not accessible to top management

- **Because of uncertainty and the lack of observability, three principles should be followed in the preparation of an employment contract:**

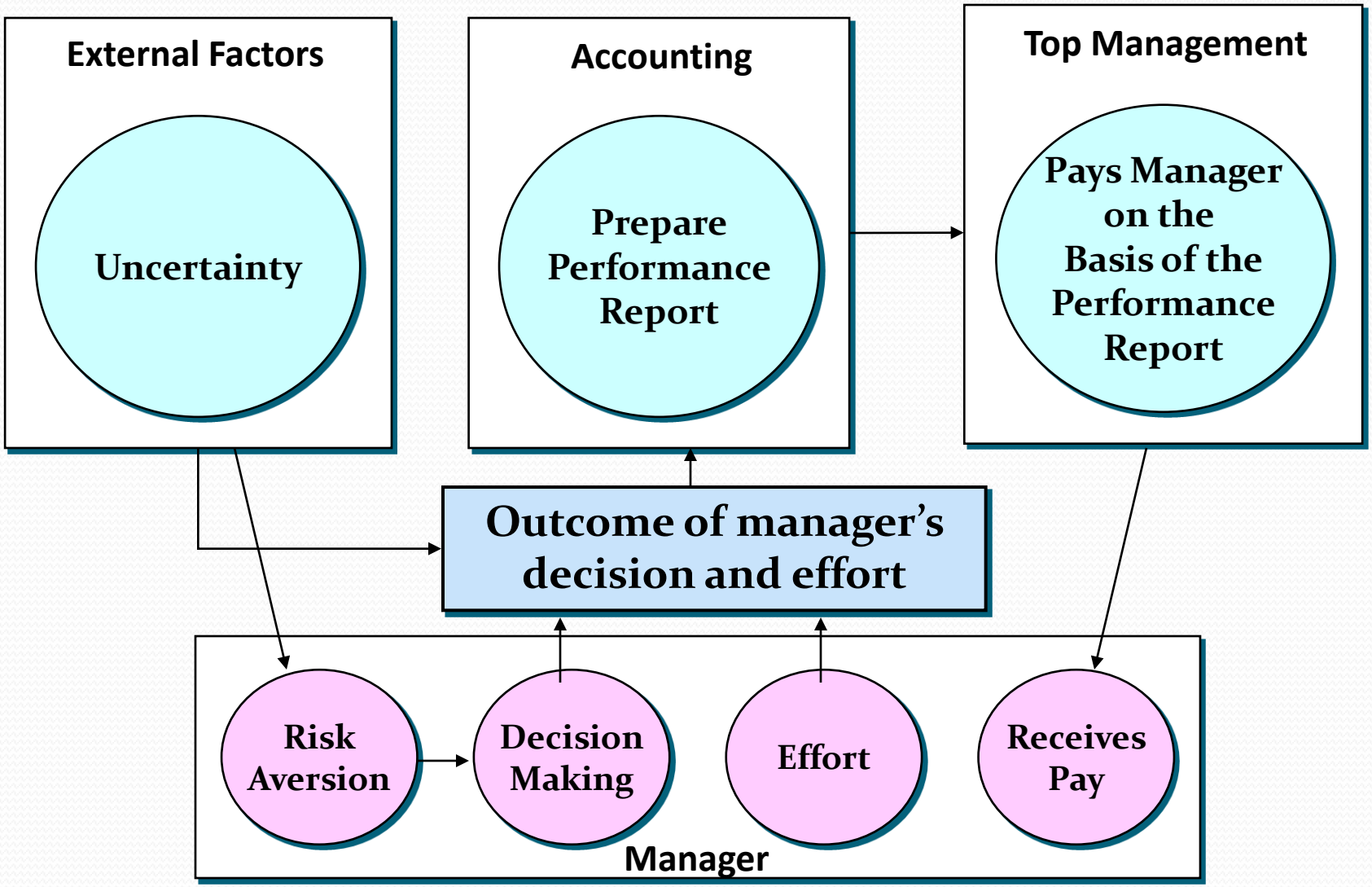
  - Separate the performance of the manager from the performance of the SBU

Employment Contracts

- Exclude known uncontrollable factors from the contract
- Risk-averse managers make decisions to avoid risk when top management might prefer choices that involve some risk. It is therefore necessary to separate the value of the outcome from the positive or negative weight associated with the risk due to uncertainty.

- **Management control systems should be designed to reduce the negative effects of risk preferences**

The Principal-Agent Model



Designing Management Control Systems

There are four questions management must ask when developing a management control system:

- ***Who*** is interested in evaluating the organization's performance (owners, directors, creditors, employees, etc.)?
- ***What*** is being evaluated (an individual, team, or SBU)?
- ***When*** is the performance evaluation to be conducted, and should it be based on the master budget (resource inputs – ex ante) or the flexible budget (outputs of the manager's effort–ex post)?
- ***Should*** the system be formal or informal?

Types of Management Control Systems

	Informal Systems	Formal Systems
Individual	Aspiration Level Personal Drives	Hiring Practices Leadership Developent Promotion Procedures Strategic Performance Measurement (SBUs)
Teams	Peer Norms Organization Culture	Team based management (TBM) Shared Responsibility

Strategic Performance Measurement

- ***Strategic performance measurement*** is a system used by top management to evaluate SBU managers

- **Before designing strategic performance measurement systems, top managers determine when delegation of responsibility is desirable**

  - A firm is *decentralized* if it has chosen to delegate a significant amount of responsibility to SBU managers
  - A *centralized* firm reserves much of the decision-making at the top-management level

Strategic Performance Measurement

- Centralized firms provide more control and the expertise of top management can be effectively utilized
- Decentralized firms are able to make more timely decisions at the operational level; top management lacks the necessary local knowledge
- Decentralized firms are often more motivating for managers, are an excellent environment for training future top-level managers, and can be a better basis for performance evaluations

Types of SBUs

- ***Cost Centers*** are a firm's production or support departments that are charged with the responsibility of providing the best quality product or service at the lowest cost (examples: a plant's assembly department, data-processing department, and its shipping and receiving department)
- ***Revenue Centers*** focus on the selling function and are defined either by product line or by geographic area
- ***Profit Centers***: when an SBU both generates revenues and incurs the major portion of the cost for producing these revenues, it is considered a ***profit center***
- ***Investment Centers*** include assets employed by the SBU as well as profits in the performance evaluation

Types of SBUs

The choice of a profit, cost, or revenue center depends on the nature of the production and selling environment in the firm:

- Products that have little need for coordination between the manufacturing and selling functions are good candidates for cost and revenue centers

- For products that require close coordination between these functions, profit centers would be the preferred option

Cost Centers

- **Direct manufacturing and manufacturing support departments are often evaluated as *cost centers*** since these managers have significant direct control over costs but little control over revenues or decision-making for investment in facilities

- **Several strategic issues arise when implementing cost centers:**

  - *Cost shifting* occurs when a department replaces its controllable costs with noncontrollable costs (e.g., variable costs to fixed costs)

(continued…)

Cost Centers

- Many performance-measurement systems focus excessively on short-term cost figures, neglecting long-term strategic issues
- The majority of cost centers have some amount of *budgetary slack*, which is the difference between budgeted and expected performance
- Budgetary slack can be good as it reduces risk aversion, but too much slack can result in reduced employee effort and can complicate the planning process

Two Methods of Implementing Cost Centers in Production and Support Departments

Discretionary-Cost Approach

Costs are mainly fixed, uncontrollable
Firms use an input-oriented planning focus
Outputs are ill-defined
The focus is on planning

Engineered-Cost Approach

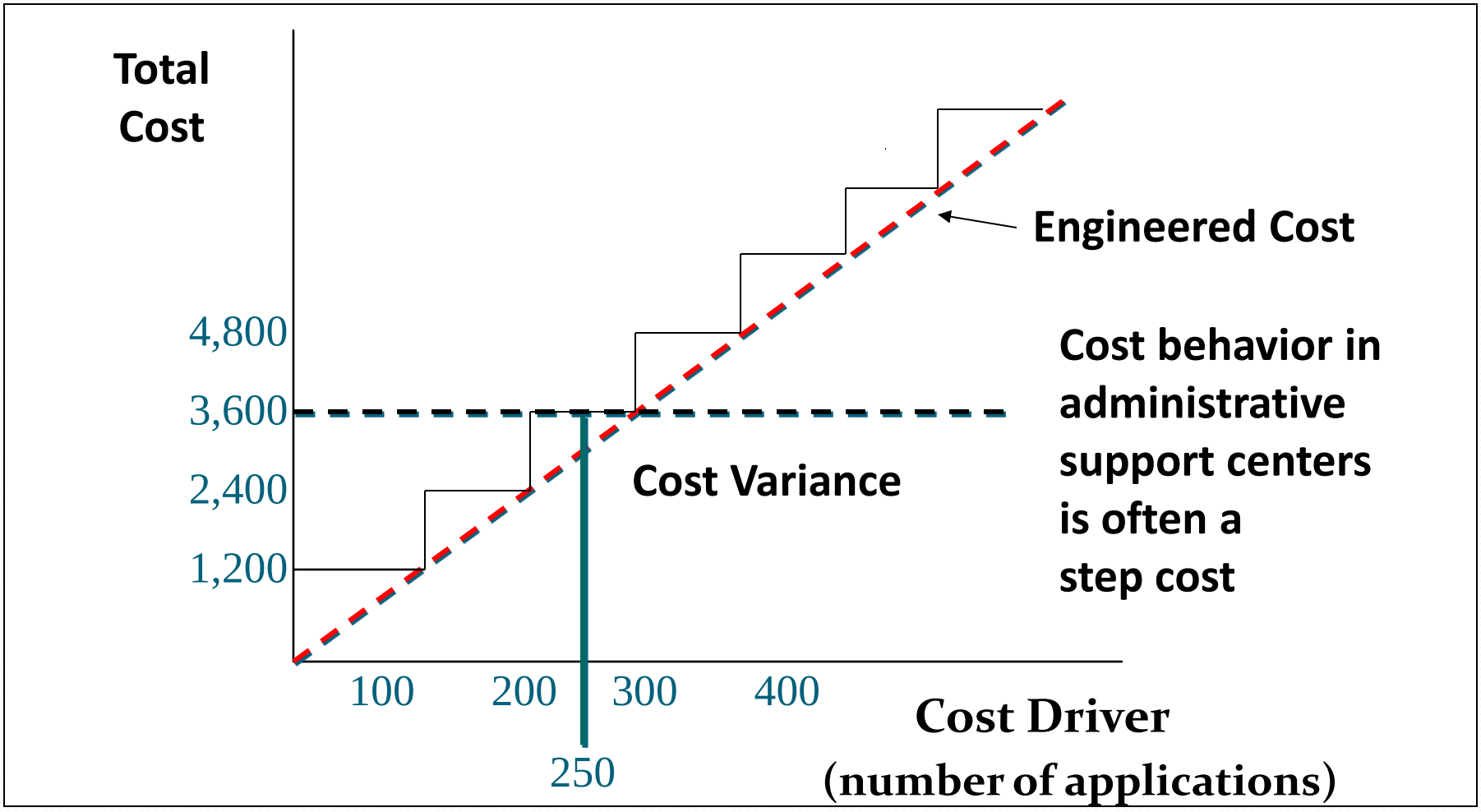
Costs are mainly variable, controllable
Firms use an output-oriented evaluation focus
Outputs are well-defined
The focus is on evaluation

Implementing Cost Centers in General and Administrative Departments

These departments have the same two methods to choose from, but the proper choice may change over time:

- For example, if cost reduction is a key objective, the human resources department might be treated as an engineered-cost center
- Later, it might be changed to a discretionary-cost center to motivate managers to focus on the achievement of long-term goals

Implementing Cost Centers in General & Administrative Departments



Cost Centers—Implementation Considerations

- **Many firms are choosing to outsource manufacturing, customer service, engineering, and other services**
- **When using a cost center, how should the firm allocate the jointly incurred costs of service departments to the departments using the service?**
  - An allocation method should be chosen based on its ability to motivate managers, encourage goal congruence, and provide a basis for fair evaluation of the managers' performance

Cost Centers—Implementation Considerations

- *Dual allocation* is a cost-allocation method that separates fixed and variable costs; variable costs are directly traced to user departments, and fixed costs are allocated on some logical basis

- Indirect costs should be traced to cost Centers using activity-based costing (ABC)

Revenue Centers

- Management commonly uses revenue drivers in evaluating the performance of revenue Centers

- *Revenue drivers* in manufacturing firms are the factors that affect sales volume, such as price changes, promotions, discounts, customer service, changes in product features, delivery dates, and other value-added factors

- Revenue drivers in service firms focus on the *quality of the service*

Marketing Departments

Marketing departments can be either a revenue or a cost Center:

- The *revenue center* responsibility stems from the fact that the marketing department manages the revenue-generating process and produces revenue reports for evaluation

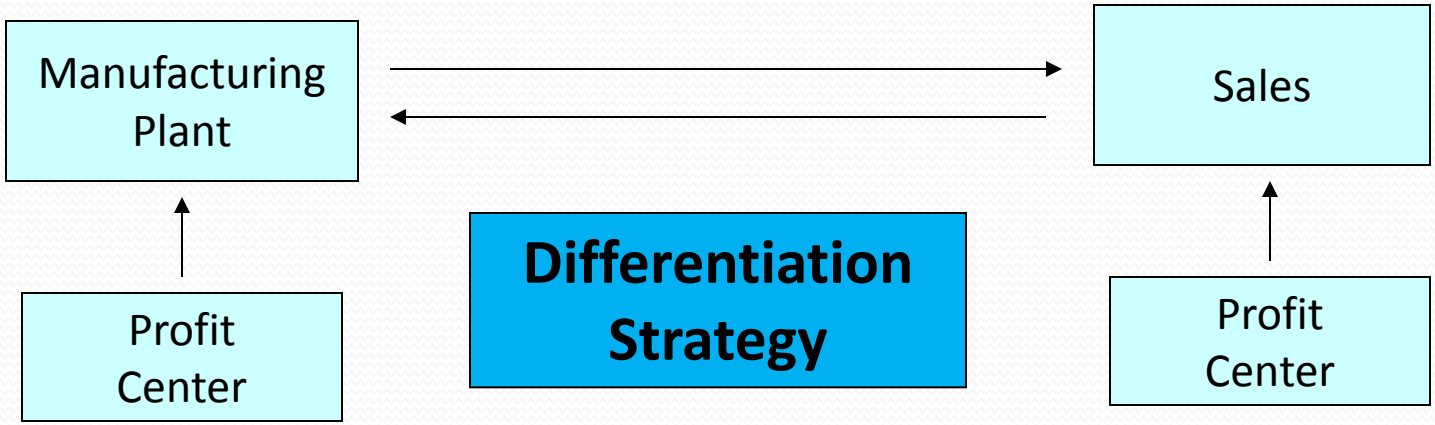
- This department can also be a *cost center* as it incurs two types of costs, order-getting (advertising and promotion) and order-filling (warehousing, packing, and shipping) costs

Profit Centers

- **The profit center manager's goal is to earn profits**
- **Three strategic issues cause firms to choose profit Centers rather than cost or revenue Centers:**
  - Profit Centers provide the ***incentive*** for the desired coordination among marketing, production, and support functions
  - Profit Centers ***motivate*** service department managers to consider their product as marketable to outside customers
  - Profit Centers ***motivate*** managers to develop new ways to earn a profit from their products and services

SBUs: Two Different Strategic Contexts





Contribution Income Statement

- A common form of profit center evaluation is the *contribution income statement*, which is based on the contribution margin developed for each profit center and for each relevant group of profit centers

- Detail of the statement varies based on management's needs

- ***Contribution by Profit Center*** **(CPC)** measures all costs traceable to, and therefore controllable by, the individual profit center, including traceable fixed costs

Controllable and Noncontrollable Fixed Costs

Fixed costs can be either controllable or noncontrollable from the perspective of each profit Center:

- *Controllable fixed costs* are fixed costs that the profit center manager can influence in approximately a year or less, such as advertising, data processing, and management consulting expenses
- *Noncontrollable fixed costs* are those that are not controllable within a year's time, such as depreciation and taxes

Profit Center Performance Measurement

- Subtracting controllable fixed costs from the contribution margin results in the center's *controllable margin*
- The contribution margin income statement can also be used to help determine whether a profit center should be dropped or retained
- One complication in the preparation of this statement is that some costs that are not traceable at a detailed level are traceable at a higher level

Contribution Income Statement Example

	Company as a Whole	Company Breakdown into Profit Centers		Breakdown of Division B to Product-Level Profit Centers			
		Division A	Division B	Not Traceable	Product 1	Product 2	Product 3
Net revenues	$2,000	$600	$1,400		$400	$700	$300
Variable costs	900	200	700		100	350	250
Contribution margin	$1,100	$400	$ 700		$300	$350	$ 50
Controllable fixed costs	250	100	150	$ 25	25	100	0
Controllable margin	$ 850	$300	$ 550	(25)	$275	$250	$ 50
Noncontrollable fixed costs	400	120	280	20	10	130	120
Contribution by profit center (CPC)	$ 450	$180	$ 270	$(45)	$265	$120	$ (70)
Untraceable costs	200						
Operating income	$ 250						

The Contribution Income Statement shows the CPC for both Divisions is positive, and when Division B is partitioned into its three product lines, Products 1 and 2 are shown as profitable, while Product 3 has a CPC loss of $70.

Contribution Income Statement Example:

- Positive values for **CPC** mean that the profit center (division or product line) is covering all of its traceable costs, both variable and fixed; since a portion of the fixed costs are not controllable (but traceable), CPC is a useful measure of the economic performance of the profit center and a useful measure of the long-term performance of the manager.
- To evaluate the short term, controllable performance of the manager, **controllable margin** is preferred since it excludes non-controllable fixed costs.

Contribution Income Statement Example:

- To assess whether a profit center should be retained or deleted, the value of the contribution margin, if positive, shows the short-term loss of dropping the unit (dropping product 3 means a loss of $50,000)
- The controllable margin, if positive, shows the longer-term (approximately a year) effect on total firm profits of dropping the unit (dropping product three means a loss of $50,000)
- The CPC of the unit, because it includes non-controllable fixed costs, represents the long-term (up to several years) profitability of the unit (dropping product 3 would save $70,000 in the long-term)

Variable vs. Full Costing

- The use of the contribution income statement is often called *variable costing* because it separates variable and fixed costs
- *Full costing* is the conventional costing system that includes fixed manufacturing cost as part of product cost
- Full costing, also called absorption costing, is required by GAAP for financial reporting and by the IRS for computing taxable income
- Full costing satisfies the matching principle while variable costing meets the three objectives of management control systems

Variable Costing

- **The reasons for using variable costing include better planning and decision making , and also improved performance measurement:**
  - Although net income determined using full costing is affected by changes in inventory levels, net income using variable costing is not affected -- under variable costing, fixed manufacturing costs are treated as period costs, not product (inventoriable) costs
- **The following example compares the two costing methods over two periods, one with increasing inventory and the other with decreasing inventory**

Variable vs. Full Costing Example

Inventory increased by 40 units

Inventory decreased by 40 units

Data Summary	Period 1	Period 2
Units:		
Beginning inventory	0	40
Price	$ 100	$ 100
Sold	60	140
Produced	100	100
Unit variable costs:		
Manufacturing	$ 30	$ 30
Selling and administrative	5	5
Fixed costs:		
Manufacturing	$ 4,000	4,000
Selling and administrative	1,200	1,200

$4000/100 units = $40 fixed manufacturing cost per unit

Variable vs. Full Costing Example

Period One Income Statements	Full Costing	Variable Costing
Sales (60 × $100)	$ 6,000	$ 6,000
Cost of goods sold:		
Beginning inventory	-	-
Cost of goods produced	7,000	3,000
Available for sale	7,000	3,000
Ending inventory	2,800	1,200
Cost of goods sold	4,200	1,800
Variable selling and administrative	-	300
Gross margin	1,800	
Contribution margin		3,900
Total fixed costs		5,200
Variable selling and administrative	300	
Fixed selling and administrative	1,200	
Net Income	$ 300	$ (1,300)

Difference in Ending Inventory

$2,800 - $1,200 = $1,600

Difference in Income

$300 – ($1,300) = $1,600

Variable vs. Full Costing Example

Period Two Income Statements	Full Costing	Variable Costing
Sales (140 × $100)	$ 14,000	$ 14,000
Cost of goods sold:		
Beginning inventory	2,800	1,200
Cost of goods produced	7,000	3,000
Available for sale	9,800	4,200
Ending inventory	-	-
Cost of goods sold	9,800	4,200
Variable selling and administrative	-	700
Gross margin	4,200	
Contribution margin		9,100
Total fixed costs		5,200
Variable selling and administrative	700	
Fixed selling and administrative	1,200	
Net Income	$ 2,300	$ 3,900

Difference in Beginning Inventory

$2,800 - $1,200 = $1,600

Difference in Income

$2,300 - $3,900 = $1,600

Variable vs. Full Costing Summary Analysis

- *Full costing* net income exceeds variable costing net income by the amount of fixed cost in the inventory change when inventory increases, and variable costing net income is higher than full-costing net income when inventory decreases

- Variable costing is not affected by the change in inventory because all fixed costs are deducted from income in the period in which they occur; fixed costs are not included in inventory so that changes in inventory levels do not affect net income

Contribution Income Statement and International Accounting Standards

- Throughout the world, 125 countries use International Financial Reporting Standards (IFRS) developed by the International Accounting Standards Board (IASB)
- IFRS are different from U.S. GAAP, though the SEC and IASB are working on the convergence of the two sets of standards
- Benefits of a worldwide set of financial reporting standards include:
  - U.S. companies with foreign units will have an easier time preparing consolidated financial reports
  - Performance measurement for managers of foreign units will benefit from greater consistency

The Contribution Income Statement and Value Streams

- In applications of lean accounting, products and services are collected into groups called ***value streams***.
- The value stream income statement shows the contribution of each of the organization's value streams in much the same way as the contribution income statement; each value stream is a profit center.
- A unique feature of the value stream income statement is that it shows separately the gain (or loss) associated with an increase (or decrease) in inventory, as determined by a comparison of full vs variable costing

Strategic Performance Measurement and the Balanced Scorecard (BSC)

- **The BSC measures SBU performance in four key perspectives:**
  - Customer satisfaction
  - Financial performance
  - Internal business processes
  - Learning and innovation
- Cost, revenue, and profit Centers focus on the financial dimension

Strategic Performance Measurement and the Balanced Scorecard (BSC):

- The BSC is an important performance measurement method because it ***aligns manager's performance with the organization's strategic goals*** – financial, customer, internal process, and learning and innovation.
- The BSC is particularly important in difficult economic times, when traditional profit-based measures may be distorted and difficult to benchmark against established benchmarks such as prior year earnings, industry earnings, and competitors' earnings.

The Balanced Scorecard (BSC): Implementation Issues

There are implementation issues when using the BSC in performance measurement:

- BSC measures are often difficult to compare across SBUs, and are used only to compare the unit to prior periods
- The BSC is often used in evaluation but less often in compensation, and the two need to be linked
- Validation is needed of the links between measures that are assumed to improve performance and actual performance
- Managers must provide information on the strategic linkages in the strategy map

The Balanced Scorecard (BSC): Implementation Issues

- Many large firms have installed *enterprise resource planning systems* (ERPs) to collect BSC information, but firms lacking such a system may have trouble collecting the necessary data
- The nonfinancial information used in the BSC is not subject to control or audit and may be unreliable or inaccurate
- Nonfinancial information is often prepared on a weekly or daily basis while performance reviews are generally conducted quarterly or annually
- Concern arises related to the timeliness and reliability of nonfinancial data prepared by external sources

Managements Control in Service Firms and Not-for-Profit Organizations

- Service firms and not-for-profit organizations commonly use cost centers and/or profit centers
- Cost centers are used when the manager's critical mission is to control costs
- Profit centers are preferred when the department manager must manage both costs and revenues, or alternatively (in a not-for-profit), manage costs without exceeding budgeted revenues

Summary

- There are formal, informal, team, and individual management control systems
- The objectives of management control are to:
  - *Motivate* managers to exert a high level of effort to achieve the goals set by top management
  - Provide the right *incentive* for managers to make decisions consistent with the goals set by top management (i.e., to align managers' efforts with the desired strategic goals)
  - Determine fairly the rewards earned by managers for their efforts and skill and the effectiveness of their decision making

Summary

- Strategic performance measurement is a system used by top management to evaluate SBU managers
- Before designing strategic performance measurement systems, top managers determine when delegation of responsibility is desirable
  - A firm is *decentralized* if it has chosen to delegate a significant amount of responsibility to SBU managers
  - A *centralized* firm reserves much of the decision making at the top management level

Summary

There are four types of SBUs:

- *Cost Centers* are a firm's production or support Centers that provide the best quality product or service at the lowest cost
- *Revenue Centers* focus on the selling function and are defined either by product line or by geographic area
- *Profit Centers*: when an SBU both generates revenues and incurs the major portion of the cost for producing these revenues, it is a *profit center*
- *Investment Centers* include assets employed by the center as well as profits in the performance measurement

Summary

- A key feature of the BSC is that it links manager's performance to the strategy of the organization
- The BSC measures SBU performance in four key perspectives
  - Customer satisfaction
  - Financial performance
  - Internal business processes
  - Learning and innovation

Summary

- The contribution income statement (variable costing) has an important role in performance evaluation because it distinguishes controllable and non-controllable costs and because it is not subject to the "inventory effect" of full costing; the inventory effect: under full costing, profits increase when inventory increases, and vice-versa, since inventory cost includes applied fixed overhead
- Many countries use international financial reporting standards (IFRS), which simplifies the comparison of financial performance for divisions in other countries
- Value stream accounting, from lean accounting , is a useful tool for performance evaluation, in particular because it specifically identifies the inventory effect noted above

Investment Centers

- Many firms use profit centers to evaluate managers, but firms cannot use profit alone to compare one business unit to other business units because of:
  - Differences in size
  - Differences in operating characteristics
- To evaluate the financial performance of investment centers, we need to somehow incorporate the level of invested capital into the performance measure

Financial Performance Measures for Investment Centers

Strategic objectives for financial-performance measures for investment SBUs are:

- *Motivate* managers to exert a high level of effort to achieve the goals of the firm (increase ROI)
- Provide the right *incentive* for managers to make decisions that are consistent with the goals of top management (goal congruence)
- Fairly determine the rewards earned by the managers for their effort and skill (ROI = sound basis for comparison between units of different size)

Alternative Measures for Evaluating the Financial Performance of Investment Centers

- Return on investment (ROI)
- Residual income (RI)
- Economic value added (EVA®)

Return on Investment (ROI)

- ROI is the most common measure of investment center short-run financial performance
  - The higher the percentage, the better the indicated financial performance

$$\text{ROI} = \text{Return on sales} \times \text{Asset turnover}$$

$$\text{ROI} = \frac{\text{Profit}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Assets}}$$

- In practice, be aware that there are different ways to define "profit" and "investment" for purposes of determining ROI

Return on Investment (ROI)

The two components of ROI give a more complete picture of management performance (goals should be set for each of the two component measures):

- *Return on sales* (ROS) or *profit margin*, a firm's profit per sales dollar, measures the manager's ability to control expenses and increase revenue to improve profitability
- *Asset turnover* (AT), the amount of dollar sales achieved per dollar of investment, measures the manager's ability to increase sales from a given level of investment

ROI Example

CompuCity sells computers, software, and books in three locations, Boston, South Florida, and the Midwest. The company's profit's declined in the Midwest last year. CompuCity's operating results and the corresponding ROI calculations appear on the next slide.

ROI Example:

Panel 1: Income, Investment, and Sales

	Income		Investment (Assets)		Sales	
	2012	2013	2012	2013	2012	2013
Computers	$ 8,000	$ 5,000	$ 50,000	$ 62,500	$ 200,000	$ 250,000
Software	15,000	16,000	100,000	80,000	150,000	160,000
Books	3,200	5,000	32,000	50,000	80,000	100,000
Total	$ 26,200	$ 26,000	$ 182,000	$ 192,500	$ 430,000	$ 510,000

$8,000 Income/$200,000 Sales

$200,000 Sales/$50,000 Investment

	Return on Sales		Asset Turnover		ROI	
	2012	2013	2012	2013	2012	2013
Computers	4.00%	2.00%	4.00	4.00	16.00%	8.00%
Software	10.00%	10.00%	1.50	2.00	15.00%	20.00%
Books	4.00%	5.00%	2.50	2.00	10.00%	10.00%
Total	6.10%	5.10%	2.36	2.65	14.40%	13.50%

$8,000 Income/$50,000 Investment

ROI Example: Summary Analysis

- Overall ROI has fallen from 14.4% in 2009 to 13.5% in 2010, mainly due to a decline in overall ROS
- The drop in ROS is due to the sharp decline in ROS for the computer unit
- Software is the most profitable investment unit, as measured by ROI

Accounting Policy Issues and ROI: Things to Consider When ROI is Used to Evaluate Relative Performance of Investment Centers

- **Depreciation policy**–the determination of the useful life of the asset and the depreciation method affect both "income" and "investment"; larger depreciation charges reduce ROI
- **Capitalization policy**–the firm's capitalization policy identifies when an item is expensed or capitalized as an asset; an expensed item reduces the numerator of ROI, a capitalized item reduces the denominator (see Exhibit 19.2)

Additional Considerations: Accounting Policies and ROI

For inventory:

- **Inventory measurement methods**–choice of inventory cost-flow assumption (FIFO, LIFO) affects "income" and reported inventory values (as such, the denominator, "investment" could be affected by this choice) (e.g., LIFO often increases CGS and decreases inventory in times of rising prices causing ROI to decrease)
- **Full costing**–full costing creates an upward bias on income, and therefore on ROI, when inventory levels are rising; the reverse is true when inventory levels are falling
- **Disposition of variances**–standard cost variances can be closed to the CGS account or prorated to CGS and ending inventory accounts; the choice has a direct effect on income and inventory balances

Defining the ROI Measure

- How is "investment" *defined* (i.e., which assets should be included in the measure of investment)?
  - "Investment" is commonly defined as the net cost of long-lived assets plus working capital
  - A key criterion for including an asset in ROI is the degree to which the unit controls it; only those controllable at the unit level should be included
  - The value of intangibles should also be considered
- Allocating shared assets?
  - Management must determine a fair sharing arrangement
  - Assets should be allocated according to peak demand if user units require high levels of service at periods of high demand

Measurement Issues: How Should "Investment" Be Measured?

- The amount of investment is typically measured at the historical cost of the assets
- *Historical cost* is amount of the book value of current assets plus the net book value (NBV) of the long-lived assets
- NBV is the asset's historical cost less accumulated depreciation
- A problem arises when long-lived assets are a significant portion of total investment because historical cost often does not reflect current market value
- Relatively small historical cost value = significantly overstated ROI (and the "illusion of profitability")

Measurement Issues for ROI Determination

Assets can be measured at either historical cost (NBV or GBV) or at some measure of current value:

- *Net book value* (NBV) is historical (acquisition) cost, less accumulated depreciation/amortization
- *Gross book value* (GBV) is the historical cost without the reduction for depreciation (removes the age bias)
- *Replacement cost* represents the current cost to replace the assets at the current level of service and functionality (purchase price)
- *Liquidation value* is the price that could be received from their sale (sale price or "exit value")

ROI Measurement Issues

CompuCity has three marketing regions: 15 stores in the Midwest; 18 stores in the Boston area; and 13 stores in South Florida. Current value information appears below.

Region	Income	Measure of Assets			
		Net Book Value	Gross Book Value	Replacement Cost	Liquidation Value
Financial data:					
Midwest	$26,000	$192,500	$250,500	$388,000	$ 332,000
Boston region	38,500	212,000	445,000	650,000	1,254,600
South Florida	16,850	133,000	155,450	225,500	195,000
Return on investment:					
Midwest		13.5%	10.4%	6.70%	7.8%
Boston region		18.2	8.7	5.9	3.1
South Florida		12.7	10.8	7.5	8.6

Asset Measurement in ROI Calculations: Summary Analysis

- At first glance the Boston area appears to be the most profitable, but when the age of the store is factored in (GBV), the ROI figures for all three regions are comparable
- Replacement cost is useful for evaluating manager's performance (South Florida is slightly in the lead)
- The analysis of liquidation-based ROIs is useful for showing CompuCity management that the real estate value of these stores could now exceed their value as CompuCity retail locations

Strategic Issues Regarding the Use of ROI for Performance-Evaluation Purposes

- Value-creation in the new economy—can this be captured by the ROI measure?
- Short-run focus of the metric:
  - Numerator issues?
  - Denominator issues?
- Decision model and performance-evaluation model inconsistency (e.g., NPV vs. ROI)
- ROI has a disincentive for new investment by the most profitable units because ROI encourages units to only invest in projects that earn higher than the unit's current ROI (**note:** this is a goal-congruency problem)

Summary Comments: Selected Advantages and Limitations of ROI

Advantages

1. Easily understood by managers
2. Comparable to interest rates and the rates of return on alternative investments
3. Widely used and reported in the business press

Limitations

1. Goal congruency issue: incentive for high ROI units to invest in projects with ROI higher than the minimum rate of return but lower than the unit's current ROI
2. Comparability across investment centers can be problematic

Residual Income (RI)

- In contrast to ROI (which is a percentage, i.e., a *relative* performance indicator), *residual income* (RI) is a dollar amount:

  RI = investment center income less an *imputed charge* for the investment in the unit

- RI is equal to the desired minimum rate of return times the level of "investment" in the unit

- RI can be interpreted as the income earned after the unit has "paid" a charge for the funds invested in the unit

Residual Income (RI) Example

Midwest		
Investment (@NBV)	$	192,500
Minimum rate of return		12%
Minimum income		23,100
Actual income		26,000
Residual income	$	2,900

Residual Income (RI) Example

In this case (*but not always*), the RI calculation for CompuCity produces the same relative profitability ranking as the ROI calculation

Financial data	Income	NBV
Midwest	$ 26,000	$ 192,500
Boston area	38,500	212,000
South Florida	16,850	133,000
ROI:		
Midwest		13.51%
Boston area		18.16%
South Florida		12.67%

RI (minimum rate of return is 12%):

	Minimum Return	RI
Midwest	$ 23,100	$ 2,900
Boston area	25,440	13,060
South Florida	15,960	890

Selected Advantages and Limitations of RI

Advantages

1. Supports incentive to accept all projects with ROI > minimum rate of return
2. Can use the minimum rate of return to adjust for differences in risk
3. Can use a different minimum rate of return for different types of assets

Limitations

1. Favors large units when the minimum rate of return is low
2. Not as intuitive as ROI
3. May be difficult to obtain a minimum rate of return at the subunit level

Advantages of Both ROI and RI

1. *Congruent* with top management goals for return on assets
2. *Comprehensive financial measure*—includes all the elements important to top management: revenues, costs, and level of investment
3. *Comparability*: expands top management's span of control by allowing comparison across SBUs

Limitations of Both ROI and RI

1. *May mislead strategic decision making*: not as comprehensive as the BSC, which includes customer satisfaction, internal processes, and learning as well as financial measures; the BSC is explicitly linked to strategy
2. *Accounting issues*: variations exist in the definition and measurement of "investment" and in the determination of "profits"
3. *Short-term focus*: investments with long-term benefits may be neglected

Economic Value Added (EVA®)

- *Economic value added* (EVA®) is a business unit's income after taxes and after deducting the cost of capital
- EVA® is a Registered Trade Mark of Stern Stewart & Co.
- EVA® approximates an entity's "economic profit"
- EVA® involves numerous adjustments to reported accounting income and level of investment (Stern Stewart reports up to 160 such adjustments!!)
- Similar to Residual Income (RI), EVA motivates managers to increase investment as long as the expected return (in $ terms) above the cost of capital is positive

Economic Value Added (EVA®)

EVA® = NOPAT – (k × Average invested capital)

NOPAT = after-tax cash operating income, after depreciation (i.e., the "total pool of cash funds available to suppliers of capital")

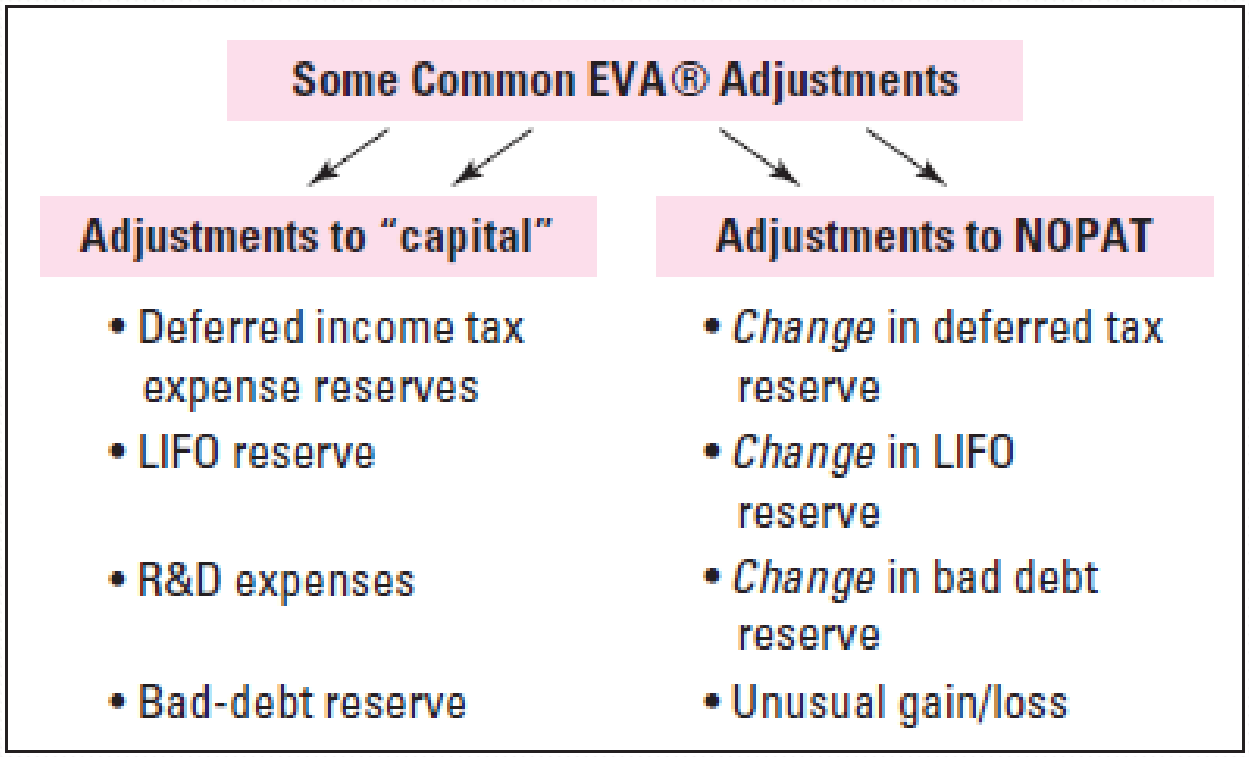
= Revenues – Cash operating costs – Depreciation – Cash taxes on operating income

k = minimum rate of return (hurdle rate), e.g., WACC

Thus, EVA® = (r – k) × capital, where r = NOPAT/invested capital ("cash on cash return")

Economic Value Added (EVA®) (continued)

To estimate EVA, it is necessary to adjust reported accounting numbers (both earnings and level of investment; the latter are referred to as *equity-equivalent adjustments*, or EE for short)



Transfer Pricing

- *Transfer pricing* is the determination of an exchange price for a intra-organizational transfers of goods or services (e.g., Division A "sells" subassemblies to Division B)

- Products can be final products sold to outside customers (e.g., batteries for automobiles) or intermediate products (e.g., components or subassemblies)

- Transfers of products and services between business units is most common in firms with a high degree of *vertical integration*

Transfer Pricing Objectives

- The objectives of transfer pricing are the same as those for evaluating the performance of profit and investment centers:
  - To *motivate* managers
  - To provide an *incentive* for managers to make decisions consistent with the firm's goals
  - To provide a basis for fairly rewarding managers
- Specific *international issues* include:
  - Minimization of customs charges
  - Minimize total (i.e., worldwide) income taxes
  - Currency restrictions
  - Risk of expropriation (government seizure)

Transfer Pricing Methods

- *Variable cost (standard or actual)*, with or without a mark-up for "profit"
- *Full cost* (*standard or actual*), with or without a markup for "profit"
- *Market price* (perhaps reduced by any internal cost savings realized by the selling division)
- *Negotiated price* between buyer and selling units, perhaps with a provision for arbitration

Comparing Transfer Pricing Methods: Variable Cost

Advantage

The relatively low transfer price encourages buying internally (the correct decision from the overall firm's standpoint when there is excess capacity)

Limitation

"Unfair" to the seller unit (profit or investment center) because no "profit" on the transfer is recognized

Comparing Transfer Pricing Methods: Full Cost

Advantages

1. Easy to implement—data already exist for financial reporting purposes
2. Intuitive and easily understood
3. Preferred by tax authorities over variable cost

Limitations

1. Irrelevance of fixed cost in short-term decision making; fixed costs should be ignored in the buyer's choice of whether to buy inside or outside the firm
2. If used, should be *standard* rather than actual cost

Comparing Transfer Pricing Methods: Market Price

Advantages

1. Helps preserve subunit autonomy
2. Provide for the selling unit to be competitive with outside suppliers
3. Has arm's-length standard desired by international taxing authorities

Limitations

1. Often intermediate products have no market price
2. Should be adjusted for cost savings such as reduced selling costs, no commissions, etc.
3. Can lead to short-term sub-optimization

Comparing Transfer Pricing Methods: Negotiation Price

Advantages

1. May be the most practical approach when significant conflict exists
2. Is consistent with the theory of decentralization

Limitations

1. Need negotiation rule and/or arbitrations procedure, which can reduce autonomy
2. Potential tax problems; may not be considered "arm's length"
3. Potential sub-optimization (dysfunctional decisions)

Choosing a Transfer Pricing Method

- Firms can use two or more methods, called *dual pricing, one method for the buying unit and a different one for the selling unit*
- From top management's (i.e., a firm-wide) perspective, there are three considerations in setting the most advantageous transfer price:
  - Is there an outside supplier?
  - Is the seller's variable cost less than the market price?
  - Is the selling unit operating at full capacity?

Transfer Pricing Example

The High Value Computer (HVC) Company

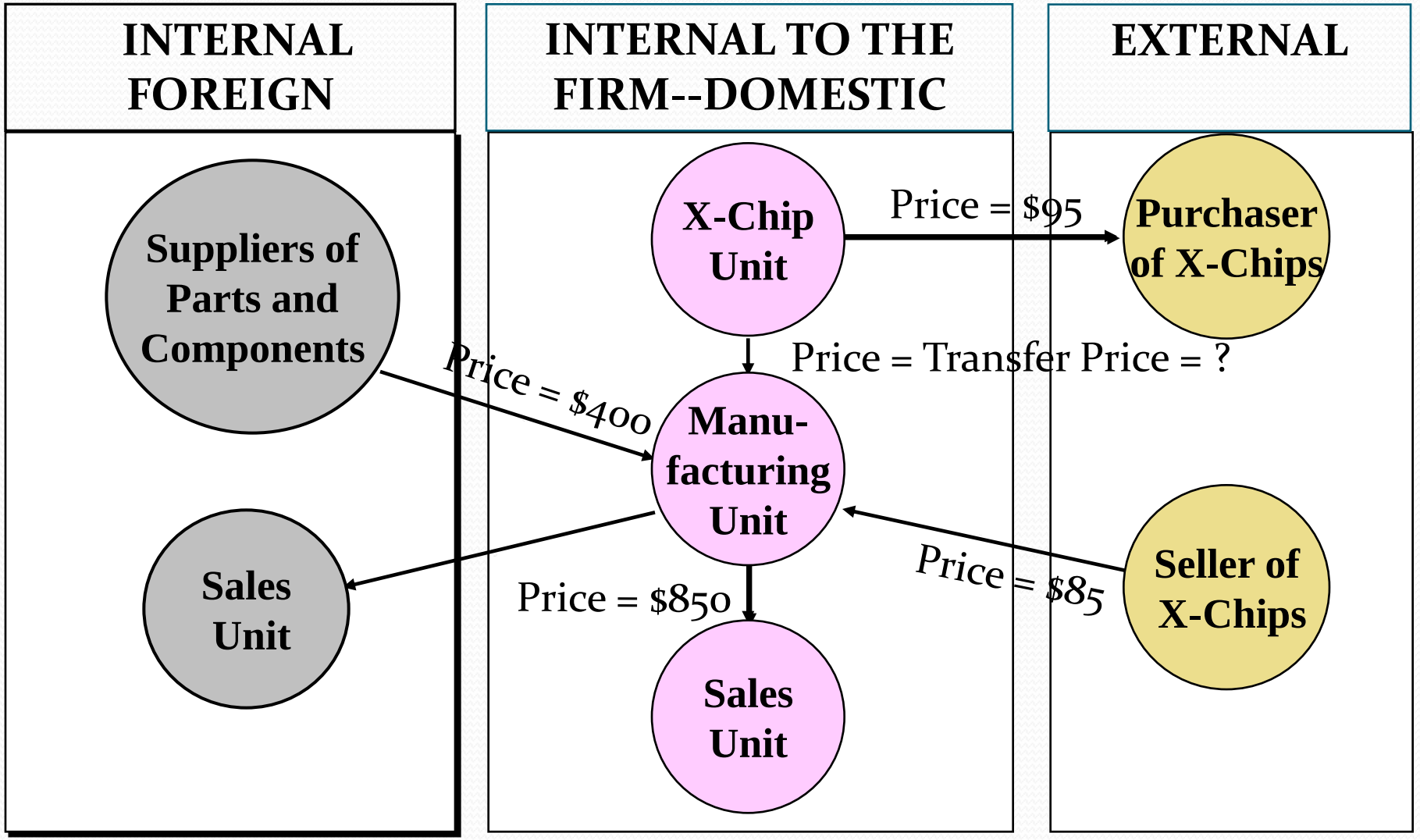
Key assumptions:

- Manufacturing unit can buy the x-chip inside or outside
- x-chip can sell inside or outside
- x-chip unit is at full capacity (150,000 units)
- One x-chip is needed for each computer manufactured

Other Information:

- Unit selling price of computer = $850
- Variable manufacturing costs (excluding x-chip) = $650
- Variable unit manufacturing cost of x-chip = $60
- Price of x-chip sold to outside supplier = $95
- Outside supplier price of x-chip = $85
- Variable cost to make the outside chips compatible = $5
- Variable selling cost for HVC to sell its chip = $2

Transfer Pricing Example



Option 1: X-Chip Unit Sells to Outside Supplier

Contribution Income Statement (000s omitted) 150,000 computers			
	Computer Mfg. Unit	X-Chip Unit	Total
Sales ($850, $95)	$127,500	$14,250	$141,750
Less: Variable costs			
X-chip ($85 + $5)	$13,500		$13,500
Other ($650, $60 + $2)	$97,500	$9,300	$106,800
CM	$16,500	$4,950	$21,450

Option 2: X-Chip Unit Sells Inside

Contribution Income Statement with Pricing at Variable Cost

(000s omitted) 150,000 computers

	Computer Mfg. Unit	X-Chip Unit	Total
Sales ($850, $60)	$127,500	$9,000	$136,500
Less: Variable costs			
x-chip ($60)	$9,000		$9,000
Other ($650, $60)	$97,500	$9,000	$106,500
CM	$21,000		$21,000

∴ The firm benefits more from Option 1

HVC Transfer Pricing Example: Summary Analysis

1. Is there an outside supplier?
   - HVC has an outside supplier, so we must compare the inside seller's variable costs to the outside seller's price
2. Is the seller's variable cost less than the market price?
   - For HVC, it is, so we must consider the utilization of capacity in the inside selling unit

HVC Transfer Pricing Example: Summary Analysis

❸ Is the selling unit operating at full capacity?

- For HVC, it is, so we must consider the contribution of the selling unit's outside sales relative to the savings from selling inside. Again, for HVC, the contribution of the selling unit's outside sales is $33 per unit, which is higher than the savings of selling inside ($30), so from the standpoint of the company as a whole, the selling unit should choose outside sales and make no internal transfers.

General Transfer-Pricing Rule (to induce firm-wide optimum financial results)

- We know that "relevant cost" for decision- making purposes = out-of-pocket costs + opportunity cost
- Based on the above, we can develop a General Transfer-Pricing Rule, as follows:

  minimum transfer price = incremental (i.e., out-of-pocket) cost of the producing division + opportunity cost to the organization as a whole, if any, for an internal transfer
- the preceding rule establishes a minimum transfer price from the standpoint of the selling division, but generally ensures that from a firm-wide standpoint the correct economic decision is made

General Transfer-Pricing Rule (to induce firm-wide optimum financial results)

- the *opportunity cost* in the preceding formula represents the amount of contribution margin given up to make the sale internally. In other words, if a sale could be made to an outside buyer, the difference between the outside buyer's price and the additional outlay costs per unit equals the opportunity cost. Obviously, the opportunity cost of selling internally depends on whether the selling division has excess capacity or not.
- Though conceptually appealing, the preceding general transfer-pricing rule may be difficult to implement in practice because of lack of required data (inputs to the formula).

International Issues in Transfer Pricing

- Survey evidence: more than 80% of multinational firms see transfer pricing as a major international tax issue, and more than half of these firms said it was *the most important issue*
- Because of international tax treaties, an "arm's-length standard" is the general rule
- The *arm's-length standard* calls for setting transfer prices to reflect the price that unrelated parties acting independently would have set

Methods for Applying the "Arm's-Length" Standard for International Transfer Pricing

- The *comparable price method* is the most commonly used and most preferred method by tax authorities
  - This method establishes an arm's-length price by using the sales prices of similar products made by unrelated parties
- The *resale price method* is used when little value is added and no significant manufacturing operations exist
  - This method based on an appropriate markup using gross profits of unrelated firms selling similar products

Applying the Arm's-Length Standard

- The *cost-plus method* determines the transfer price based on the seller's costs plus a gross profit % determined by comparing the seller's sales to those of unrelated parties or comparing unrelated parties' sales to other unrelated parties
- *Advance pricing agreements* (APAs) are agreements between the IRS and the firm using transfer prices that establish an agreed-upon transfer price (to save time and avoid costly litigation)

Summary

- An investment center is a responsibility unit within an organization in which the manager of that unit has responsibility over revenue generation, cost control, and level of investment.
- Because , by definition, the manager of an investment center has decision authority over the level of investment, that factor should logically be incorporated into any financial-performance indicator applied to the center.

Summary

- Performance-measurement systems regarding investment centers have the same strategic objectives as systems designed for profit centers :
  - To *motivate* managers
  - To provide the right *incentives* for managers to make decisions compatible with the goals of top management
  - To fairly determine the rewards earned by the managers

Summary

- ROI is the most common investment SBU measure; the higher the %, the better the indicated ROI
  - ROI is equal to ROS times AT
  - ROI = (income/sales) × (sales/investment)
  - ROI is referred to as a relative (not absolute) measure of performance
  - There are a number of important accounting and measurement issues related to the use of ROI as a financial performance measure
  - While widely used, ROI has some inherent limitations as a performance indicator

Summary

- In contrast to ROI, which is a %, residual income (RI) is a dollar amount equal to the income of a business unit less an imputed charge for the level of investment in the unit
  - RI is equal to the firm's desired minimum rate of return times the investment amount
- Economic value added (EVA®) is a refinement of RI and as such represents an estimate of the economic profits of an investment center
  - EVA® = adjusted after-tax cash income – imputed charge for level of invested capital in the investment center

Summary

- *Transfer pricing* refers to the process of determining an exchange price for products or services transferred between subunits (profit centers and/or investment centers) of the same organization
- Four methods for determining the transfer price:
  - Variable cost
  - Full cost
  - Market price
  - Negotiated price

Summary

- For international transfers, the *arm's-length standard* calls for setting transfer prices to reflect the price that unrelated parties acting independently would have set

Transfer-pricing issues

Transfer Pricing

In a decentralized organization, much of the decision-making power resides in its individual subunits. Those subunits often supply goods or services to one another.

- In that case, top management uses transfer prices to coordinate the actions of the subunits and to evaluate the performance of their managers.
- Transfer price—the price one subunit (department or division) charges for a product or service supplied to another subunit of the same organization.

Transfer Pricing

- The transfer price creates revenues for the selling subunit and purchase costs for the buying subunit affecting each subunit's operating income.
- The operating incomes can be used to evaluate the subunits' performances and to motivate their managers.
- Intermediate product—the product or service transferred between subunits of an organization.

Criteria for evaluating transfer prices

To help a company achieve its goals, transfer prices should meet four key criteria:

1. Promote goal congruence so that division managers acting in their own interest will take actions that are aligned with the objectives of top management.
2. Induce managers to exert a high level of effort.
3. Help top managers evaluate the performance of individual subunits.
4. Preserve autonomy of subunits if top managers favor a high degree of decentralization.

Three Transfer Pricing Methods

There are three broad categories of methods top managers can use to determine transfer prices. They are as follows:

1. Market-based transfer prices.
2. Cost-based transfer prices.
3. Hybrid transfer prices.

Under what circumstances should each of these options be used? Let's look in more detail at each category.

Market-Based Transfer Prices

- Market-based transfer prices are useful when there is a highly competitive market for the intermediate product.

- The producing department can opt to sell most or its entire intermediate product to external customers.

Market-Based Transfer Prices

- Top managers may choose to use the price of a similar product or service that is publicly available. Sources of prices include trade associations, competitors, and so on.
- Or, they may select the external price a subunit charges outside customers.

Market-Based Transfer Prices

- Transferring products or services at market prices generally leads to optimal decisions when three conditions are satisfied:
  1. The market for the intermediate product is perfectly competitive.
  2. The interdependencies of subunits are minimal.
  3. There are no additional costs or benefits to the company as a whole from buying or selling in the external market instead of transacting internally.

Market-Based Transfer Prices

- A perfectly competitive market exists when there is a homogeneous product with buying prices equal to selling prices and no individual buyer or seller can affect those prices by their own actions.
- Allows a firm to achieve goal congruence, motivating management effort, subunit performance evaluations, and preserve subunit autonomy.
- Perhaps should not be used if the market is currently in a state of "distress pricing."

Cost-Based Transfer Prices

- Cost-based transfer prices are based on a specific definition of the cost of the intermediate product.
- When the cost includes an allocation for fixed costs, and the transferring segment has the opportunity to sell to external customers, this may lead to suboptimal decisions for the organization.
- When the transferring segment does not have external customers, this reduces the transferring segment's incentives to reduce costs.

Cost-Based Transfer Prices

- Top managers choose a transfer price based on the costs of producing the intermediate product. Examples include:
  - Full-cost bases.
  - Variable-cost bases.
- Useful when market prices are unavailable, inappropriate, or too costly to obtain, such as when markets are not perfectly competitive, when the product is specialized or when the internal product is different from the products available externally in terms of its quality and the customer service provided for it.

Cost-Based Transfer Prices

- Despite its limitations, managers generally prefer to use full-cost-based transfer prices because:
  - They represent relevant costs for long-run decisions.
  - They facilitate external pricing based on variable and fixed costs.
  - They are the least costly to administer.

Cost-Based Transfer Prices

- Full-cost transfer pricing also raises many issues:
  1. How are the subunit's indirect costs allocated to products?
  2. Have the correct activities, cost pools and cost-allocation bases been identified?
  3. Should the chosen fixed-cost rates be actual or budgeted?

Hybrid Transfer Prices

- Takes into account both cost and market information.
- Top management may set the prices by specifying a transfer price that is an average of the cost of producing and transporting the product internally and the market price for comparable products.
- Types of hybrid transfer prices:
  - Prorating the difference between maximum and minimum transfer prices.
  - Negotiated pricing. (most common hybrid type)
  - Dual pricing.

Hybrid Transfer Pricing, cont'd

- Prorating the difference between the maximum and minimum cost-based transfer prices.
- Dual-pricing—using two separate transfer-pricing methods to price each transfer from one subunit to another. Example: selling division receives full cost pricing, and the buying division pays market pricing.

Dual-Rate Transfer Prices

- When dual-rate transfer prices are used, the producing department's selling price is different than the purchasing department's purchase price.

- Dual-rate transfer prices are useful to motivate appropriate manager behavior for both departments.

Negotiated Transfer Prices

- In some cases, managers of the producing and purchasing departments meet to exchange information and determine the transfer price.

- The resultant transfer price is called a negotiated transfer price.

Negotiated Transfer Prices

- Occasionally, subunits of a firm are free to negotiate the transfer price between themselves and then to decide whether to buy and sell internally or deal with external parties.
- May or may not bear any resemblance to cost or market data.
- Often used when market prices are volatile.
- Represent the outcome of a bargaining process between the selling and buying subunits.

Comparison of Transfer-Pricing Methods

Criteria	Market-Based	Cost-Based	Negotiated
Achieves goal congruence	Yes, when markets are competitive	Often, but not always	Yes
Motivates management effort	Yes	Yes, when based on budgeted costs; less incentive to control costs if transfers are based on actual costs	Yes
Useful for evaluating subunit performance	Yes, when markets are competitive	Difficult unless transfer price exceeds full cost and even then is somewhat arbitrary	Yes, but transfer prices are affected by bargaining strengths of the buying and selling divisions
Preserves subunit autonomy	Yes, when markets are competitive	No, because it is rule-based	Yes, because it is based on negotiations between subunits
Other factors	Market may not exist, or markets may be imperfect or in distress	Useful for determining full cost of products and services; easy to implement	Bargaining and negotiations take time and may need to be reviewed repeatedly as conditions change

Minimum Transfer Price

- The minimum transfer price in many situations should be:

Minimum Transfer Price	=	Incremental cost per unit incurred up to the point of transfer	+	Opportunity Cost per unit to the selling subunit

- Incremental cost is the additional cost of producing and transferring the product or service.
  - Opportunity cost is the maximum contribution margin forgone by the selling subunit if the product or service is transferred internally.

How multinationals use transfer Pricing to minimize their Taxes

- Transfer pricing is an important accounting priority for managers around the world.
- The reason is that parent companies can save large sums of money in taxes depending on the transfer pricing methods they use.

How multinationals use transfer Pricing to minimize their Taxes, concluded

- Transfer prices affect not just income taxes, but also payroll taxes, customs duties, tariffs, sales taxes, value-added taxes, environment-related taxes, and other government levies.
- Tax factors, particularly income taxes, are an important consideration for managers when determining transfer prices.

Transfer Prices

- Goods or services transferred between the segments of an organization are known as intermediate products.
- Performance evaluation of the business segments can be affected.
- Organizations set transfer prices on these goods and services.
- Transfer prices are eliminated during the preparation of consolidated financial statements, so they have no effect on an organization's income.

Activity-Based Transfer Prices

- Activity-based transfer prices are based on the unit-level and batch-level costs of the intermediate product plus a percentage of the producing department's facility-level costs.

- When the purchasing department's annual requirements for the intermediate product are known in advance, the transferring segment's planning is improved.

Minimum Transfer Price

- From the standpoint of the producing division, the lowest acceptable transfer price is one that covers the variable costs plus any contribution margin that is lost when the goods are not sold to external customers:

$$\text{Transfer price} \geq \text{Variable cost per unit} + \frac{\text{Total contribution margin on lost external sales}}{\text{Number of units transferred}}$$

- The lost contribution margin depends on whether the producing department has sufficient external customers to use its entire capacity.

Transfer Price Example

Shepard, Inc. has two divisions, East and West. East makes a component called XW3 that West uses in its production. East's capacity is 100,000 units of XW3 each month. The variable costs of producing XW3 are $4/unit and East's fixed costs are $150,000 per month. East can sell XW3 to external customers for $6 and West can buy it from another supplier for $6. West needs 20,000 units of XW3 per month. Compute the transfer price if East charges the full absorption cost. Suppose that East can sell 70,000 units to external customers. Will East and West agree to the transfer? Is the transfer in the best interests of Shepard?

Cost-based transfer price = $4.00 + $150,000/100,000 = $5.50

East's minimum transfer price = $4.00 + $0 = $4.00, because it has sufficient capacity to cover West's demand for the product.

Both divisions will agree to the transfer. It is in the best interests of Shepard because it only costs $4.00 x 20,000 = $80,000 for East to produce the units, but it would cost West $6.00 x 20,000 = $120,000 to get the units from an outside supplier.

Transfer Price Example

Shepard, Inc. has two divisions, East and West. East makes a component called XW3 that West uses in its production. East's capacity is 100,000 units of XW3 each month. The variable costs of producing XW3 are $4/unit and East's fixed costs are $150,000 per month. East can sell XW3 to external customers for $6 and West can buy it from another supplier for $6. West needs 20,000 units of XW3 per month. Suppose that East can sell 97,000 units to external customers. Compute the minimum transfer price East will accept. Will West agree to the transfer? Is the transfer in the best interests of Shepard?

East will lose sales of 17,000 units to regular customer if it transfers the units to West. The contribution margin on a regular customer is $6 - $4 = $2.

East's minimum transfer price = $4 + ($2 x 17,000)/20,000 = $5.70.

West will agree to this because $5.70 < $6. It is in the best interests of Shepard because it only costs $4 x 20,000 + {lost contribution margin of $2 x 17,000} = $114,000 for East to produce the units, but it would cost West $6.00 x 20,000 = $120,000 to get the units from an outside supplier.

Transfer Price Uses

- Organizations set transfer prices for products and services transferred between business segments.
- Transfer prices can also be set for corporate overhead costs.
- International organizations set transfer prices so that total taxes are minimized for the organization, subject to IRS regulations.

Problems and Examples – Case study illustration

Day 4

Flexible budgets and variance analysis

- The features of budgetary control
- Define the master budget and explain its major benefits to an organization
- Describe the difference between a static budget and a flexible budget
- Compute flexible-budget variances and sales-volume variances
- Explain why standard costs are often used in variance analysis
- Integrate continuous improvement into variance analysis
- Case study, problems and exercises

The features of budgetary control

Budgetary Control

- Budgetary control is simply the review of budgets and actual results and making strategic adjustments.

Budgeting fundamentals

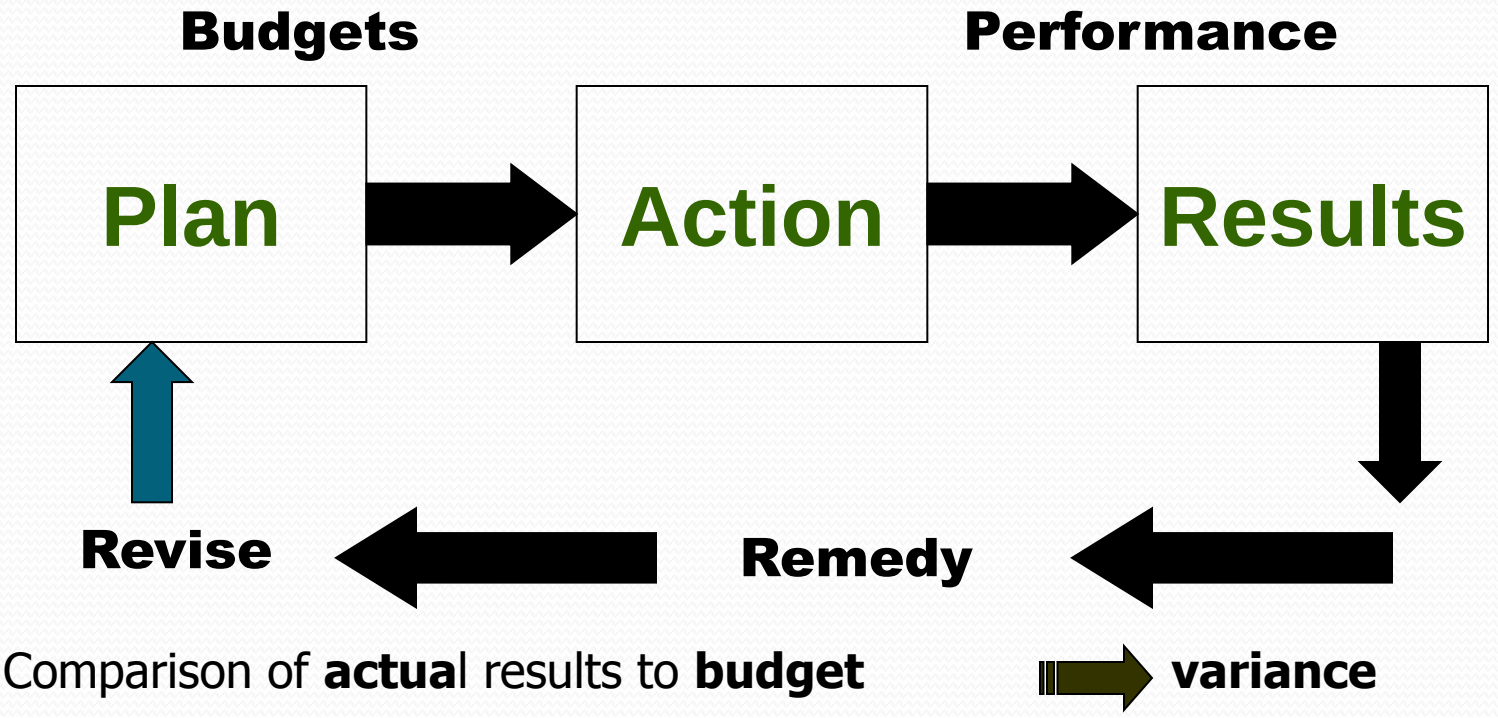
- Budgeting is the process used to develop:
  - A formal written statement
  - Of managements plans for the future
  - Expressed in financial terms

Types of plans

- Long term: 5 to 10 years
- Medium term: 1 to 5 years
- Short term: up to 1 year

The planning cycle

Budgets are the mechanism by which management control of an organisation becomes possible.



Benefits of budgets

1. Forces managers to do **planning.**
2. Realistic performance targets.
3. Basis for **controlling** what happens within the organisation.
4. Helps **coordinate** the activities of the various centres that make up the business.
5. **Communication** – managers exchange information on ideas, etc.
6. **Motivating** tool – if the process involves staff.

Limitations of budgets

- Only estimates, not statements of facts.
- No substitute for sound management practices.
- Need to be amended if circumstances change.
- Preparation does not guarantee success.
- Aspects of people's behaviour may undermine the value of the process.

Budget classification

- **Static (fixed) budgets**: prepared for one level of activity, usually around the forecasts made for sales.

- **Flexible budgets**: a series of fixed budgets set to different levels of sales activity within which the organisation may operate.

Cost/volume relationships

- **Fixed costs**: in **total** remain the **same** for a period of time and over a particular range of activity.

- **Variable costs**: in **total** tend to **change** as the level of activity changes.

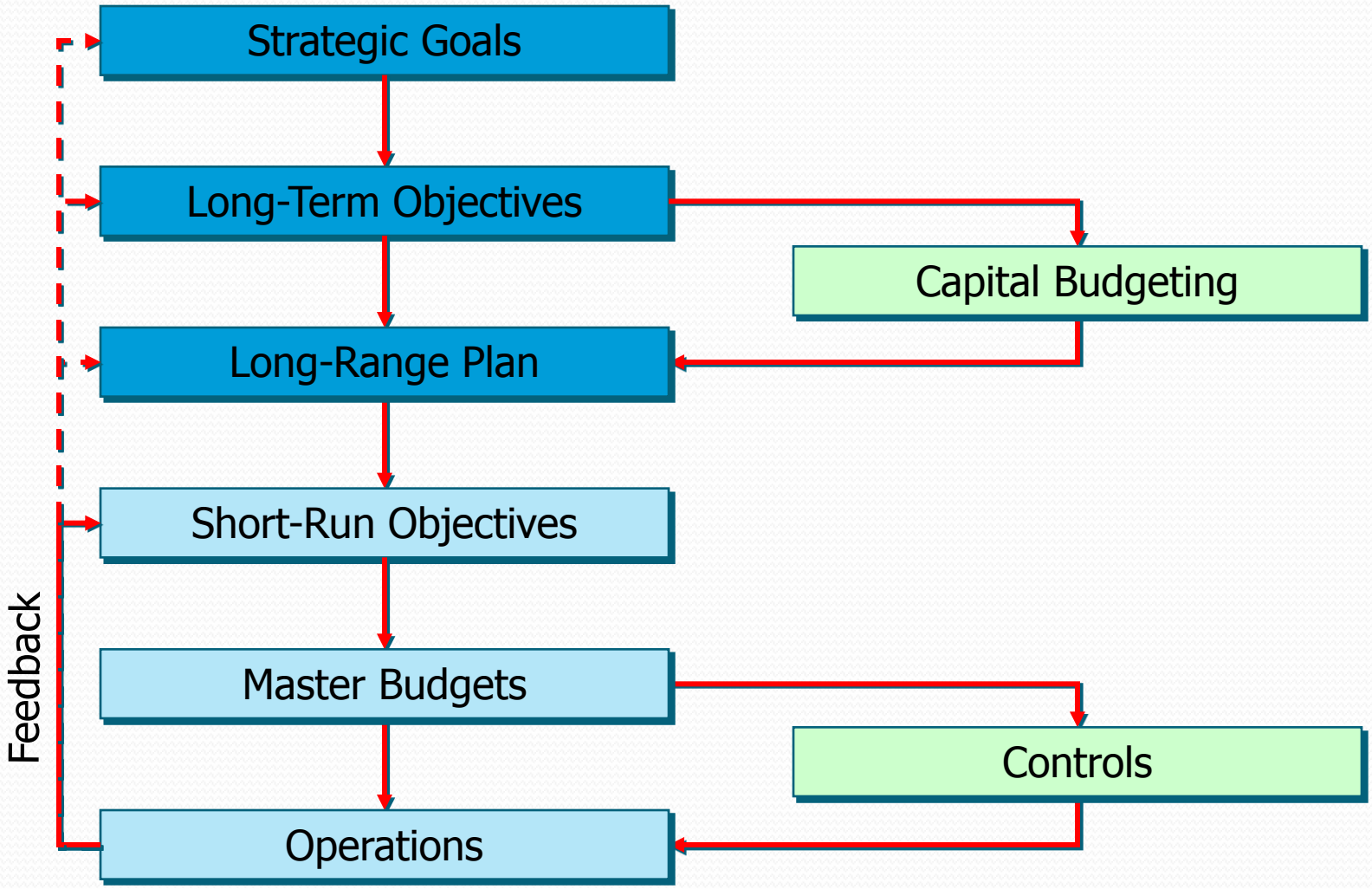
Budget processes

- **Zero-based budgeting**: sets the initial figures for each activity to zero.
- **Period budgets**: developed for a specific period of time, e.g. a month.
- **Rolling (continuous) budgets**: are continually updated by periodically adding a new incremental time period and dropping the period just completed.

Types of budgets

- **Revenue budgets**: estimates of the income of an organisation from the sale of goods and/or provision of services for a specific period.
- **Operating budgets**: estimate activities that will affect profit.
- **Budgeted financial statements**: show the estimated results and projected financial position of a business. That is budgeted income statement, balance sheet and statement of cash flows.

Budget Relationship



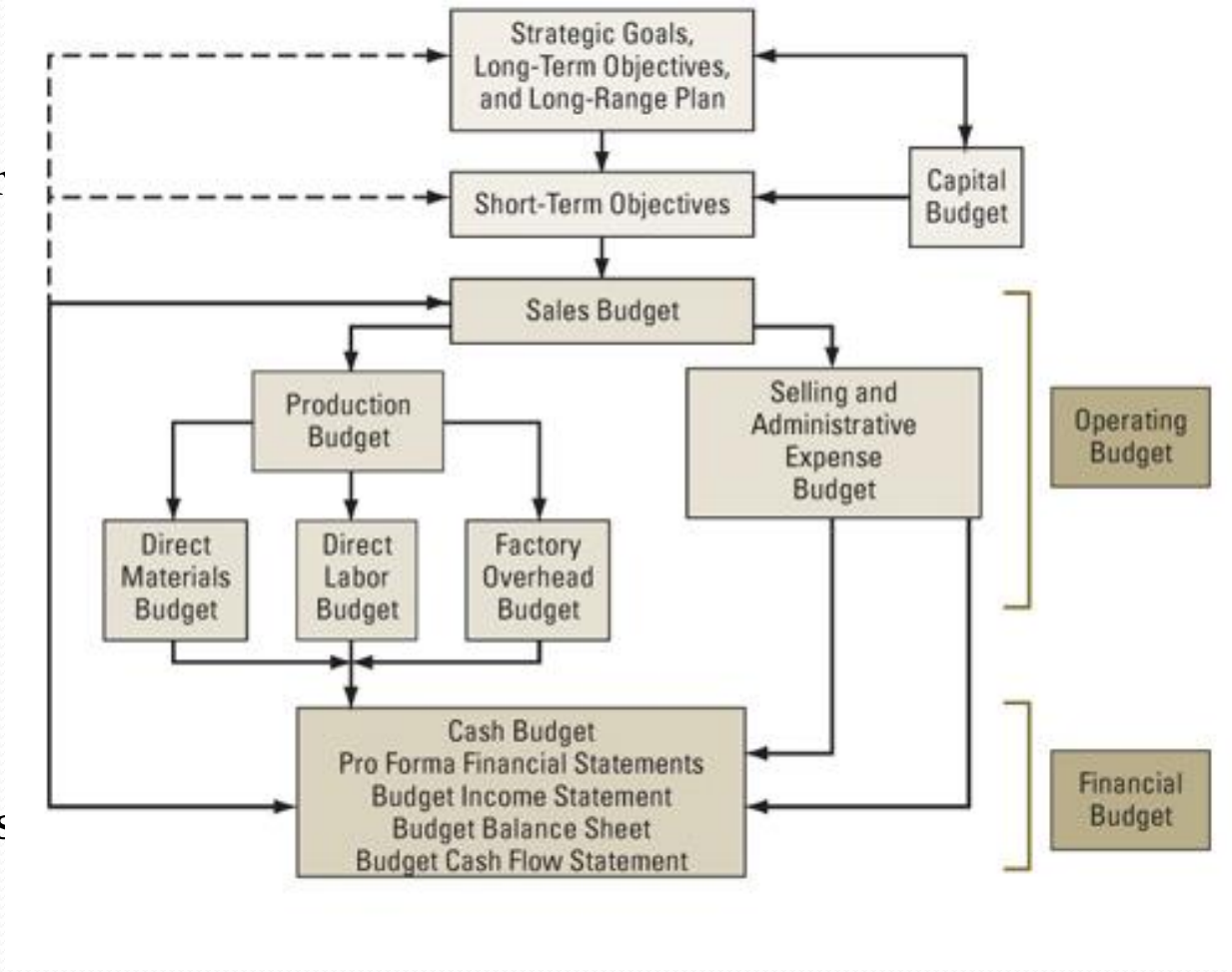
Define the master budget and explain its major benefits to an organization

Master budget

A combination of all the budgets of an organisation.

Master Budget

- A master budget is a comprehensive budget for a specific period
- It consists of **many interrelated operating and financial budgets**
- A **sales budget** often is regarded as the cornerstone of the entire budget
- The starting point in preparing a sales budget is **sales forecasts**



Master budget

Merchandising firm	**Professional services**	**Manufacturing firm**
Sales budget	Fees or fees & sales budget	Sales budget
Purchases budget	Professional & support labour budget	Cost of production budget
Cost of goods sold budget	Cost of supplies used	Cost of goods sold budget
Other operating expense budgets	Other operating expense budgets	Other operating expense budgets

Master budget

- Irrespective of the type of organisation, the following budgets will be part of the master budget:
  - Statement of financial performance [revenue budget]
  - Statement of financial position [balance sheet]
  - Statement of cash flow

Budgeting cycle:

1. Before the start of a fiscal year, managers at all levels take into account past performance, market feedback, anticipated future changes and other indicators to initiate plans for the next period.
2. Senior managers give subordinate managers a frame of reference against which they will compare actual results.
3. Managers and management accountants investigate any deviations from the plan.

Working document: Master Budget

The master budget is at the core of the budgeting process. It expresses management's operating and financial plans for a specified period:

- Operating decisions deal with how to best use the limited resources of an organization. (the operating budget)
- Financial decisions deal with how to obtain the funds to acquire those resources. (the financial budget)

Advantages of Budgets

- Promotes coordination and communication among subunits within the company.
- Provides a framework for judging performance and facilitating learning.
- Motivates managers and other employees.

Challenges in administering a budget

- Top managers want lower-level managers to participate in the budgeting process because they have more specialized knowledge of day-to-day management, however…
- The budgeting process is time-consuming, and
- Upper-level management's support is crucial

Time coverage of budgets

The timeline for a budget is dependent on the motive for creating the budget.

The most frequently used budget period is 1 year.

Businesses may also use a rolling budget. This budget is always available for a specified future period, by continually adding a month, quarter, or year to the period just ended.

To facilitate the budget process, use the 5-step decision making process

1. Identify the problem and uncertainties
2. Obtain information
3. Make predictions about the future
4. Make decisions by choosing among alternatives
5. Implement the decision, evaluate performance and learn

Basic Operating Budget Steps

1. Prepare the revenues budget (schedule 1; the starting point) Page 206
2. Prepare the production budget (schedule 2; in units). Page 207
3. Prepare the direct materials usage budget and direct materials purchases budget (schedule 3) Pages 207 and 208
4. Prepare the direct manufacturing labor budget (schedule 4) Page 208

Basic Operating Budget Steps

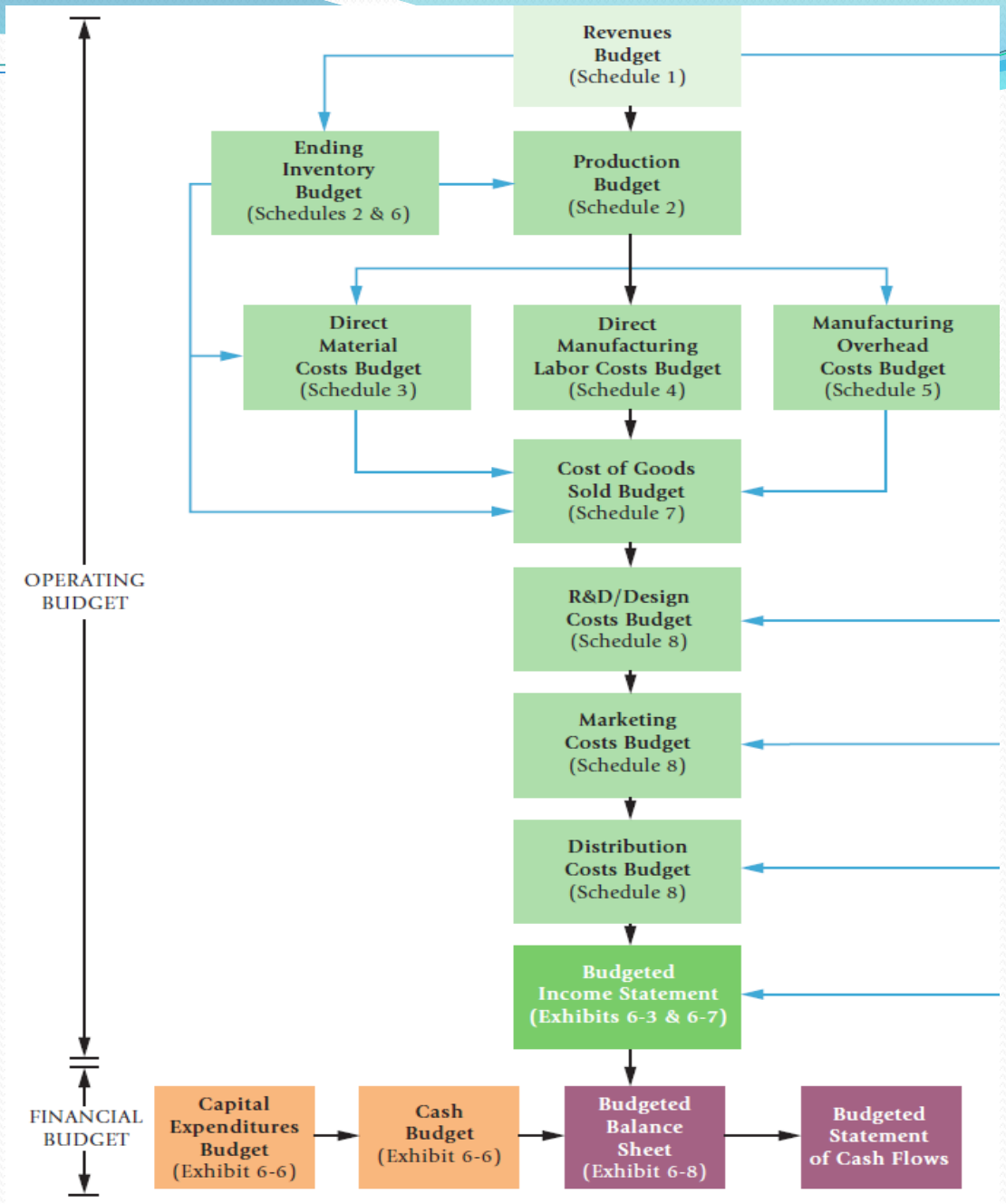
5. Prepare the manufacturing overhead costs budget (schedule 5) Page 210
6. Prepare the ending inventories budget (schedule 6A, units; schedule 6B, dollars) Pages 211 and 212
7. Prepare the cost of goods sold budget (schedule 7) Page 212
8. Prepare the operating expense (period cost) budget (schedule 8) Page 213
9. Prepare the budgeted income statement Exhibit 6-3 page 213

Basic Financial Budget Steps

Based on the operating budgets:

1. Prepare the capital expenditures budget.
2. Prepare the cash budget.
3. Prepare the budgeted balance sheet.
4. Prepare the budgeted statement of cash flows.

Overview of the Master Budget



Financial-planning models & sensitivity analysis:

- Financial planning models may be employed to conduct sensitivity ("what-if") analysis to assist in the budgetary process.
- A "what-if" analysis or sensitivity analysis is a technique that examines how a result will change if the original predicted data or underlying assumption change.

Sensitivity Analysis

- Sensitivity analysis is used to assist managers in planning and budgeting.
- Sensitivity analysis is a "what if" technique that illustrates the impact of changes from the predicted data.
- Two scenarios are being considered for Stylistic Furniture's (the company from the textbook) budget.

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	A	B	C	D	E	F	G	H	I
1	Key Assumptions								
2		Units Sold		Selling Price		Direct Material Cost		Budgeted Operating Income	
3	What-If Scenario	Casual	Deluxe	Casual	Deluxe	Red Oak	Granite	Dollars	Change from Master Budget
4	Master budget	50,000	10,000	$600	$800	$7.00	$10.00	$4,860,000	
5	Scenario 1	50,000	10,000	582	776	$7.00	$10.00	3,794,100	22% decrease
6	Scenario 2	50,000	10,000	600	800	$7.35	$10.50	4,483,800	8% decrease

Describe the difference between a static budget and a flexible budget

Budgets & Strategic Management Process

- A budget is
  - A formalized financial plan.
  - A translation of an organization's strategies.
  - A method of communicating.
  - A way to define areas of responsibility and decision rights.

- The budget cycle is the series of sequential steps followed to create and use budgets.

Budgets & Strategic Management Process

- Budgeting process begins with the organizational vision, core competencies, and risk appetite
- Organizational strategies designed to achieve the vision will drive the capital expenditures and long term financing plans
- Operating plans are then created in line with the organizational strategies
- Actual results must be monitored, measured, and analyzed compared to budgeted plans

Budgets & Levers of Control

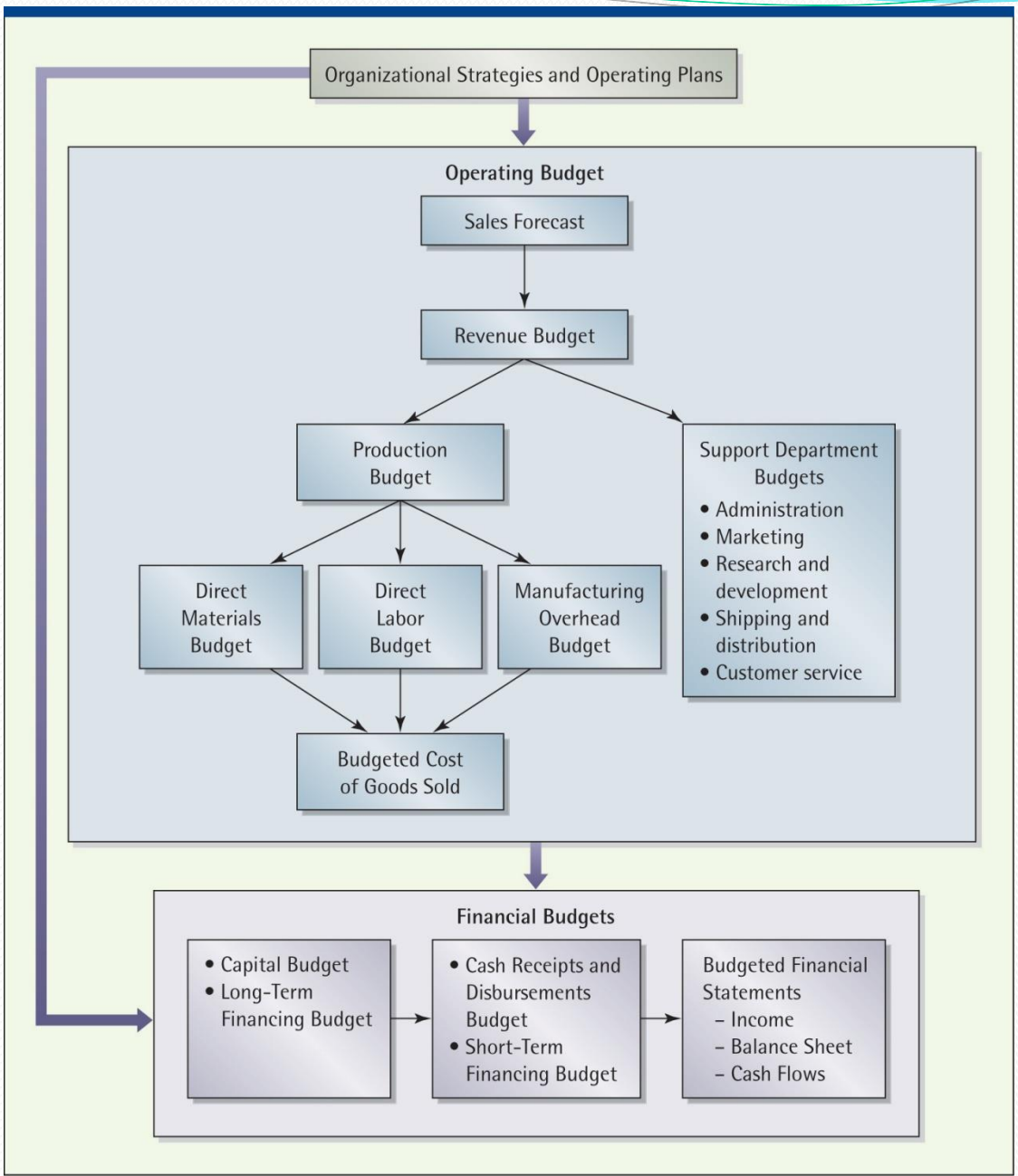
Belief Systems	Boundary Systems	Interactive Control Systems	Diagnostic Control Systems
• Communicates organizational strategies and goals • Motivates managers to plan in advance and coordinate activities	• Authorizes employees to engage in planned activities and spend within budget limits • Ensures sufficient cash flow for financial viability	• Utilize variances to identify opportunities and threats to the business • Revaluate strategies and operating plans as conditions changes	• Assign responsibility and reward employees for achieving budget targets • Motivate managers to provide good estimates and use resources appropriately

Master Budgets

- A master budget is
  - A comprehensive plan for the upcoming accounting period.
  - Usually prepared for a one-year period.
  - Is based on a series of budget assumptions.

- The master budget consists of several subsidiary budgets, in two categories:
  - Operating budgets.
  - Financial budgets.

Operating Budgets



Operating Budgets

The operating budget is created by preparing the following individual budgets, in this order:

- Revenue budget
- Production budget
- Direct materials budget
- Direct labor budget
- Manufacturing overhead budget
- Inventory and cost of goods sold budget
- Support department budgets
- Budgeted income statement

Financial Budgets

The financial budget is created by preparing the following individual budgets, in this order:

- Capital budget
- Long-term financing budget
- Cash budget
- Budgeted balance sheet
- Budgeted statement of cash flows

Operating Budget Example

Stanley J, Inc., makes a tool used by auto mechanics that sells for $68/unit. It expects to sell 6,000 units in April and 7,000 units in May. Stanley J prefers to end each period with a finished goods inventory equal to 10% of the next period's sales in units and a direct materials inventory equal to 20% of the direct materials required for the next period's production. The company never has any beginning or ending work-in-process inventories. There were 400 units in finished goods inventory on April 1. Prepare the revenue and production budgets for April.

Revenue budget	
Budgeted sales in units in April	6,000
Budgeted selling price per unit	$68.00
Budgeted revenues	$408,000

Production budget	
Budgeted sales in units in April	6,000
Desired ending FG inventory	700
Total units required	6,700
Less: beginning FG inventory	(400)
Required production in units	6,300

Operating Budget Example

Stanley J's product uses 0.3 pounds of direct material per unit, at a cost of $4/lb. There were 220 lbs. of direct material on hand on April 1. Assume that budgeted production for May is 6,500 units. Prepare the direct materials purchases and usage budget for April.

Direct materials budget	
Required production in units	6,300
DM required per unit, in pounds	0.3
Total DM required, in pounds	1,890
Less: Beginning DM inventory	(220)
Plus: Desired ending DM inventory	390
Required DM purchases in pounds	2,060
Budgeted DM cost per pound	$4.00
Budgeted cost of DM	$8,240

Usage Budget = 1,890 pounds * $4 per pound = $7,560

Operating Budget Example

Stanley J's product uses 0.2 hours of direct labor at a cost of $12/hr. Prepare the direct labor budget for April.

Direct labor budget	
Required production in units	6,300
DL required per unit, in hours	0.2
Total DL hours required	1,260
Budgeted cost per DL hour	$12.00
Budgeted cost of DL	$15,120

Operating Budget Example

Stanley J's budgeted fixed manufacturing overhead for April is $167,000, and variable manufacturing overhead is budgeted at $6 per direct labor hour. Prepare the manufacturing overhead budget for April.

Manufacturing overhead budget	
Total DL hours required	1,260
Budgeted variable overhead per DL hour	$6.00
Total budgeted variable overhead	$7,560
Budgeted fixed overhead	$167,000
Total budgeted overhead	$174,560

Operating Budget Example

Assume that Stanley J's April 1 direct materials inventory had a cost of $1,560. Prepare the April ending inventories budget for direct materials.

Ending inventories budgets	
Budgeted cost of DM purchases	$8,240
Beginning DM inventory	$854
DM available for use	$9,094
Budgeted cost of desired ending DM inventory:	
[6,500 units x 0.3 lbs/unit] x 20% x $4/lb	$1,560
Budgeted cost of DM to be used	$7,534

Operating Budget Example

Prepare the April ending inventories budget for finished goods.

Budgeted cost of DM to be used	$7,534
Budgeted cost of DL	$15,120
Total budgeted overhead	$174,560
Total budgeted manufacturing costs	$197,214
Required production in units	6,300
Budgeted manufacturing cost per unit	$31.3037
Budgeted ending FG inventory in units	700
Budgeted cost of ending FG inventory	$21,913

Operating Budget Example

Assume that Stanley J's April 1 finished goods inventory had a cost of $12,146. Prepare the cost of goods sold budget for April.

Cost of goods sold budget	
Beginning FG inventory	$12,146
Total budgeted manufacturing costs	$197,214
Cost of goods available for sale	$209,359
Less: budgeted ending FG inventory	$21,913
Budgeted cost of goods sold	$187,447

Operating Budget Example

Stanley J's budget for April includes $22,000 for administrative costs, $34,000 for fixed distribution costs, $18,000 for research and development, and $13,000 for fixed marketing costs. Additionally, the budgeted variable costs for distribution are $0.75/unit sold and the budgeted variable costs for marketing are 4% of sales revenue. Prepare the support department budget for April.

Support department budget		
Administration		$22,000
Distribution: Fixed costs	$34,000	
Variable costs	$4,500	$38,500
Research & development		$18,000
Marketing: Fixed costs	$13,000	
Variable costs	$16,320	$29,320
Total budgeted support department costs		$107,820

Operating Budget Example

Suppose that Stanley J's income tax rate is 28%. Prepare the budgeted income statement for April.

Budgeted income statement		
Sales revenue		$408,000
Cost of goods sold		$187,447
Gross margin		$220,553
Operating costs:		
Administration	$22,000	
Distribution	$38,500	
Research & development	$18,000	
Marketing	$29,320	$107,820
Net income before taxes		$112,733
Income taxes		$31,565
Net income		$81,168

Budget Variances

- Managers compare actual results to budgeted results in order to
  - Monitor operations, and
  - Motivate appropriate performance.

- Differences between budgeted and actual results are called budget variances.
  - Variances are stated in absolute value terms, and labeled as Favorable or Unfavorable.

Budget Variances

- Reasons for budget variances are investigated.

- The investigation may find:
  - Inefficiencies in actual operations that can be corrected.
  - Efficiencies in actual operations that can be replicated in other areas of the organization.
  - Uncontrollable outside factors that require changes to the budgeting process.

Static Budgets

- A budget prepared for a single level of sales volume is called a static budget.
- Static budgets are prepared at the beginning of the year.
- Differences between actual results and the static budget are called static budget variances.

Flexible Budgets

- A budget prepared for a multiple levels of sales volume is called a flexible budget.
- Flexible budgets are prepared at the beginning of the year for planning purposes and at the end of the year for performance evaluation.
- Flexible budgets are also used for sensitivity analysis and to manage risk due to uncertainty.
- Differences between actual results and the flexible budget are called flexible budget variances.

Flexible Budget Example

Tina's Trinkets is preparing a budget for 2006. The budgeted selling price per unit is $10, and total fixed costs for 2006 are estimated to be $5,000. Variable costs are budgeted at $3/unit. Prepare a flexible budget for the volume levels 1,000, 1,100, and 1,200 units.

	Volume Levels		
Sales in units	1,000	1,100	1,200
Revenues	$10,000	$11,000	$12,000
Variable costs	$3,000	$3,300	$3,600
Contribution margin	$7,000	$7,700	$8,400
Fixed costs	$5,000	$5,000	$5,000
Operating income	$2,000	$2,700	$3,400

Static Budget Variances Example

Suppose that Tina's 2006 static budget was for 1,100 units of sales. The actual results are given below. Compute the static budget variances for each row and discuss.

	Static Budget	Actual Results	Static Budget Variance	
Sales in units	1,100	980		
Revenues	$11,000	$9,604	$1,396	Unfavorable
Variable costs	$3,300	$2,989	$311	Favorable
Contribution margin	$7,700	$6,615	$1,085	Unfavorable
Fixed costs	$5,000	$4,520	$480	Favorable
Operating income	$2,700	$2,095	$605	Unfavorable

Flexible Budget Variances Example

Compute the flexible budget variances for Tina and discuss the results. Compare the flexible budget variances to the static budget variances on the prior page.

	Year-end Flexible Budget	Actual Results	Flexible Budget Variance	
Sales in units	980	980		
Revenues	$9,800	$9,604	$196	Unfavorable
Variable costs	$2,940	$2,989	$49	Unfavorable
Contribution margin	$6,860	$6,615	$245	Unfavorable
Fixed costs	$5,000	$4,520	$480	Favorable
Operating income	$1,860	$2,095	$235	Unfavorable

Performance Evaluation

- A static budget variance includes effects from output volume.
- A flexible budget variance removes these output volume effects.
- Other adjustments to the year-end flexible budget may be made for a fair performance evaluation, such as
  - Input price changes outside the control of the manager under evaluation
  - Fixed cost increases outside the control of the manager under evaluation

Behavior Tensions in Budgeting

- Budgets used to evaluate performance and compensation can create behavioral tension
- Participative budgeting – when managers who are responsible for the budgets prepare the budget forecasts
  - Can result in budgetary slack – when managers set targets so low that goals can be met easily (and bonuses achieved)
- Budget ratcheting – when top managers set targets
  - If targets unachievable, this can result in employees having little motivation to meet targets
- Organizations must watch for budget manipulation

Other Budgeting Approaches

- Zero based budgets are prepared without using past information as justification.
- Rolling budgets are prepared frequently for overlapping time periods and actual results may be used to update the budget for the next period.
- Kaizen budgets plan cost reductions over time.
- Activity based budgets use more cost pools and cost drivers.
- GPK and RCA budgets identify fixed and variable cost functions at the resource center level.
- Beyond budgeting uses external benchmarks to evaluate managers' performance

Compute flexible-budget variances and sales-volume variances

Basic Concepts

- Variance—difference between actual results and expected (budgeted) performance.
- Management by exception—the practice of focusing attention on areas not operating as expected (budgeted).
- Static (master) budget is based on the output planned at the start of the budget period.

Basic Concepts

- Static-budget variance—the difference between the actual result and the corresponding static budget amount
- Favorable variance (F)—has the effect of increasing operating income relative to the budget amount
- Unfavorable variance (U)—has the effect of decreasing operating income relative to the budget amount

Variances

- Variances may start out “at the top” with a Level o analysis.
- This is the highest level of analysis, a super-macro view of operating results.
- The Level o analysis is nothing more than the difference between actual and static-budget operating income.

Variances

- Further analysis decomposes (breaks down) the Level 0 analysis into progressively smaller and smaller components.
  - Answers: “How much were we off?”
- Levels 1, 2, and 3 examine the Level 0 variance into progressively more-detailed levels of analysis.
  - Answers: “Where and why were we off?”

Evaluation

- Level 0 tells the user very little other than how much operating income was off from budget.
  - Level 0 answers the question: “How much were we off in total?”
- Level 1 gives the user a little more information: it shows which line-items led to the total Level 0 variance.
  - Level 1 answers the question: “Where were we off?”

Level 1 Analysis, Illustrated

Level 1 Analysis

	Actual Results (1)	Static-Budget Variances (2) = (1) – (3)	Static Budget (3)
Units sold	10,000	2,000 U	12,000
Revenues	$1,250,000	$190,000 U	$1,440,000
Variable costs			
Direct materials	621,600	98,400 F	720,000
Direct manufacturing labor	198,000	6,000 U	192,000
Variable manufacturing overhead	130,500	13,500 F	144,000
Total variable costs	950,100	105,900 F	1,056,000
Contribution margin	299,900[b]	84,100 U	384,000[c]
Fixed costs	285,000	9,000 U	276,000
Operating income	$ 14,900	$ 93,100 U	$ 108,000

$ 93,100 U

Static-budget variance

[a]F = favorable effect on operating income; U = unfavorable effect on operating income.

[b]Contribution margin percentage = $299,900 ÷ $1,250,000 = 24.0%.

[c]Contribution margin percentage = $384,000 ÷ $1,440,000 = 26.7%.

Flexible Budget

- Flexible budget—shifts budgeted revenues and costs up and down based on actual operating results (activities)
- Represents a blending of actual activities and budgeted dollar amounts
- Will allow for preparation of Level 2 and 3 variances
  - Answers the question: “Why were we off?”

Level 2 Analysis, Illustrated

Level 2 Analysis

	Actual Results (1)	Flexible-Budget Variances (2) = (1) – (3)	Flexible Budget (3)	Sales-Volume Variances (4) = (3) – (5)	Static Budget (5)
Units sold	10,000	0	10,000	2,000 U	12,000
Revenues	$1,250,000	$50,000 F	$1,200,000	$240,000 U	$1,440,000
Variable costs					
Direct materials	621,600	21,600 U	600,000	120,000 F	720,000
Direct manufacturing labor	198,000	38,000 U	160,000	32,000 F	192,000
Variable manufacturing overhead	130,500	10,500 U	120,000	24,000 F	144,000
Total variable costs	950,100	70,100 U	880,000	176,000 F	1,056,000
Contribution margin	299,900	20,100 U	320,000	64,000 U	384,000
Fixed manufacturing costs	285,000	9,000 U	276,000	0	276,000
Operating income	$ 14,900	$29,100 U	$ 44,000	$ 64,000 U	$ 108,000

Level 2

$29,100 U — Flexible-budget variance

$ 64,000 U — Sales-volume variance

Level 1

$93,100 U — Static-budget variance

[a]F = favorable effect on operating income; U = unfavorable effect on operating income.

LEVEL 2 VARIANCES, ANALYSIS

Some possible reasons we might incur an unfavorable Sales-Volume Variance include:

1. Failure to execute the sales plan
2. Weaker than anticipated demand
3. Aggressive competitors taking market share
4. Unanticipated market preference away from the product
5. Quality problems

Level 3 Variances

- All product costs can have Level 3 variances. Direct materials and direct labor will be handled next.
- Direct materials and direct labor both have price and efficiency variances, and their formulae are the same.

Level 3 Variances

- Price variance formula:

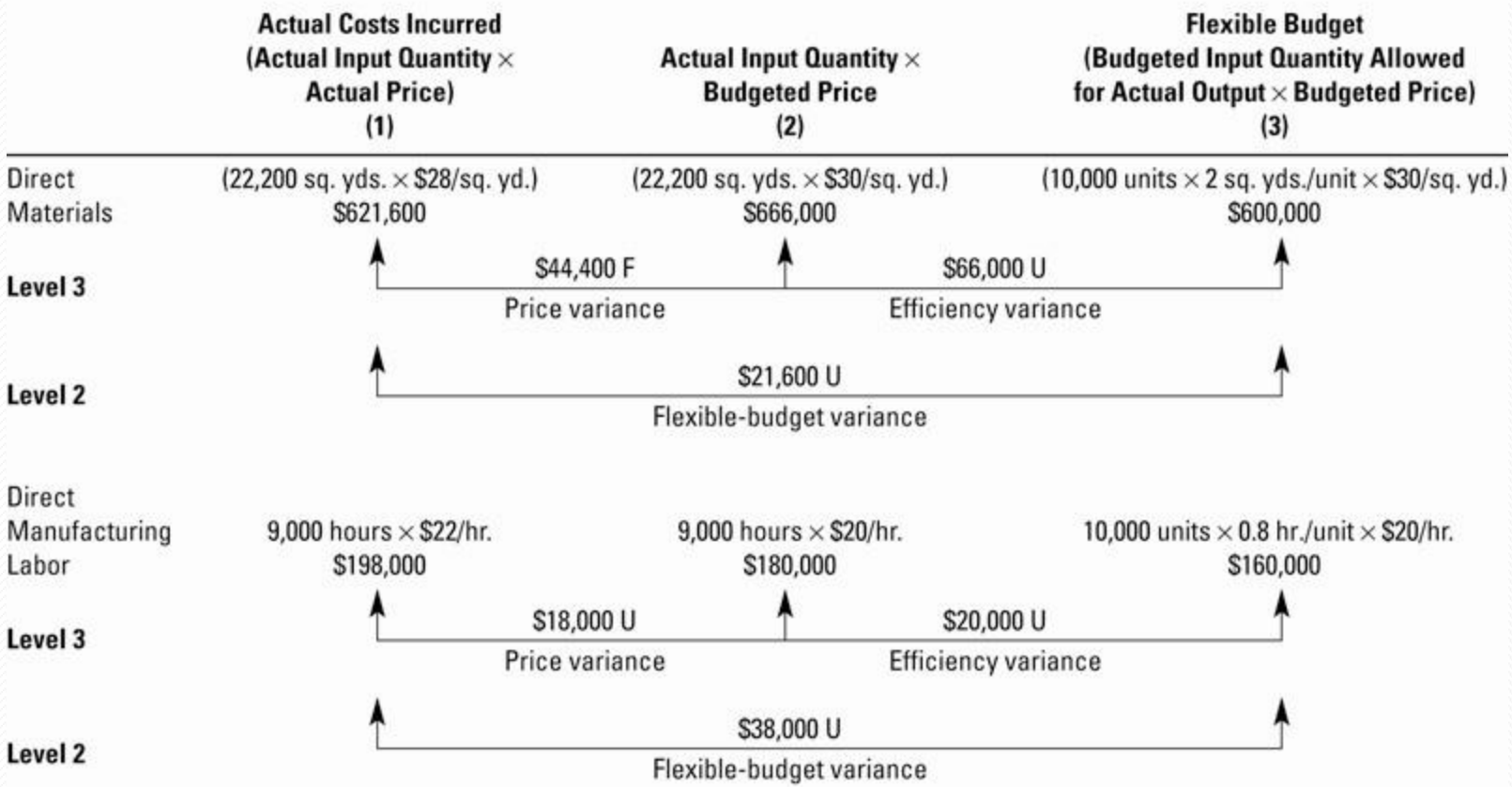
Price Variance	=	{	Actual Price Of Input	-	Budgeted Price Of Input	}	X	Actual Quantity Of Input

- Efficiency variance formula:

Efficiency Variance	=	{	Actual Quantity Of Input Used	-	Budgeted Quantity of Input Allowed for Actual Output	}	X	Budgeted Price Of Input

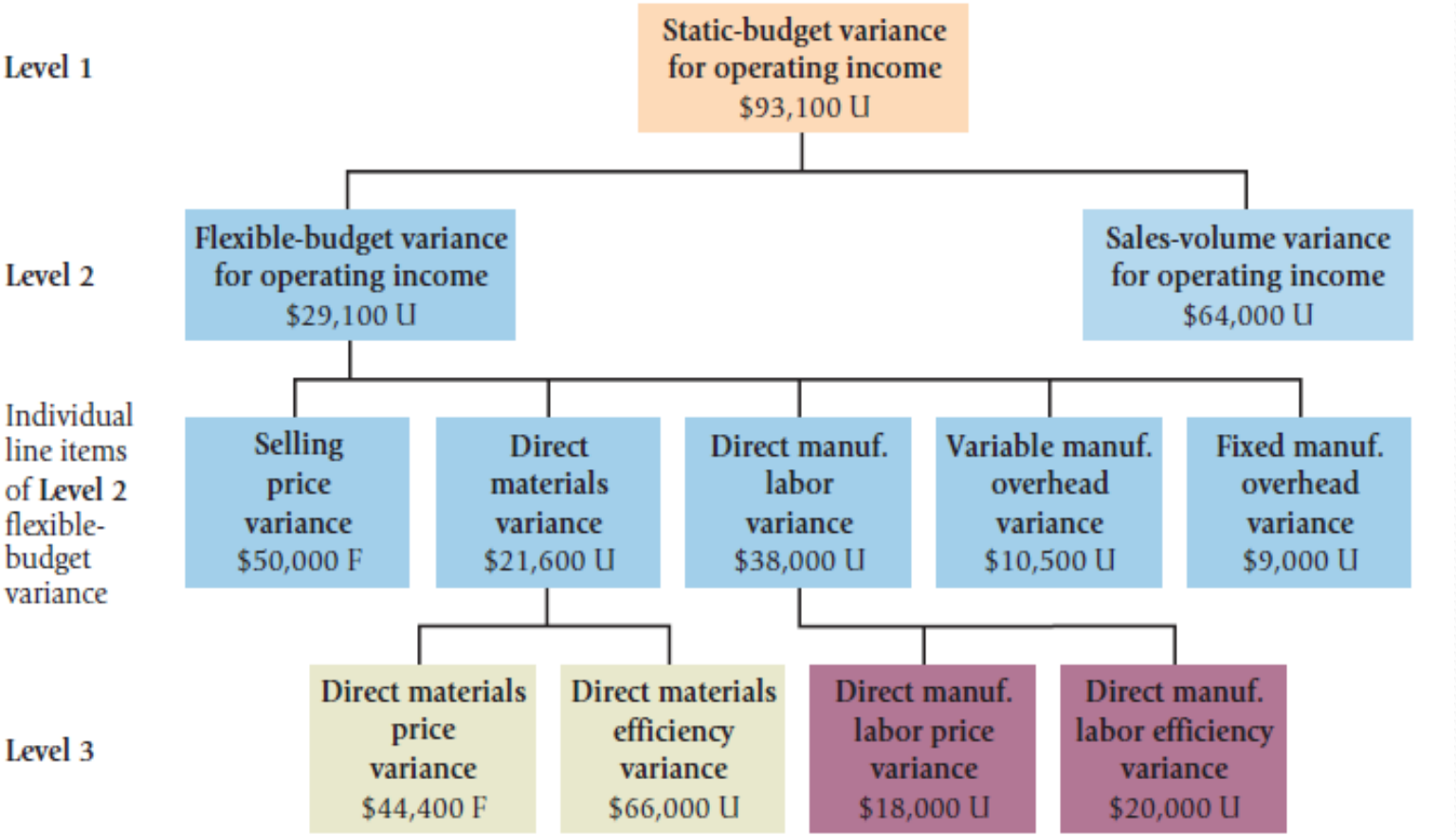
Level 3 Analysis, Illustrated

Level 3 Analysis



[a]F = favorable effect on operating income; U = unfavorable effect on operating income.

Variance Summary



Obtaining budgeted input prices and input quantities

Budgeted input prices and budgeted input quantities can be obtained from a number of sources including actual input data from past periods, data from other companies that have similar processes and standards developed by the firm itself.

A standard is a carefully determined price, cost or quantity that is used as a benchmark for judging performance.

Variances and Journal Entries

- Each variance may be journalized.
- Each variance has its own account.
- Favorable variances are credits; unfavorable variances are debits.
- Variance accounts are generally closed into cost of goods sold at the end of the period, if immaterial.

Standard Costing

- Targets or standards are established for direct material and direct labor.
- The standard costs are recorded in the accounting system.
- Actual price and usage amounts are compared to the standard and variances are recorded.

Standard Costs can be a Useful Tool

- Price and efficiency variances provide feedback to initiate corrective actions.
- Standards are used to control costs.
- Managers use variance analysis to evaluate performance after decisions are implemented.
- Part of a continuous improvement program.

Benchmarking and Variances

- Benchmarking is the continuous process of comparing the levels of performance in producing products and services against the best levels of performance in competing companies.
- Variances can be extended to include comparison to other entities.

Benchmarking airlines

	A	B	C	D	E	F	G
1		Operating Cost	Operating Revenue	Operating Income	Fuel Cost	Labor Cost	Total ASMs
2		(Cents per ASM)	(Cents per ASM)	(Cents per ASM)	(Cents per ASM)	(Cents per ASM)	(Millions)
3	**Airline**	**(1)**	**(2)**	**(3) = (2) – (1)**	**(4)**	**(5)**	**(6)**
4							
5	United Airlines	14.19	13.10	- 1.09	4.90	4.24	216,299
6	Airlines used as benchmarks:						
7	Alaska Airlines	11.90	13.09	1.19	4.10	3.53	28,185
8	American Airlines	14.26	13.47	-0.79	4.90	4.28	152,627
9	Delta Airlines	13.80	14.48	0.68	5.00	3.86	200,880
10	JetBlue Airways	11.42	11.96	0.54	4.40	2.76	40,095
11	Southwest Airlines	12.83	13.29	0.46	4.60	3.90	128,272
12	U.S. Airways	13.25	13.49	0.24	4.60	3.54	74,204
13	Average of airlines						
14	used as benchmarks	12.91	13.30	0.39	4.60	3.65	104,044
15							
16	*Source: 2012 data from the MIT Global Airline Industry Program*						

Planning fixed and variable Overhead

- To effectively plan variable overhead costs, managers should focus on activities that add value and eliminate those that do not.
- Fixed overhead planning is similar ~ plan only for essential activities and plan to be as efficient as possible.

Standard Costing

…is a costing system that

- Traces direct costs to output by multiplying the standard prices or rate by the standard quantities of inputs *allowed* for actual outputs produced.
- Allocates overhead costs on the basis of the standard overhead-cost rates times the standard quantities of the allocation bases *allowed* for the actual outputs produced.

Developing Budgeted Variable Overhead Cost Rates

1. Choose the period to be used for the budget.
2. Select the cost-allocation bases to use in allocating variable overhead costs to output produced.
3. Identify the variable overhead costs associated with each cost-allocation base.
4. Compute the rate per unit of each cost-allocation base used to allocate variable overhead costs to output produced.

The Details: Variable OH Variances VARIABLE OVERHEAD FLEXIBLE-BUDGET VARIANCE

- Variable overhead flexible-budget variance measures the difference between actual variable overhead costs incurred and flexible-budget variable overhead amounts.

Variable Overhead flexible-budget variance	=	Actual Costs Incurred	-	Flexible-budget amount

This variance can be further broken down into the Variable Overhead Efficiency Variance and the Variable Overhead Spending Variance.

The Details: Variable OH Variances

VARIABLE OVERHEAD EFFICIENCY VARIANCE

- Variable overhead efficiency variance is the difference between the actual quantity of the variable overhead cost-allocation base used and the budgeted quantity of the variable overhead cost-allocation base allowed for the actual output X the budgeted variable overhead cost per unit of the cost-allocation base.

	Variable Overhead Efficiency Variance	=	{	Actual quantity of variable overhead cost-allocation base used for actual output	-	Budgeted quantity of variable overhead cost-allocation base allowed for actual output	}	X	Budgeted variable overhead cost per unit of cost-allocation base	

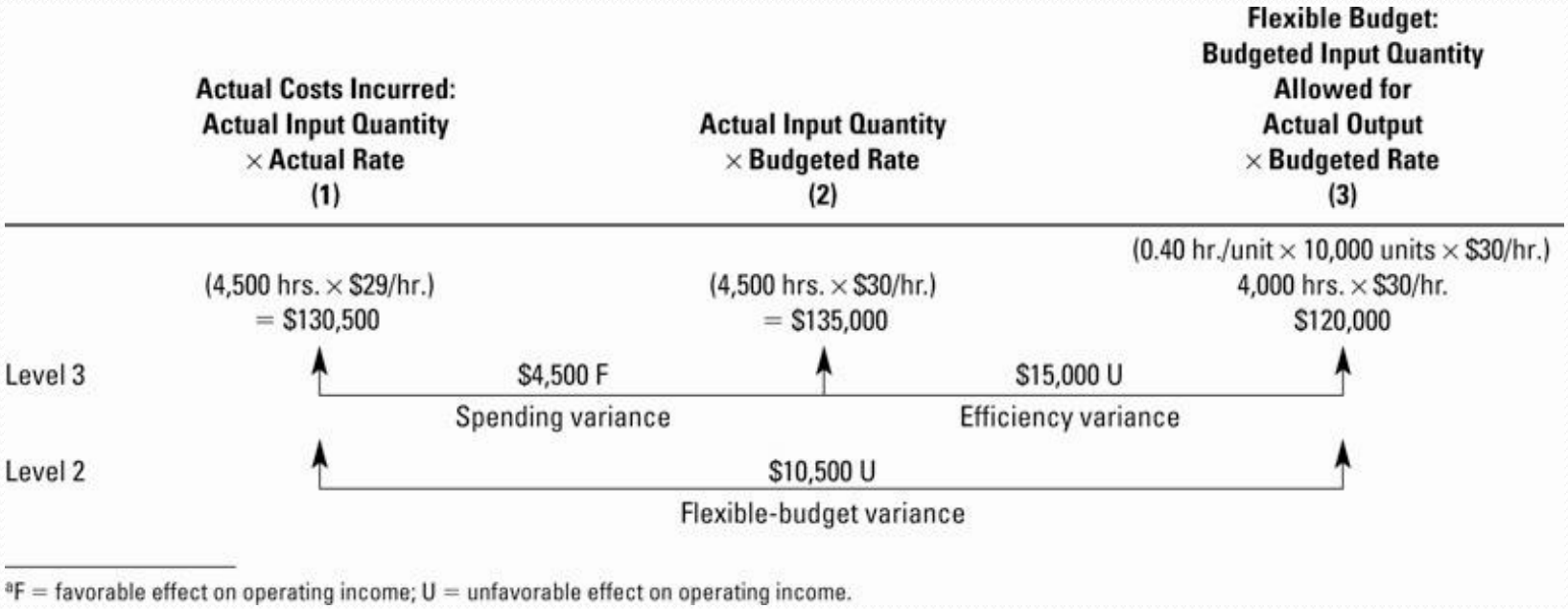
The Details: Variable OH Variances

VARIABLE OVERHEAD SPENDING VARIANCE

- Variable overhead spending variance is the difference between actual and budgeted variable overhead cost per unit of the cost-allocation base, multiplied by the actual quantity of variable overhead cost-allocation base used.

=	{	Actual variable overhead cost per unit of cost-allocation base	-	Budgeted variable overhead cost per unit of cost-allocation base	}	X	Actual quantity of variable overhead cost-allocation base used				

Variable Overhead Variance Analysis Illustrated



[a]F = favorable effect on operating income; U = unfavorable effect on operating income.

Developing budgeted fixed overhead rates-intro

Fixed overhead costs are, by definition, a lump sum of costs that remain unchanged for a given period despite potentially wide changes in activity within the relevant range.

These costs are fixed in the sense that, unlike variable costs, fixed costs do not automatically increase or decrease with the level of activity within the relevant range.

Developing Budgeted Fixed Overhead Cost Rates

1. Choose the period to be used for the budget.
2. Select the cost-allocation bases to use in allocating fixed overhead costs to output produced.
3. Identify the fixed overhead costs associated with each cost-allocation base.
4. Compute the rate per unit of each cost-allocation base used to allocate fixed overhead costs to output produced.

The Details: Fixed OH Variances
fixed overhead flexible-budget variance & fixed overhead spending variance

- Fixed overhead flexible-budget variance is the difference between actual fixed overhead costs and fixed overhead costs in the flexible budget.
- The fixed overhead spending variance is the same variance as the Fixed Overhead Flexible-Budget Variance

Fixed Overhead flexible-budget variance	=	Actual Costs Incurred	-	Flexible-budget amount

The Details: Fixed OH Variances production-volume variance

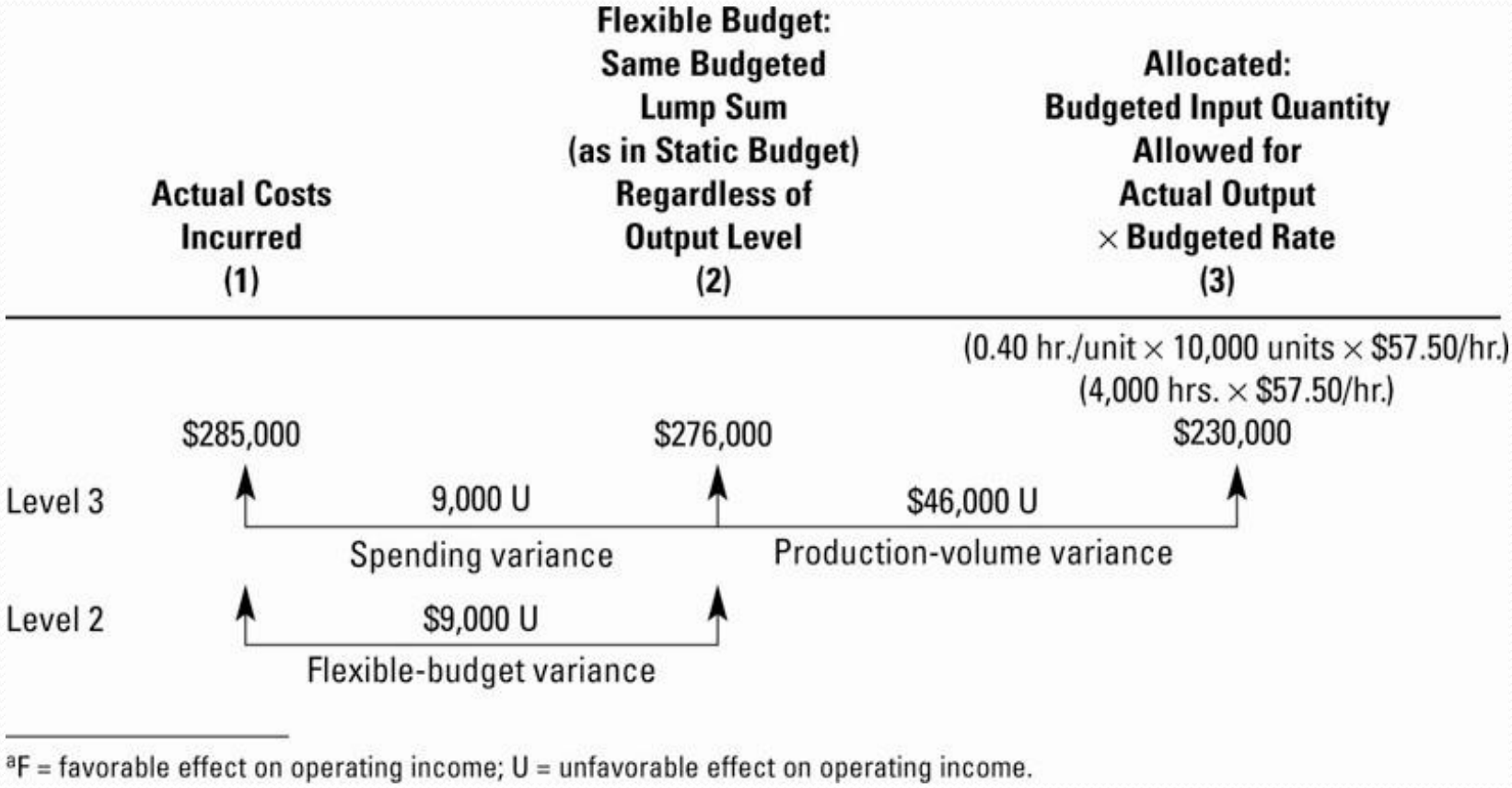
- Production-volume variance is the difference between budgeted fixed overhead and fixed overhead allocated on the basis of actual output produced.
- This variance is also known as the denominator-level variance.

Production-Volume Variance	=	Budgeted Fixed Overhead	-	Fixed Overhead allocated for actual output units produced

Production-Volume Variance

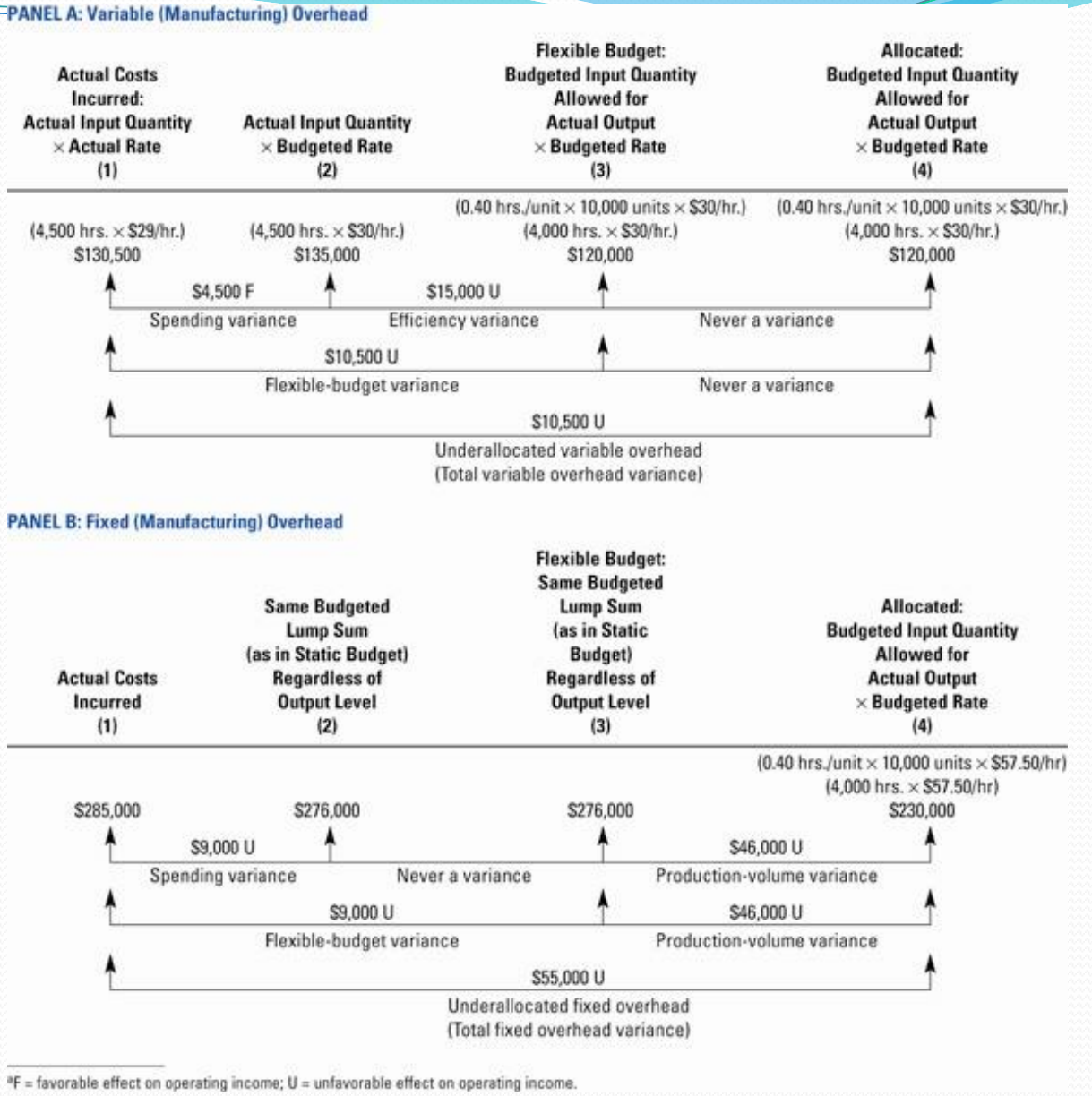
- Interpretation of this variance is difficult due to the nature of the costs involved and how they are budgeted.
- Fixed costs are by definition somewhat inflexible. While market conditions may cause production to flex up or down, the associated fixed costs remain the same.
- Fixed costs may be set years in advance, and may be difficult to change quickly.
- *Contradiction*: Despite this, examination of the fixed overhead budget formulae reveals that it is budgeted similar to a *variable* cost.

Fixed Overhead Variance Analysis Illustrated



[a]F = favorable effect on operating income; U = unfavorable effect on operating income.

Integrated Variance Analysis Illustrated



[a]F = favorable effect on operating income; U = unfavorable effect on operating income.

4-variance analysis

	4-VARIANCE ANALYSIS		
	SPENDING VARIANCE	EFFICIENCY VARIANCE	PRODUCTION-VOLUME VARIANCE
VARIABLE OVERHEAD	YES	YES	NEVER A VARIANCE
FIXED OVERHEAD	YES	NEVER A VARIANCE	YES

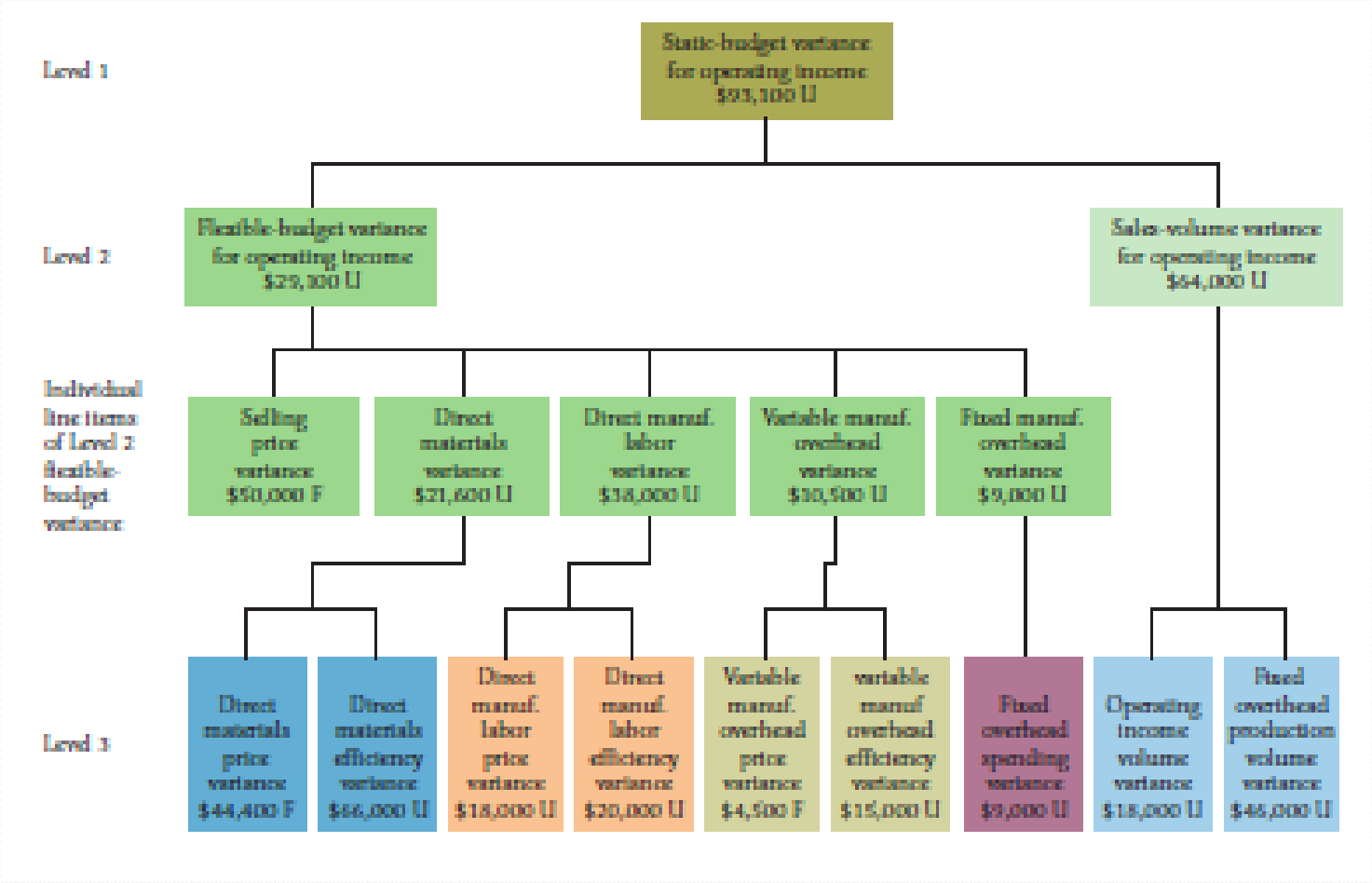
Production-volume variance and sales-volume variance

The static budget variance (the difference between the static budget and the actual results) was $93,100 Unfavorable for Webb Company, our sample company.

The sales-volume variance (the difference between the flexible budget and the static budget) was $64,000 Unfavorable.

The sales-volume variance consists of two components: The operating-income volume variance and the production-volume variance.

Summary of variance analysis



Variance analysis and activity based costing

- Activity-based costing systems focus on individual activities as the fundamental cost objects.
- Variances are calculated for each activity

Overhead variances in nonmanufacturing settings

- Nonmanufacturing companies can benefit from overhead variances just as manufacturing companies can.
- Variance analysis can be used to examine overhead costs and make decisions about pricing, managing costs and the mix of products.
- Output measures will be different and can be passenger-miles flown, patient days provided, rooms-days occupied, ton-miles of freight hauled, etc.

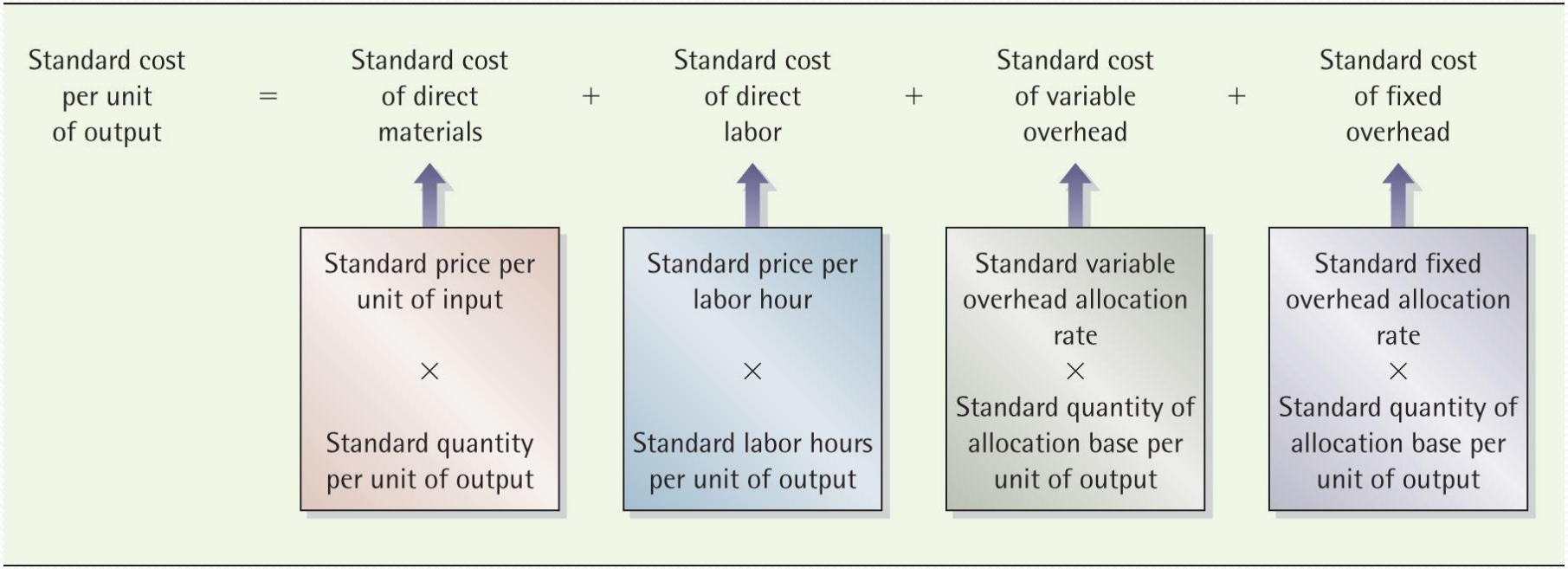
Explain why standard costs are often used in variance analysis

Standard Costs

- Organizations set standards to help plan operations.

- A standard cost is the expected cost of providing a good or service.
- In manufacturing, the standard cost of a unit of output is comprised of:
  - the standard price (SP) of the input, and
  - the standard quantity of the input expected to be consumed in the production of one output unit.

Standard Costs



Establishing & Using Standard Costs

- Standards can be set using:
  - Information from the prior year
  - Engineered estimates
  - New information available

- Standards can be used for:
  - Planning future operations
  - Monitoring current operations
  - Motivating manager and employee behavior
  - Evaluating performance

Standard Costing Systems

Advantages

- Information can be used to quickly estimate job or project costs
- Monitor resources to measure efficiency
- Communicates targets (goals) to employeess
- Provides information to analyze operations

Disadvantages

- May reduce employee motivation if the standards are too high or low
- Time involved in setting standards and analyzing variances
- Incorrect standards could result in inappropriate employee rewards or penalties

Variance Analysis

- The difference between an actual cost and the standard cost of producing goods or services at the *actual volume level* is called a standard cost variance.

- Managers investigate the reasons for standard cost variances so that:
  - efficiencies can be rewarded and replicated,
  - inefficiencies can be minimized, and
  - the validity of the standards can be assessed.

Variance Analysis in Diagnostic Control System

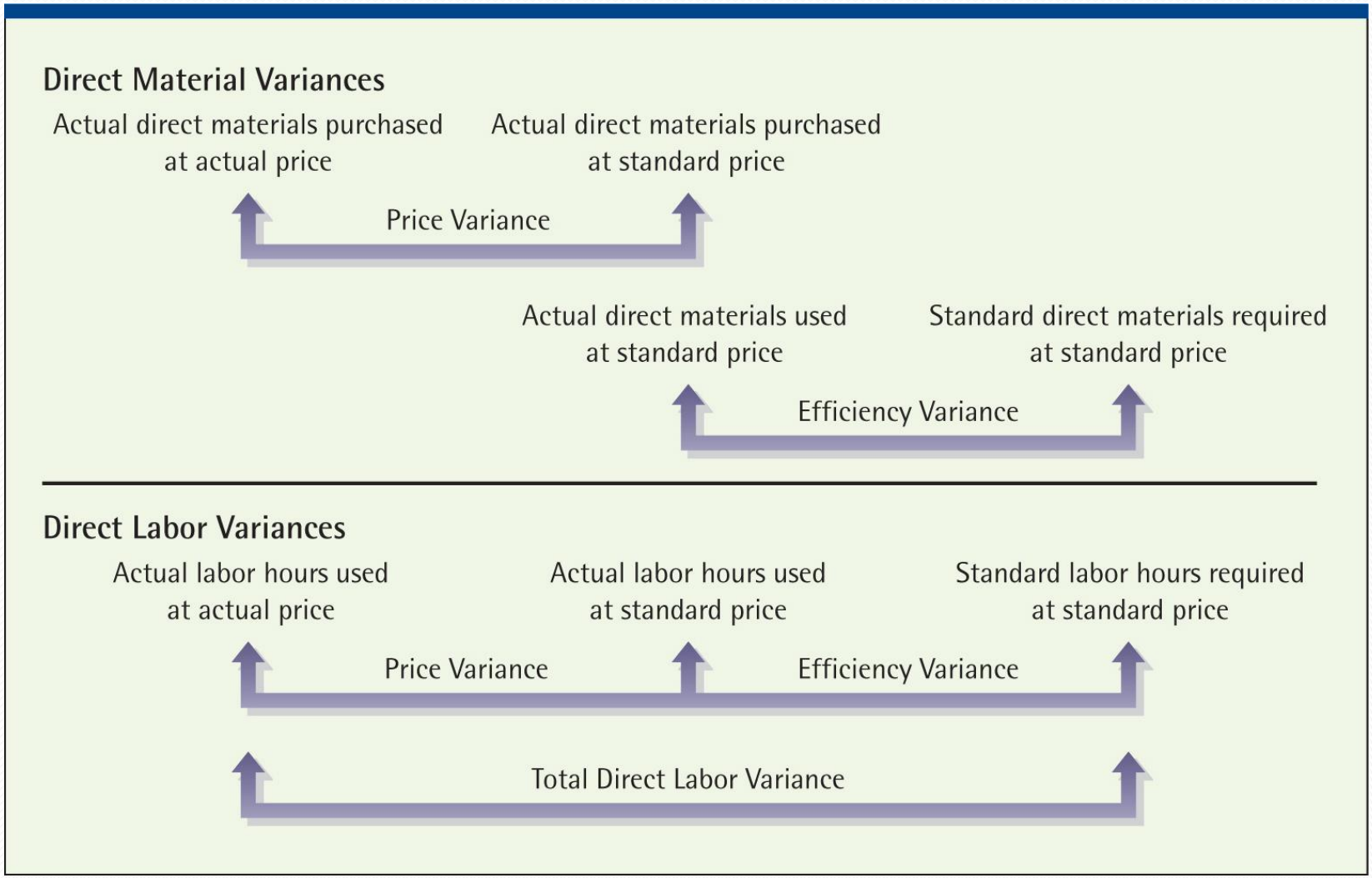
- Investigating Variances
  - Must decide what amount of variance needs to be investigated (% of budget, given $ amount)
  - Trends in variances should also be considered
  - Separating variances into component parts improves analysis
- Conclusions and Actions
  - After determining reasons for variances, managers need to draw conclusions about what happened
  - Determine if corrective action is required
  - Must consider behavioral implications and employee incentives to ensure standards are promoting overall success

Direct Cost Variances

- A price variance is the difference between the standard cost of resources purchased (or that should have been consumed) and the actual cost.

- An efficiency variance measures whether inputs were used efficiently.
  - It is the difference between the inputs used and the inputs that should have been used, times the standard price of the input

Q3: Direct Cost Variances



Direct Labor Cost Variances

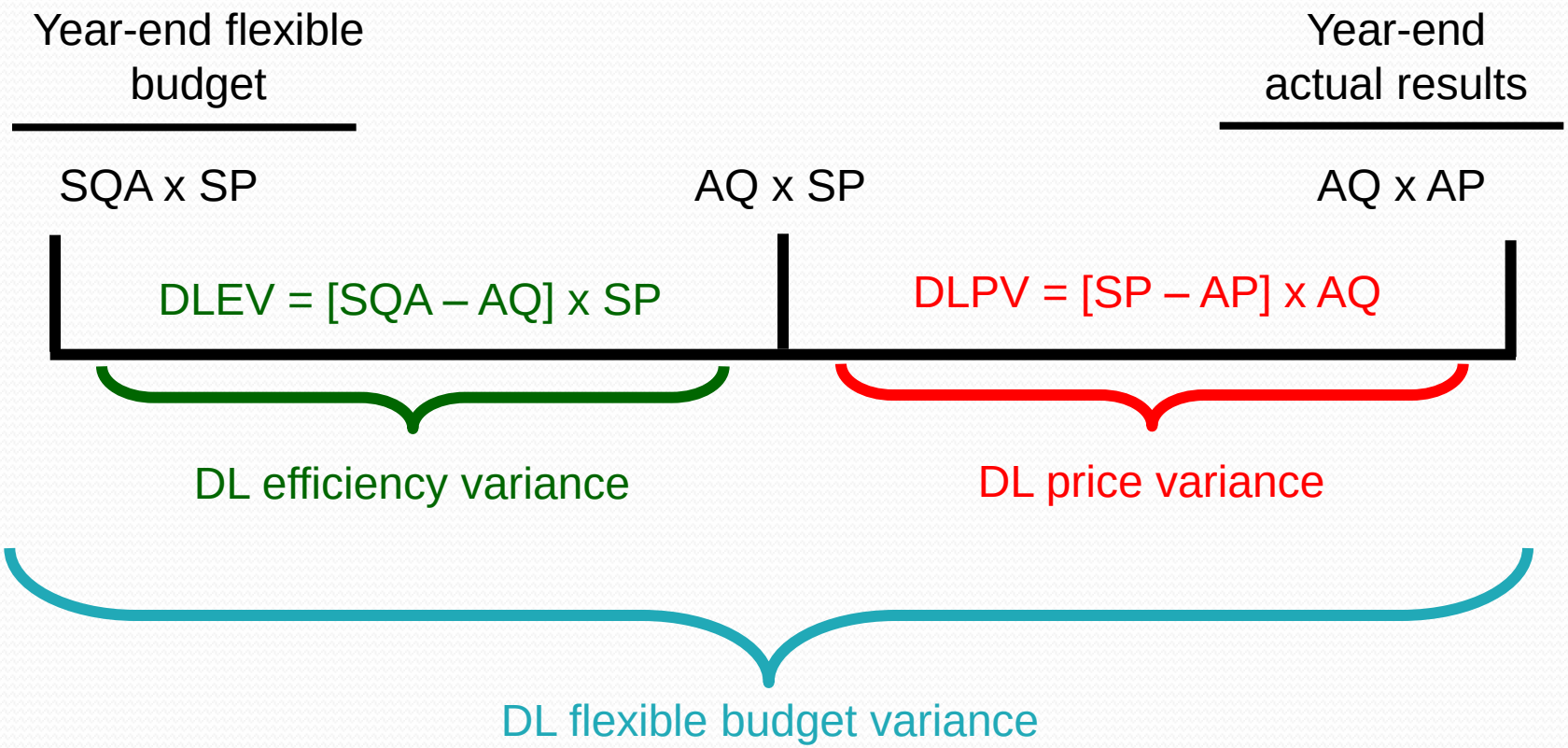
- The direct labor price and efficiency variances are a decomposition of the direct labor flexible budget variance.

- The year-end flexible budget direct labor cost is based on the standard direct labor hours for the actual output, or standard quantity allowed (SQA).

- Other abbreviations used:
  - SP = standard price of the input
  - AP = actual price of the input
  - AQ = actual quantity of the input used

Direct Labor Cost Variances

The direct labor price and efficiency variances are a decomposition of the direct labor flexible budget variance.



Direct Labor Cost Variances Example

Matthews Manufacturing makes a product that is expected to use ¼ hour of direct labor to produce. At the beginning of the year Matthews expected to produce 10,000 units. Actual production, however, was 9,800 units. The standard price of direct labor is $10/hour. Actual direct labor costs were $24,696 for the 2,520 labor hours used. Compute the direct labor cost variances.

First compute SQA for direct labor:

SQA = 9,800 units x ¼ hour/unit = 2,450 hours

Then compute AP for direct labor:

AP = $24,696/2,520 hours = $9.80/hour

DLPV = [SP – AP] x AQ = [$10/hour - $9.80/hour] x 2,520 hours = $504F

DLEV = [SQA – AQ] x SP = [2,450 hours - 2,520 hours] x $10/hour = $700U

Note that the DL FBV = $504F + $700U = $196U

Direct Labor Cost Variances Example

What are some possible explanations for the direct labor cost variances of Matthews Manufacturing?

- The favorable price variance could be due to:
  - an incorrect standard price,
  - using a higher percentage of lower-paid workers than expected, or
  - a favorable renegotiation of a labor contract.

- The unfavorable efficiency variance could be due to:
  - an incorrect standard quantity for labor,
  - inefficiency of direct labor personnel,
  - unexpected problems with machinery, or
  - lower quality of inputs that were more difficult to use.

Direct Material Cost Variances

- The direct materials and direct labor efficiency variances are computed in the same fashion.
- The direct material price variance is computed slightly differently than the direct labor price variance.
- Direct materials can be purchased and stored, and direct labor is consumed as it is purchased.
- The direct materials price and efficiency variances do not sum to the direct material flexible budget variance when there are any direct materials inventories.

Direct Material Cost Variances

The direct material price variance is based on the actual quantity of direct materials purchased, not the actual quantity of direct materials used.

Year-end flexible budget

SQA x SP — AQ x SP

DMEV = [SQA – AQ] x SP

DM efficiency variance

Remember that AQ=Actual quantity used, not actual quantity purchased.

Actual Quantity Purchased x SP — Actual Quantity Purchased x AP

DMPV = [SP – AP] x Actual Quantity Purchased

DM price variance

Direct Material Cost Variances Example

Matthews Manufacturing makes a product that is expected to use 2 pounds of direct material to produce. At the beginning of the year Matthews expected to produce 10,000 units. Actual production, however, was 9,800 units. The standard price of direct materials is $3/pound. Matthews purchased 20,500 pounds of direct material at $3.10/pound, and used 19,400 pounds. Compute the direct material cost variances.

First compute SQA for direct materials:

SQA = 9,800 units x 2 pounds/unit = 19,600 pounds

DMPV = [SP – AP] x Actual Quantity Purchased =

[$3/pound - $3.10/pound] x 20,500 pounds = $2,050U

DMEV = [SQA – AQ] x SP =

[19,600 pounds - 19,400 pounds] x $3/pound = $600F

Direct Material Cost Variances Example

What are some possible explanations for the direct material cost variances of Matthews Manufacturing?

- The unfavorable price variance could be due to:
  - an incorrect standard price,
  - an unexpected price increase from a supplier, or
  - the purchase of higher quality materials.

- The favorable efficiency variance could be due to:
  - an incorrect standard quantity for material,
  - efficient use of direct materials during production, or
  - less waste of direct materials due to higher material quality.

Recording Direct Cost Variances

- The direct material price variance is recorded when the materials are purchased.
- The direct material efficiency variance is recorded when the materials are used in production.
- The direct labor price and efficiency variances are recorded when labor is used in production.
- Work in process inventory is debited for the standard cost of the inputs that should have been used to produce the actual quantity of outputs (SP x SQA).

Recording Direct Labor Cost Variances

The journal entry to record the use of direct labor is:

dr. Work in process inventory	SP x SQA
dr. or cr. DLEV	[SQA-AQ] x SP
dr. or cr. DLPV	[SP-AP] x AQ
cr. Accrued payroll	AP x AQ

Unfavorable variances are debited to the variance accounts and favorable variances are credited to the variance accounts.

Recording Direct Labor Cost Variances Example

Prepare a summary journal entry to record the direct labor costs for Matthews Manufacturing, including the direct labor cost variances. Refer to slide #8.

dr. Work in process inventory	24,500	
[2,450 hrs x $10/hr]		
dr. DLEV	700	
[(2,450 hrs – 2,520 hrs) x $10/hr]		
cr. DLPV		504
[($10/hr - $9.80/hr) x 2,520 hrs]		
cr. Accrued payroll		24,696
[given]		

Recording Direct Material Cost Variances

The journal entry to record the purchase of direct materials is:

dr. Raw materials inventory	SP x Actual Qty Purch'd
dr. or cr. DMPV	[SP–AP] x Actual Qty Purch'd
cr. Accounts payable	AP x Actual Qty Purch'd

The journal entry to record the use of direct materials is:

dr. Work in process inventory	SP x SQA
dr. or cr. DMEV	[SQA-AQ] x SP
cr. Raw materials inventory	SP x AQ

Recording Direct Material Cost Variances Example

Prepare summary journal entries to record the purchase and the use of direct material for Matthews Manufacturing, including the direct material cost variances. Refer to slide #12.

The journal entry to record the purchase of direct materials is:

dr. Raw materials inventory [$3/lb x 20,500 lbs]	61,500	
dr. DMPV [($3/lb –$3.10/lb) x 20,500 lbs]	2,050	
cr. Accounts payable [$3.10/lb x 20,500 lbs]		63,550

The journal entry to record the use of direct materials is:

dr. Work in process inventory [$3/lb X 19,600 lbs]	58,800	
cr. DMEV [(19,600 lbs – 19,400 lbs) x $3/lb]		600
cr. Raw materials inventory [19,400 lbs x $3/lb]		58,200

Allocating Overhead Costs

- We covered the allocation of overhead to units of production.
- Estimated overhead rates are calculated for both fixed and variable overhead.

$$\text{Standard variable overhead allocation rate} = \frac{\text{Estimated variable overhead costs}}{\text{Estimated volume of an overhead allocation base}}$$

$$\text{Standard fixed overhead allocation rate} = \frac{\text{Estimated fixed overhead costs}}{\text{Estimated volume of an overhead allocation base}}$$

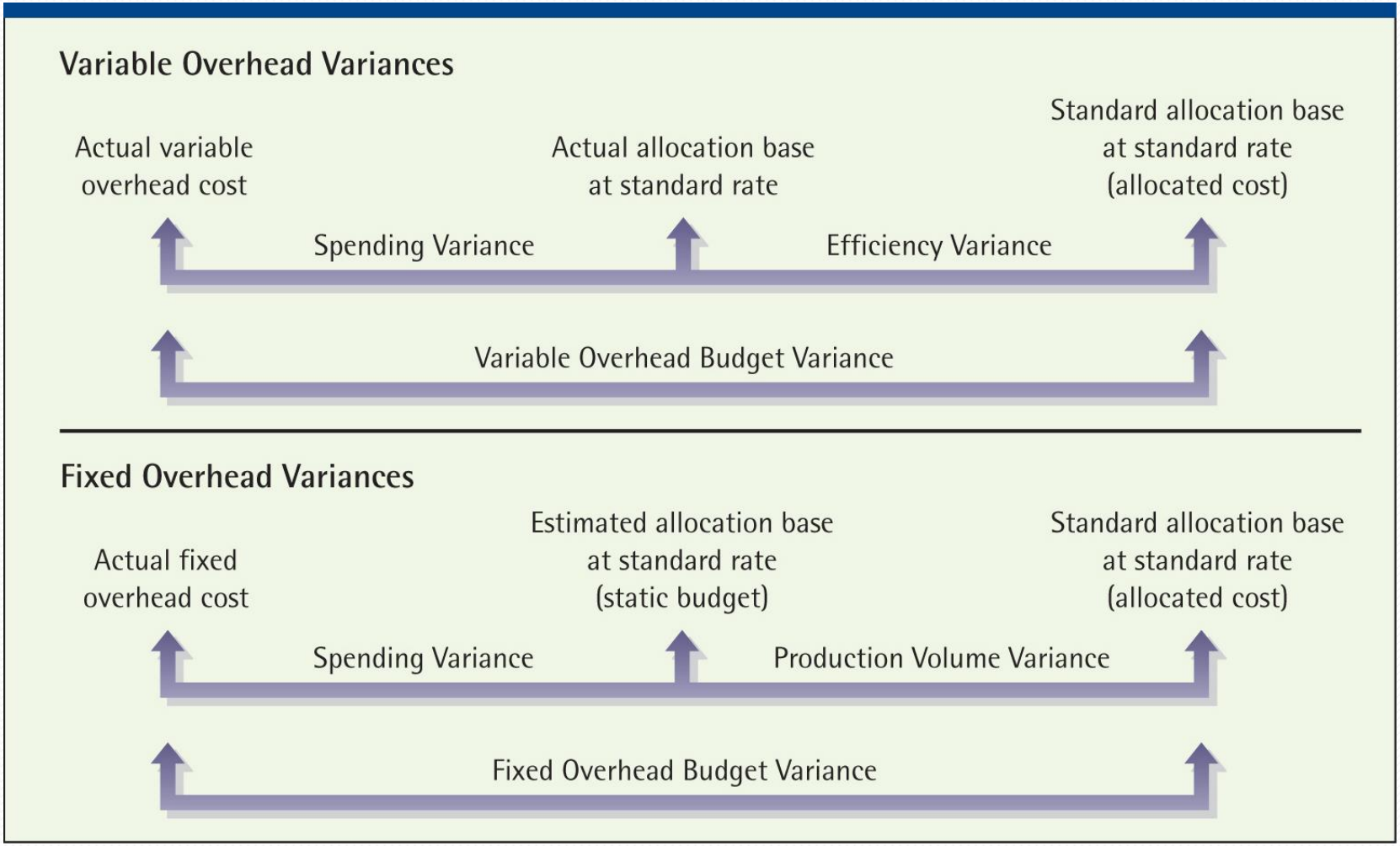
Overhead Cost Management

- For both variable and fixed overhead, cost management includes reducing non-value-added costs.

- For each variable overhead cost pool, cost management includes reducing the consumption of the related cost allocation base.

- For fixed overhead, cost management involves a trade-off between insufficient and excess capacity.

Overhead Cost Variances

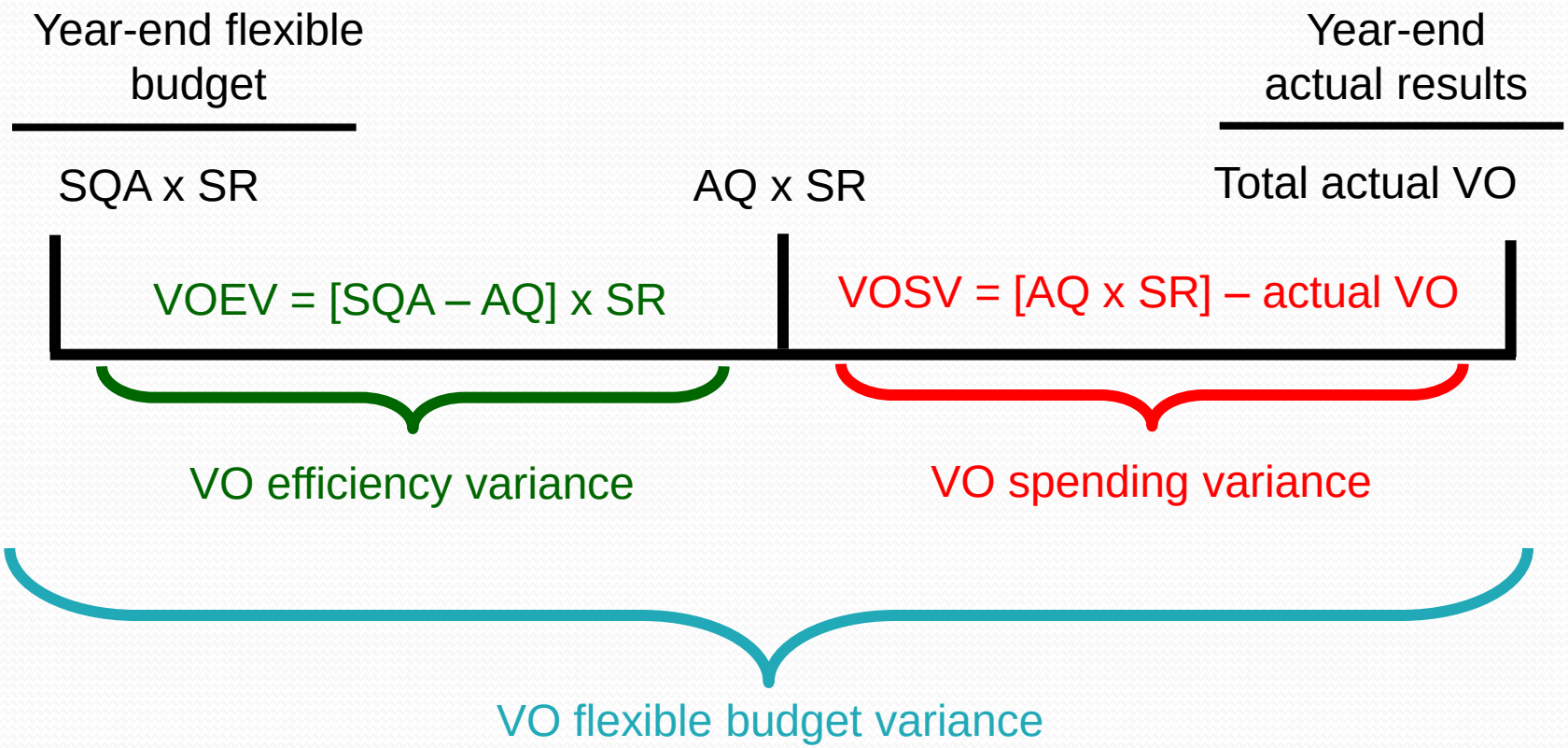


Variable Overhead Cost Variances

- The variable overhead cost variances are computed in the same fashion as the direct labor cost variances.
- The variable overhead spending variance is similar to the direct labor price variance.
- The variable overhead efficiency variance is similar to the direct labor efficiency variance.
- The variable overhead (flexible) budget variance is the sum of these two variable overhead variances.

Variable Overhead Cost Variances

The standard quantity allowed (SQA) in the variable overhead cost variance calculations is the quantity of the variable overhead allocation base that should have been used to produce the actual output. SR is the standard variable overhead allocation rate.



Variable Overhead Cost Variances Example

Matthews Manufacturing makes a product that is expected to use ¼ hour of direct labor to produce. At the beginning of the year Matthews expected to produce 10,000 units. Actual production, however, was 9,800 units. The estimated variable overhead allocation rate is $4 per direct labor hour, actual variable overhead costs were $10,450, and actual direct labor hours were 2,520. Compute the variable overhead cost variances.

First compute SQA for direct labor, the VO cost allocation base:

SQA = 9,800 units x ¼ hour/unit = 2,450 hours

VOEV = [SQA – AQ] x SR = [2,450 hours - 2,520 hours] x $4/hour = $280U

VOSV = AQ x SR – actual VO = 2,520 hrs x $4/hr - $10,450 = $370U

Note that the VO FBV = $280U + $370U = $650U

Variable Overhead Cost Variances Example

What are some possible explanations for the variable overhead cost variances of Matthews Manufacturing?

- The favorable spending variance could be due to:
  - an incorrect standard variable overhead rate per direct labor hour,
  - lower prices than expected for the components of the variable overhead cost pool (e.g. a lower price per quart of machine oil), or
  - lower consumption than expected of the components of the variable overhead cost pool (e.g. less indirect labor used per direct labor hour).
- The unfavorable efficiency variance could be due to:
  - an incorrect standard quantity for labor,
  - inefficiency of direct labor personnel,
  - unexpected problems with machinery, or
  - lower quality of inputs that were more difficult to use.

Recording Variable Overhead Cost Variances

The summary entry to record the incurrence of variable overhead costs is:

dr. Variable overhead cost control Actual VO costs

cr. Various accounts Actual VO costs

The summary entry to record the allocation of variable overhead costs is:

dr. Work in process inventory SR x SQA

cr. Variable overhead cost control SR x SQA

The year-end entry to close the Variable overhead cost control and record the variable overhead cost variances will:

- close the Variable overhead cost control account with a debit or credit, whichever is required, and
- debit (credit) the Variable overhead spending variance and Variable overhead efficiency variance accounts for unfavorable (favorable) variances.

Recording Variable Overhead Cost Variances Example

Prepare summary journal entries to record the incurrence of and the allocation to work in process of variable overhead costs for Matthews Manufacturing. Also prepare the year-end entry to close variable overhead control and record the variances. Refer to slide #22.

The journal entry to record the incurrence of variable overhead costs is:

dr. Variable overhead cost control	10,450	
cr. Various accounts		10,450

The journal entry to record the allocation of variable overhead is:

dr. Work in process inventory [$4/hr X 2,450 hrs]	9,800	
cr. Variable overhead cost control		9,800

The year-end entry to close the Variable overhead cost control account is:

dr. VOSV	280	
dr. VOEV	370	
cr. Variable overhead cost control		650

Fixed Overhead Cost Variances

- The fixed overhead spending variance is the same as the fixed overhead (flexible) budget variance.

- There is no fixed overhead efficiency variance because changes in the quantity of the fixed overhead allocation base do not cause changes in actual total fixed overhead costs.
- The production volume variance occurs when actual volume is different than the static budget estimated volume.

The Production Volume Variance

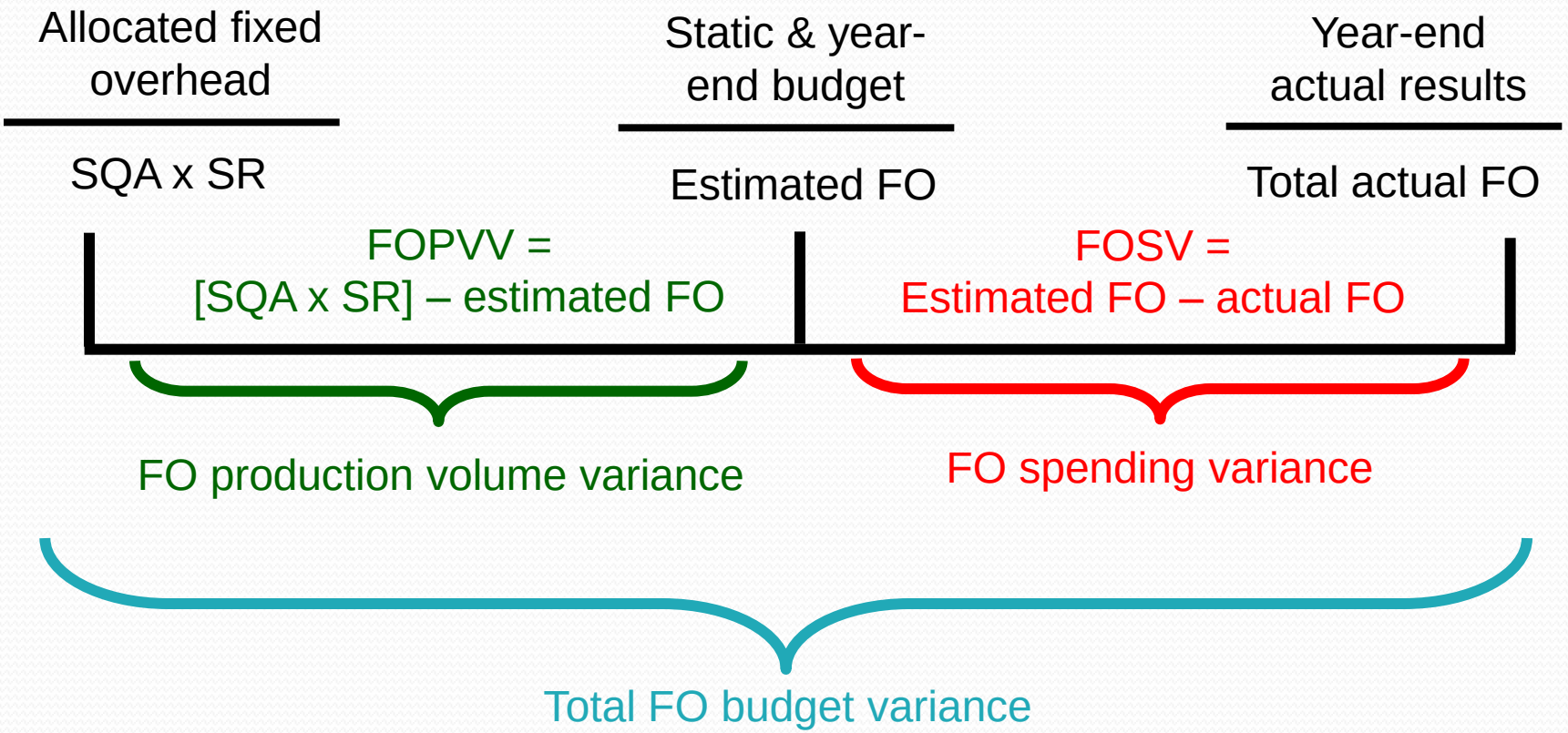
- Allocating fixed overhead to production using a standard rate per unit of a cost allocation base treats fixed overhead as a variable cost for bookkeeping purposes.

- Since fixed overhead is not a variable cost, the fixed overhead allocated to production will differ from budgeted fixed overhead when actual volume differs from static budget estimated volume.

- The production volume variance is favorable (unfavorable) when actual volume exceeds (is less than) static budget estimated volume.

Fixed Overhead Cost Variances

The standard quantity allowed (SQA) in the fixed overhead cost variance calculations is the quantity of the fixed overhead allocation base that should have been used to produce the actual output. SR is the standard fixed overhead allocation rate.



Fixed Overhead Cost Variances Example

Matthews Manufacturing makes a product that is expected to use 1.2 machine hours to produce. At the beginning of the year Matthews expected to produce 10,000 units. Actual production, however, was 9,800 units. Estimated fixed overhead at the beginning of the year was $60,000 and actual fixed overhead was $58,100. Actual machine hours for the year totaled 12,200 hours. Compute the fixed overhead cost variances.

First compute SQA for machine hours:

SQA = 9,800 units x 1.2 hours/unit = 11,760 hours

Next compute the estimated fixed overhead rate per machine hour:

SR = $60,000/[10,000 units x 1.2 hrs/unit] = $5/hr

FOSV = Estimated FO – actual FO = $60,000 - $58,100 = $1,900F

FOPVV = SQA x SR – estimated FO =

11,760 hours x $5/hr - $60,000 = $1,200U

Fixed Overhead Cost Variances Example

What are some possible explanations for the fixed overhead cost variances of Matthews Manufacturing?

- The favorable spending variance could be due to:
  - an incorrect estimate for fixed overhead costs,
  - a decision to forgo a budgeted discretionary fixed cost, or
  - a favorable renegotiation of leasing agreements.

- The unfavorable production volume variance is due to:
  - an actual volume level that is less than the static budget volume level.

Recording Fixed Overhead Cost Variances

The summary entry to record the incurrence of fixed overhead costs is:

dr. Fixed overhead cost control Actual FO costs

cr. Various accounts Actual FO costs

The summary entry to record the allocation of fixed overhead costs is:

dr. Work in process inventory SR x SQA

cr. Fixed overhead cost control SR x SQA

The year-end entry to close the fixed overhead cost control and record the fixed overhead cost variances will:

- close the Fixed overhead cost control account with a debit or credit, whichever is required, and
- debit (credit) the fixed overhead production volume variance and fixed overhead spending variance accounts for unfavorable (favorable) variances.

Recording Fixed Overhead Cost Variances Example

Prepare summary journal entries to record the incurrence of and the allocation to work in process of fixed overhead costs for Matthews Manufacturing. Also prepare the year-end entry to close Fixed overhead control and record the variances. Refer to slide #29.

The journal entry to record the incurrence of variable overhead costs is:

dr. Fixed overhead cost control	58,100	
cr. Various accounts		58,100

The journal entry to record the allocation of fixed overhead is:

dr. Work in process inventory [$5/hr x 11,760 hrs]	58,800	
cr. Fixed overhead cost control		58,800

The year-end entry to close the fixed overhead cost control account is:

dr. Fixed overhead cost control	700	
dr. Fixed overhead production volume variance	1,200	
cr. Fixed overhead spending variance		1,900

Closing Manufacturing Variances

- At the end of the year, all eight variance accounts are closed out to Work in process inventory, Finished goods inventory, and Cost of goods sold.

- The net of the variance accounts is generally prorated to the three accounts using a ratio of the accounts' ending balances.

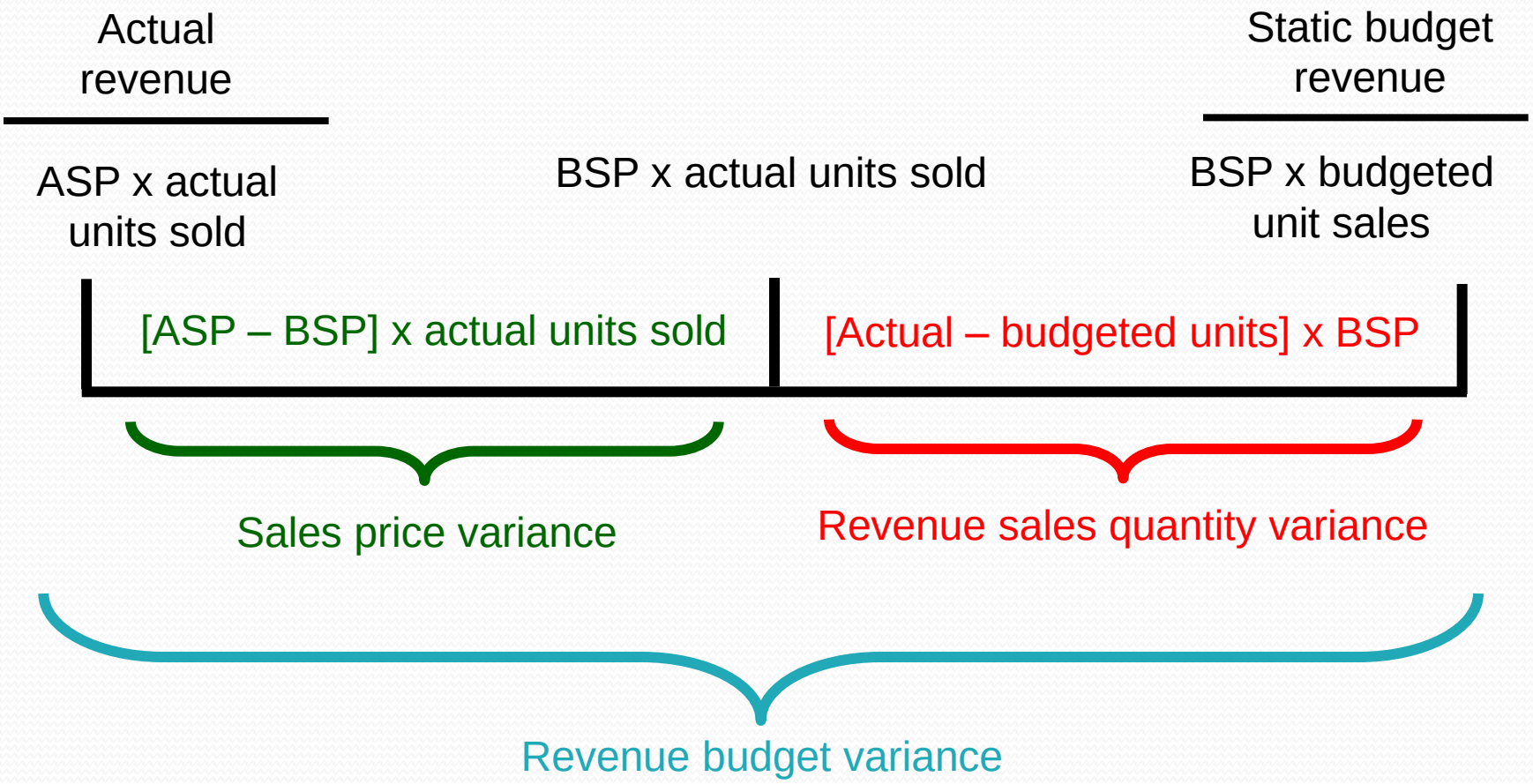
- Technically, a portion of the direct materials price variance should also be allocated to Raw materials inventory, but this complication is ignored here.

Revenue Budget Variance

- The revenue budget variance measures the difference between actual revenues and static budget revenues, and has two components:
  - The sales price variance is due to the difference between actual average selling price and the budgeted selling price per unit.
  - The revenue sales quantity variance is due to the difference between the actual number and the budgeted number of units sold.

Revenue Budget Variance

ASP is the actual average selling price per unit; BSP is the budgeted selling price from the static budget.



Revenue Budget Variance Example

Matthews Manufacturing makes a product with a budgeted selling price of $15/unit. At the beginning of the year Matthews expected to sell 10,000 units. Actual sales, however, were 9,800 units, and actual revenue was $156,800. Compute the revenue budget variances.

First compute the actual average selling price per unit:

ASP = $156,800/9,800 units = $16/unit

Sales price variance = [$16/unit - $15/unit] x 9,800 units = $9,800F

Revenue sales quantity variance =
[9,800 units – 10,000 units] x $15/unit = $3,000U

Note the revenue budget variance is $9,800F + $3,000U = $6,800F

Contribution Margin Budget Variance

- The contribution margin budget variance measures the difference between actual contribution margin and the contribution margin budgeted at the beginning of the year. It has two components:
  - The contribution margin variance is the difference between the actual contribution margin and the budgeted contribution margin in in the year-end flexible budget (which is based on actual sales levels).
  - The contribution margin sales volume variance is difference budgeted contribution margin at the beginning of the year and the budgeted contribution margin in the year-end flexible budget.

Contribution Margin Sales Volume Variance

- When a company sells more than one product, the contribution margin sales volume variance itself has two components:
  - The contribution margin sales mix variance is the portion of the contribution margin sales volume variance caused by a change in the sales mix from the budgeted mix.
  - The contribution margin sales quantity variance is the portion of the contribution margin sales volume variance caused by the difference between budgeted total unit sales at the beginning of the year and actual total unit sales.

Profit-Related Variances Example

Matthews Manufacturing produces three products, Alpha, Beta, and Gamma. You are given the following information from Matthews' static budget:

Product	Budgeted Selling Price Per Unit	Budgeted CM per Unit	Static Budget Unit Sales	Static Budget Revenue	Static Budget Total CM	Static Budget Sales Mix
Alpha	$20.00	$12.00	3,000	$60,000	$36,000	30%
Beta	$15.00	$9.00	4,500	$67,500	$40,500	45%
Gamma	$12.00	$3.00	2,500	$30,000	$7,500	25%
			10,000	$157,500	$84,000	100%

Profit-Related Variances Example

You are given below the actual results for Matthews Manufacturing. Compute the revenue budget variances.

Product	Actual Selling Price Per Unit	Actual CM per Unit	Actual Unit Sales	Actual Revenue	Actual Total CM	Actual Sales Mix
Alpha	$22.00	$13.00	3,350	$73,700	$43,550	30.45%
Beta	$12.00	$5.00	6,000	$72,000	$30,000	54.55%
Gamma	$13.00	$3.00	1,650	$21,450	$4,950	15.00%
			11,000	$167,150	$78,500	100.00%

Total Actual Revenue		Actual Units Sold Times Budgeted Selling Price		Total Static Budget Revenue
$167,150		$176,800		$157,500
Sales Price Variance			Revenue Sales Quantity Variance	
$9,650	Favorable		$19,300	Unfavorable

Revenue Budget Variance	
$9,650	Unfavorable

Profit-Related Variances Example

Use the given information on the prior two slides to compute all of the contribution margin budget variances for Matthews Manufacturing.

Total Static Budget CM	Actual Total Units Sold Times Static Budget Sales Mix Times Static Budget CM per Unit	Actual Total Units Sold Times Actual Sales Mix Times Static Budget CM per Unit	Units Sold Times Actual Sales Mix Times Actual CM
$84,000	$92,400	$99,150	$78,500

CM Sales Quantity Variance	CM Sales Mix Variance
$8,400 Favorable	$6,750 Favorable

CM Sales Volume Variance	CM Variance
$15,150 Favorable	$20,650 Favorable

CM Budget Variance
$5,500 Unfavorable

Integrate continuous improvement into variance analysis

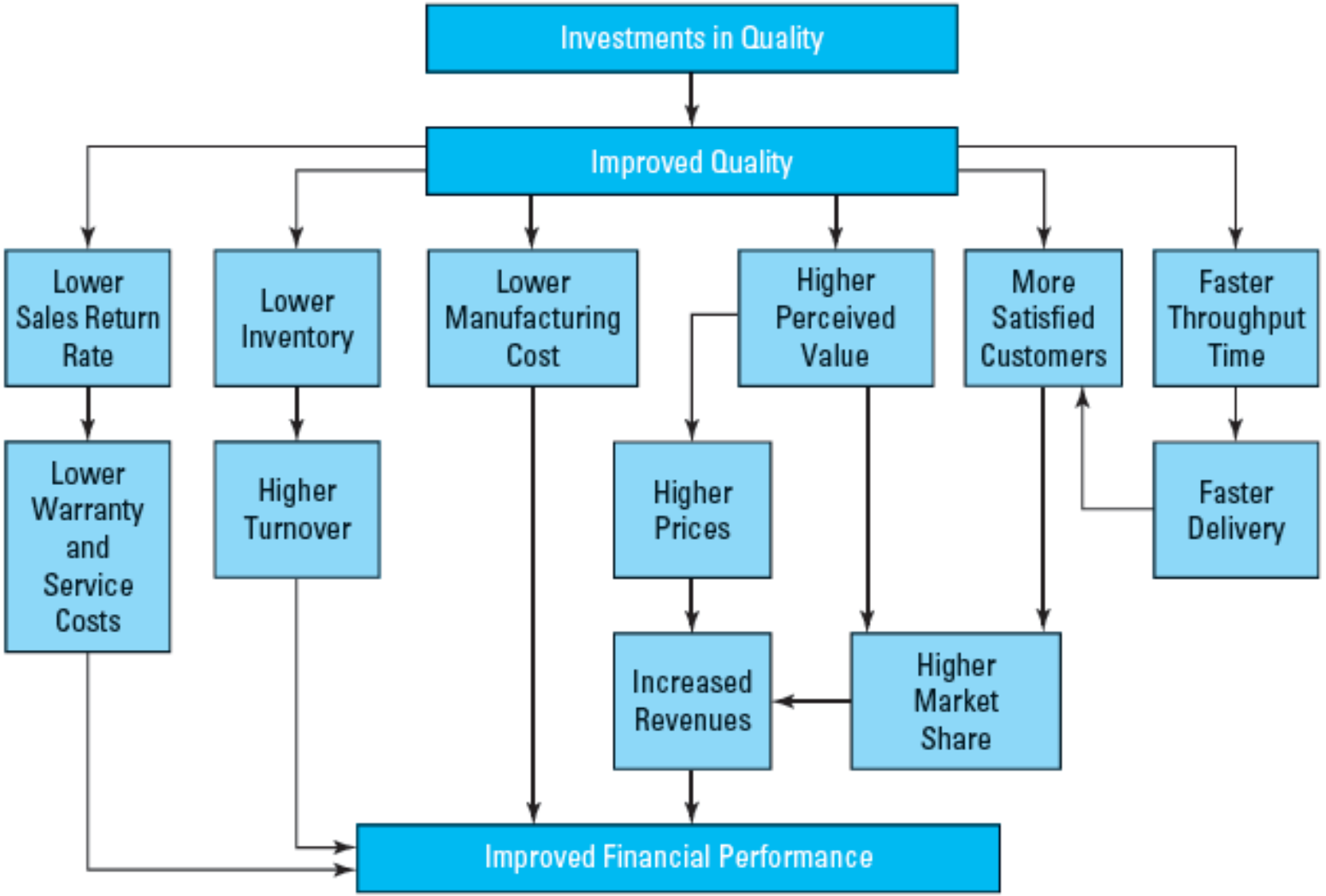
Integrate continuous improvement into variance analysis

- If used effectively, VA can help us improve the way we do business.
- One way is to drive costs down, cheaper suppliers etc
- Another way is through quality.
- Any others – class discussion

Strategic Importance of Quality

- Baldrige Quality Award
- ISO 9000 and ISO 14000
- Conceptual linkage between Quality and Profitability (see next slide)

Exhibit


Investments in Quality
Improved Quality
Lower Sales Return Rate
Lower Inventory
Lower Manufacturing Cost
Higher Perceived Value
More Satisfied Customers
Faster Throughput Time
Lower Warranty and Service Costs
Higher Turnover
Higher Prices
Faster Delivery
Increased Revenues
Higher Market Share
Improved Financial Performance

Accounting's Role in the Management & Control of Quality

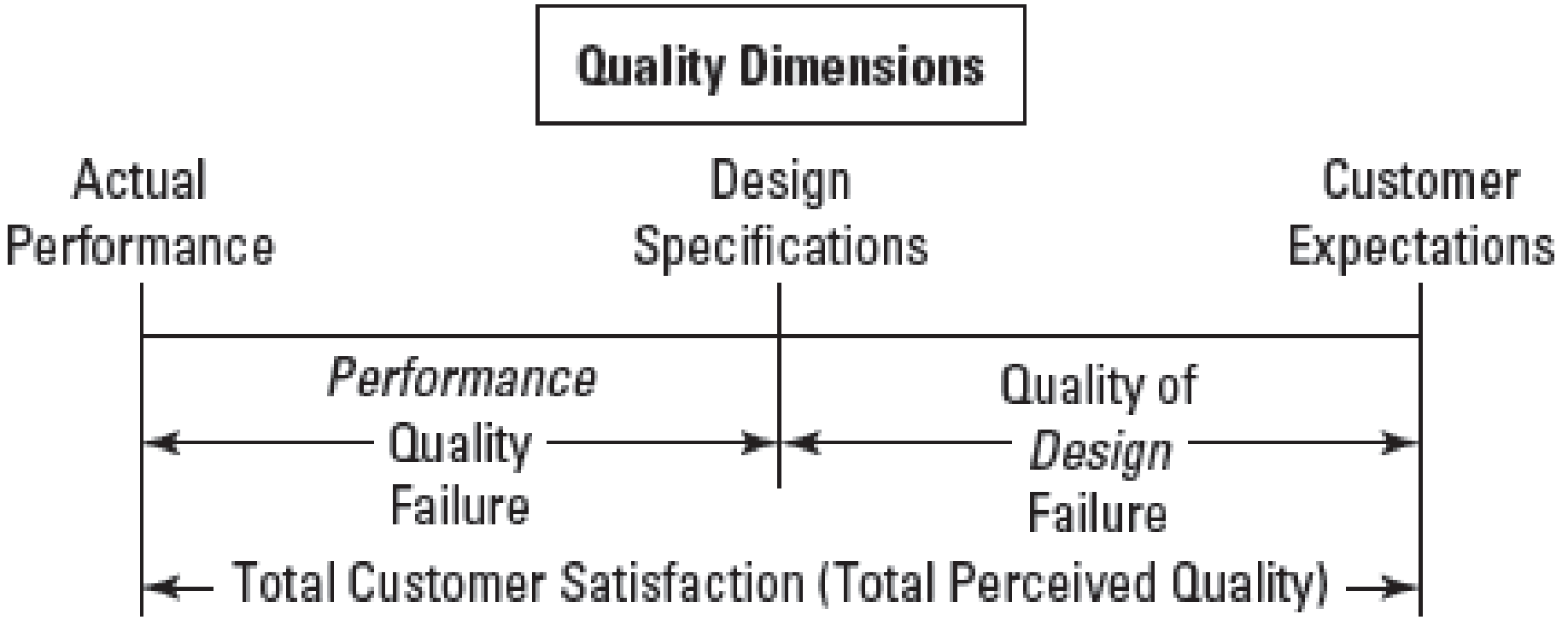
- Accountants can add value to the organization by providing decision-makers with relevant financial and nonfinancial information related to quality

- Such information actively supports the quality initiatives embraced by management

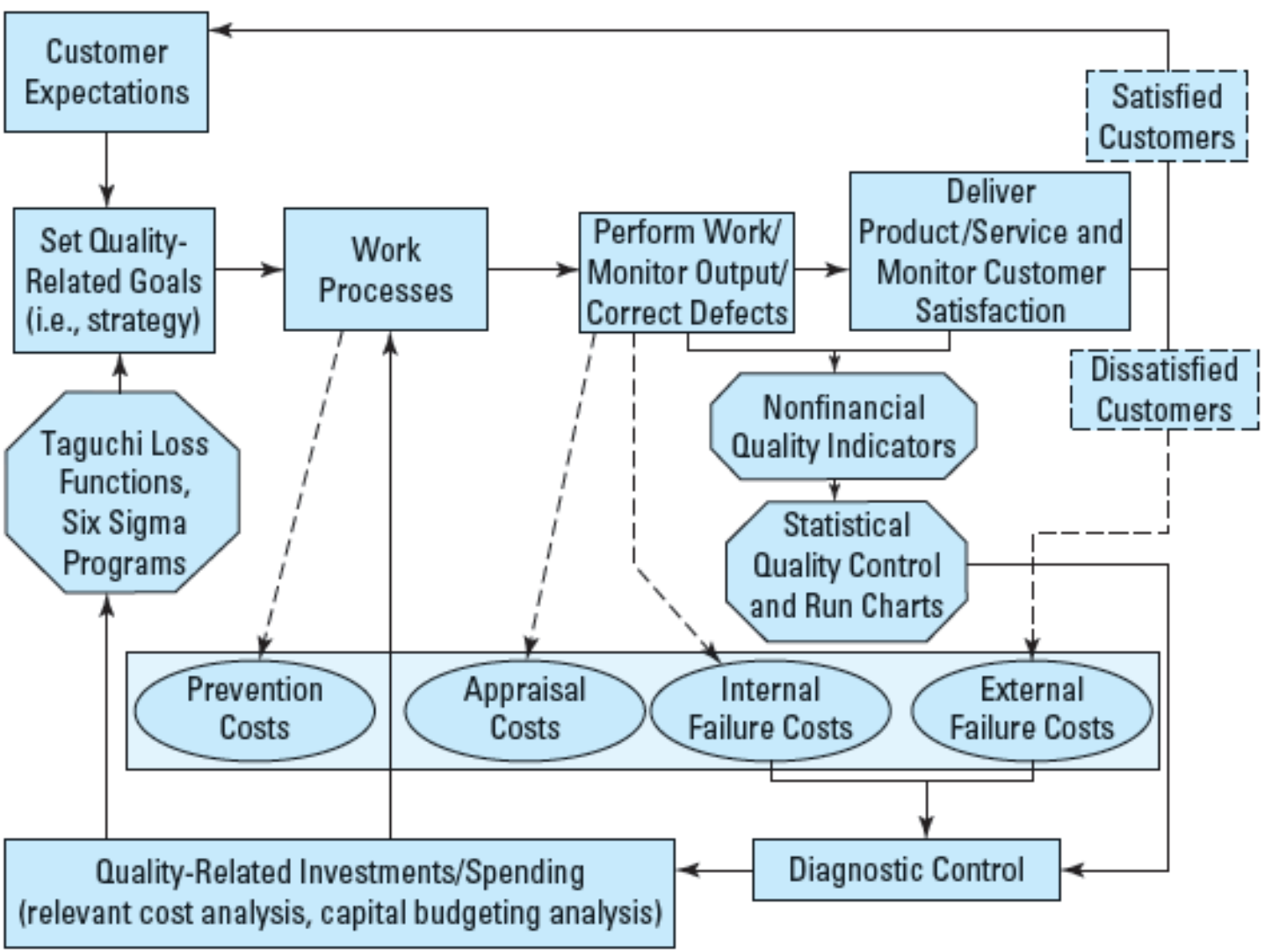
Basic Terminology

- "Quality"— customer satisfaction with the total experience of a product or service, consisting of two components:
  - *Design quality* (focuses on the *features* that customers want)
  - *Performance quality* (focuses on product/service performance)

Basic Terminology



Creating a Comprehensive Framework for Managing/Controlling Quality



Characteristics of the Comprehensive Framework for Managing/Controlling Quality

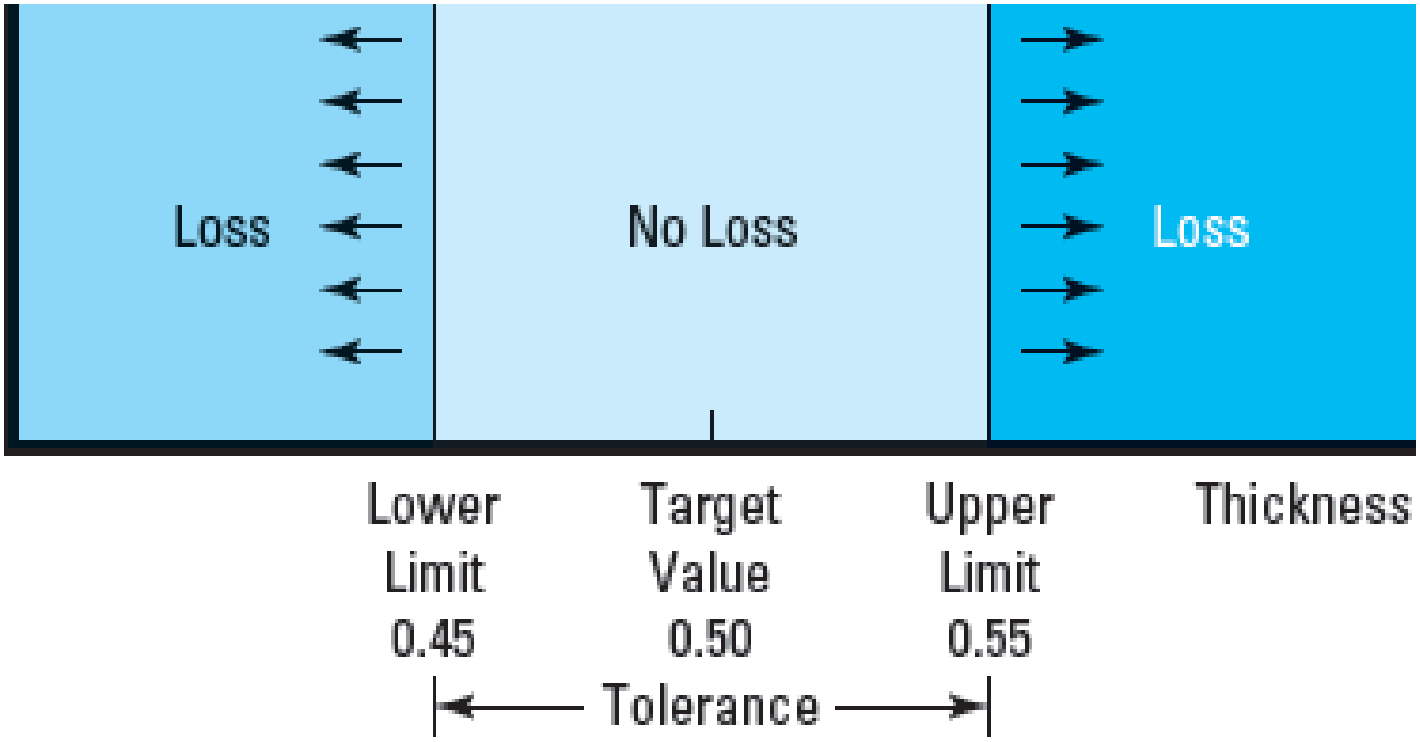
- Broad business perspective—knowledge of business processes
- Paramount role of the consumer
- Relevant financial data
- Nonfinancial performance indicators
- Feedback loops
- Linkage to operations management
- Breadth of the system—value-chain approach

Setting Quality-Related Expectations

- **Six-Sigma approach:**
  - **D**efine
  - **M**easure
  - **A**nalyze
  - **I**mprove
  - **C**ontrol
- **Goalpost vs. Absolute Conformance:**
  - Goalpost conformance
  - Absolute quality conformance (robust quality approach)

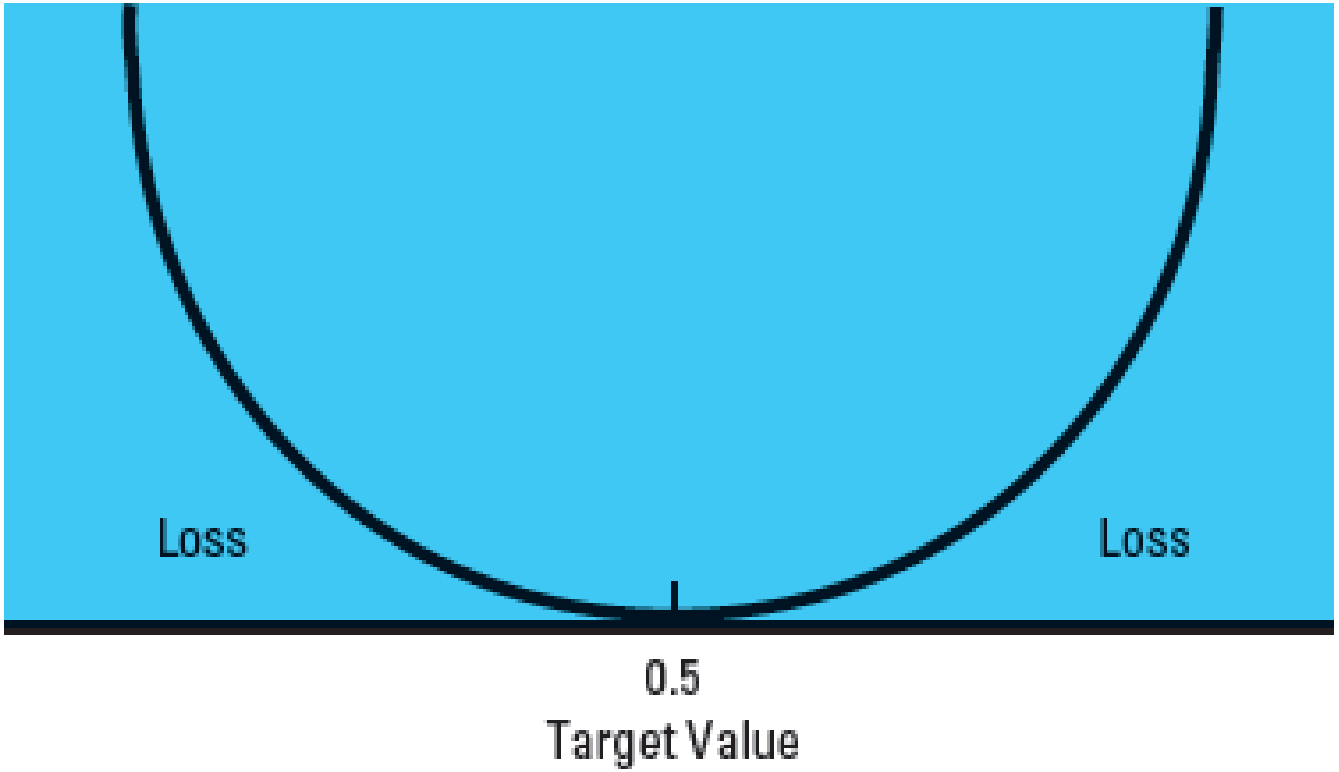
Goalpost Conformance

Goalpost conformance assumes that the firm incurs no quality or failure cost or loss if quality measures fall with the specified limits



Absolute Conformance

Absolute quality conformance requires that all products or services meet *exactly* the target value with no variation allowed



Setting Performance Expectations: Taguchi Loss Functions

The basic idea is that a quadratic functions provides a good approximation of quality costs (losses): the farther from the target value, the greater the penalty or cost/loss.

$$L(x) = k(x - T)^2$$

Where k can be approximated as:

$$k = \text{Total quality cost}/(\text{Tolerance allowed})^2$$

Taguchi Quality Loss Function: Example

Your firm has determined that no customer will accept sheet-metal deviating more than 0.05" from the target thickness (0.50"). The cost to the firm is estimated as $5,000 for each rejection by a customer.

$$k = \frac{\text{Total Quality Cost}}{(\text{Tolerance Allowed})^2}$$

$k = \$5{,}000 \div (0.05)^2$

$= \$2{,}000{,}000$

Taguchi Quality Loss Function: Example (continued)

$$L(x) = k(x - T)$$

$$L(0.47) = \$2{,}000{,}000(0.47 - 0.50)^2$$

$$L(0.47) = \$1{,}800$$

Thus, if the actual thickness of a unit is 0.47, then the estimated total loss for the unit is $1,800.

Financial Measures & Cost of Quality (COQ)

- Relevant cost information for decision-making :
  - Future costs and revenues that differ between decision alternatives
  - "Avoidable costs" vs. Sunk costs
  - Out-of-Pocket costs + Opportunity costs
- Cost of Quality (COQ) Reporting

COQ Reporting: Cost Categories

- **Prevention costs**—expenditures incurred to keep quality defects from occurring
- **Appraisal costs** —costs incurred in the measurement and analysis of data to find out if products and services conform to specification/customer expectations
- **Internal failure costs**—costs incurred as a result of poor quality found through appraisal prior to delivery to customers
- **External failure costs**—costs incurred to rectify quality defects after unacceptable products or services reach the customer

Sample Costs of Quality

Prevention:

- Quality training costs
- Equipment maintenance costs

Appraisal:

- Testing & inspection costs
- Quality audits
- Vendor certification
- Test equipment and instruments



Sample Costs of Quality (continued)

Internal failure:

- Rework costs
- Scrap (net of disposal value)
- Lost contribution margin because of schedule disruptions

External failure:

- Costs to handle customer complaints & returns
- Lost sales/market share (customer ill-will)
- Field service/repair costs
- Product liability lawsuits

Sample COQ Report

	Year 2	% of Sales	Year 0	% of Sales	Percent Change in Cost
Prevention Costs					
Training	$ 90,000		$ 20,000		350%
Quality planning	86,000		20,000		330
Other quality improvement	60,000		40,000		50
Supplier evaluation	40,000		30,000		33
Total	$ 276,000	3.07%	$ 110,000	1.38%	151
Appraisal Costs					
Testing	$ 120,000		$ 100,000		20
Quality performance measurement	100,000		80,000		25
Supplier monitoring	60,000		10,000		500
Customer surveys	30,000		10,000		200
Total	$ 310,000	3.44%	$ 200,000	2.50%	55
Internal Failure Costs					
Rework and reject	$ 55,000		$ 150,000		(63)
Reinspection and testing	35,000		30,000		16
Equipment failure	30,000		50,000		(40)
Downtime	20,000		50,000		(60)
Total	$ 140,000	1.56%	$ 280,000	3.50%	(50)
External Failure Costs					
Product liability insurance	$ 70,000		$ 250,000		(72)
Warranty repairs	100,000		120,000		(17)
Customer losses (estimated)	600,000		1,400,000		(57)
Total	$ 770,000	8.55%	$1,770,000	22.12%	(56)
Total Quality Costs	$1,496,000	**16.62%**	$2,360,000	**29.50%**	(37)
Total sales	$9,000,000	100.00%	$8,000,000	100.00%	

Conformance and Nonconformance Quality Costs

Cost of Conformity:

- Prevention Costs
- Appraisal Costs

Cost of Nonconformity:

- Internal Failure Costs
- External Failure Costs



Nonfinancial Quality Indicators

Internal Nonfinancial Quality Metrics:

- Process yield
- Productivity
- Machine up-time
- Safety record
- Throughput
- Cycle time efficiency

Nonfinancial Quality Indicators

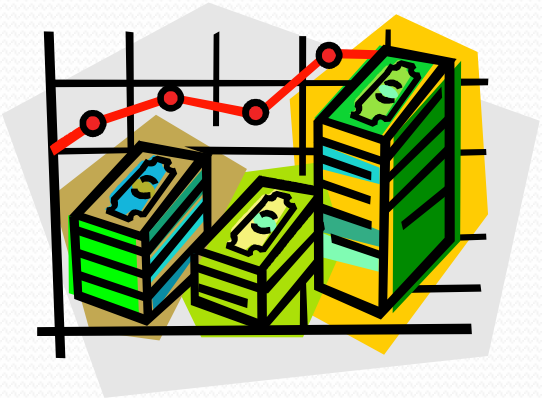
External Nonfinancial Quality Metrics:

- Customer response time (CRT)
- No. of defective units shipped
- No. of customer complaints
- Delivery delays
- On-time delivery rate
- Percentage of products that experience early or excessive failure

Detecting & Correcting Poor Quality

Detecting Poor Quality:

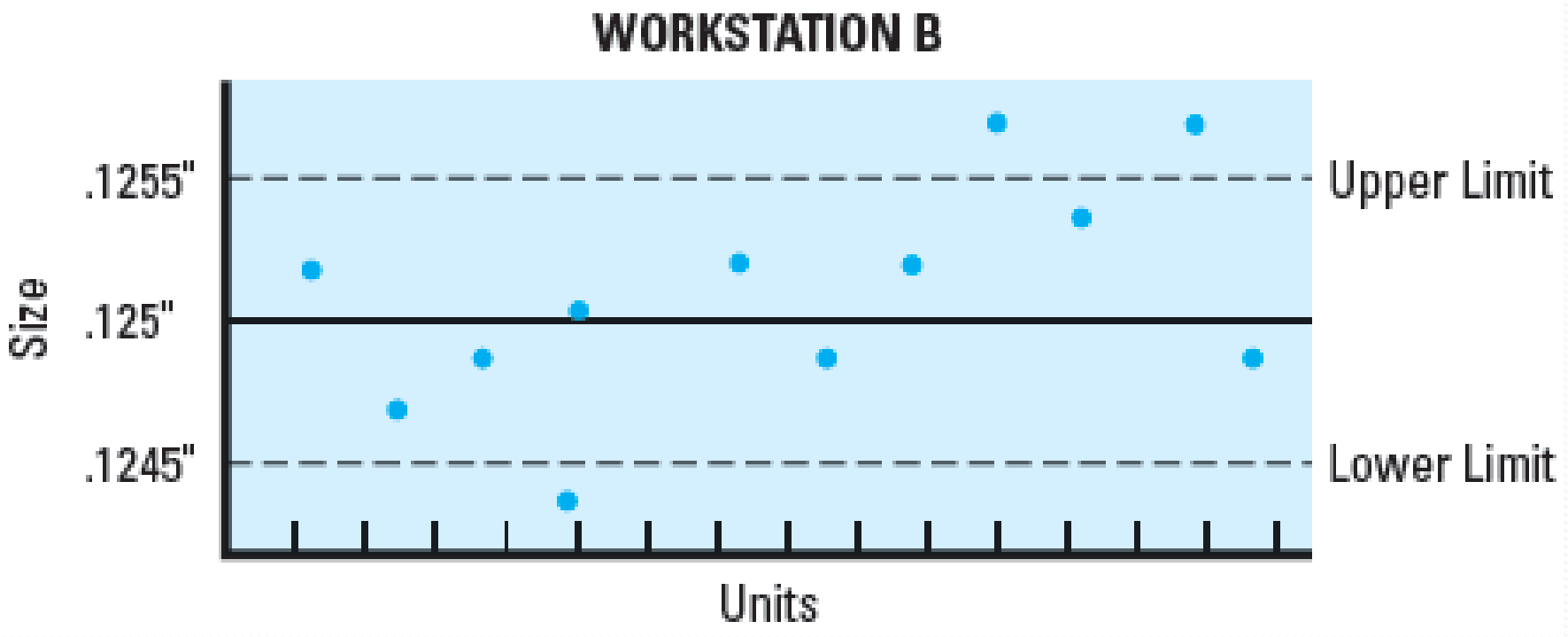
- Control Charts
- Statistical Control Charts
- Run Charts



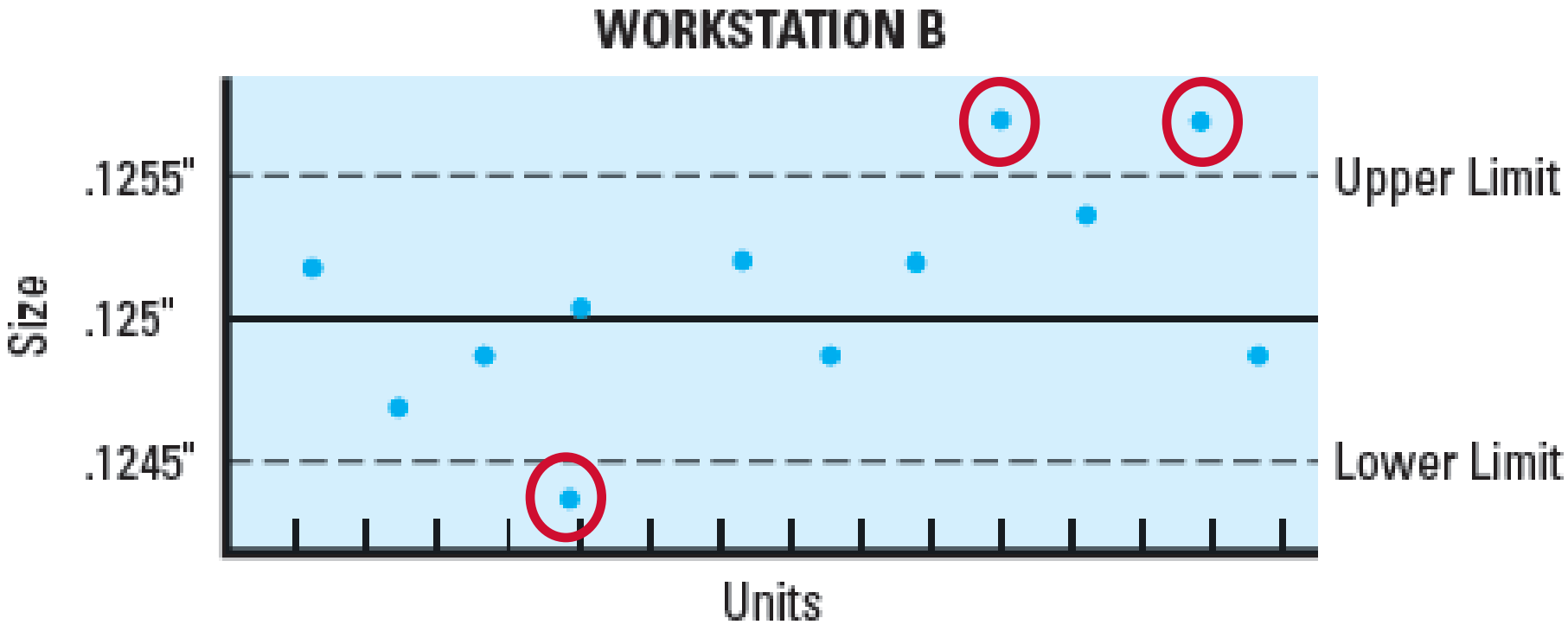
Taking Corrective Action:

- Histograms
- Pareto Diagrams (Charts)
- "Cause-and-Effect" ("fishbone") Diagrams

Control Chart (Workstation B)

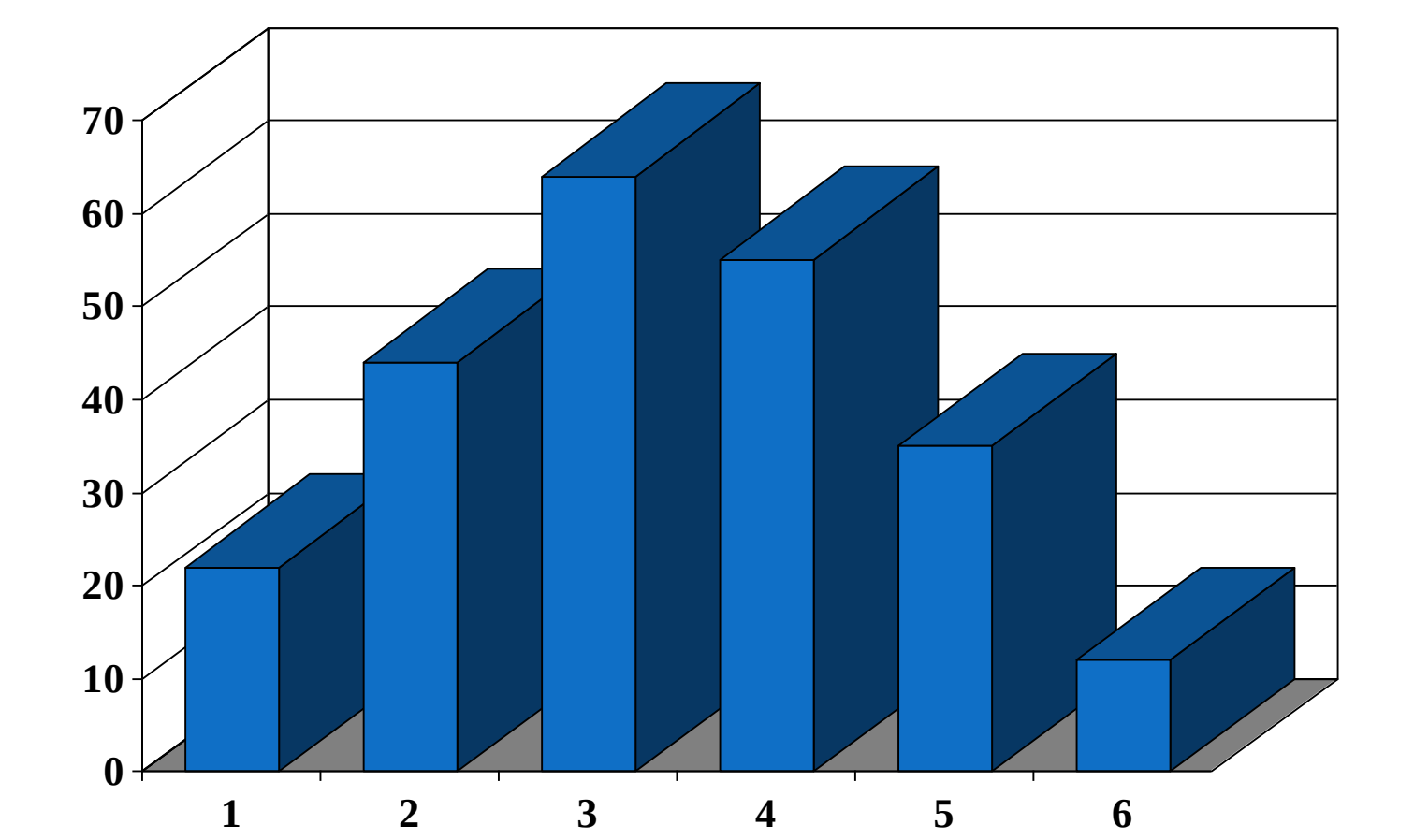


Control Chart (continued)



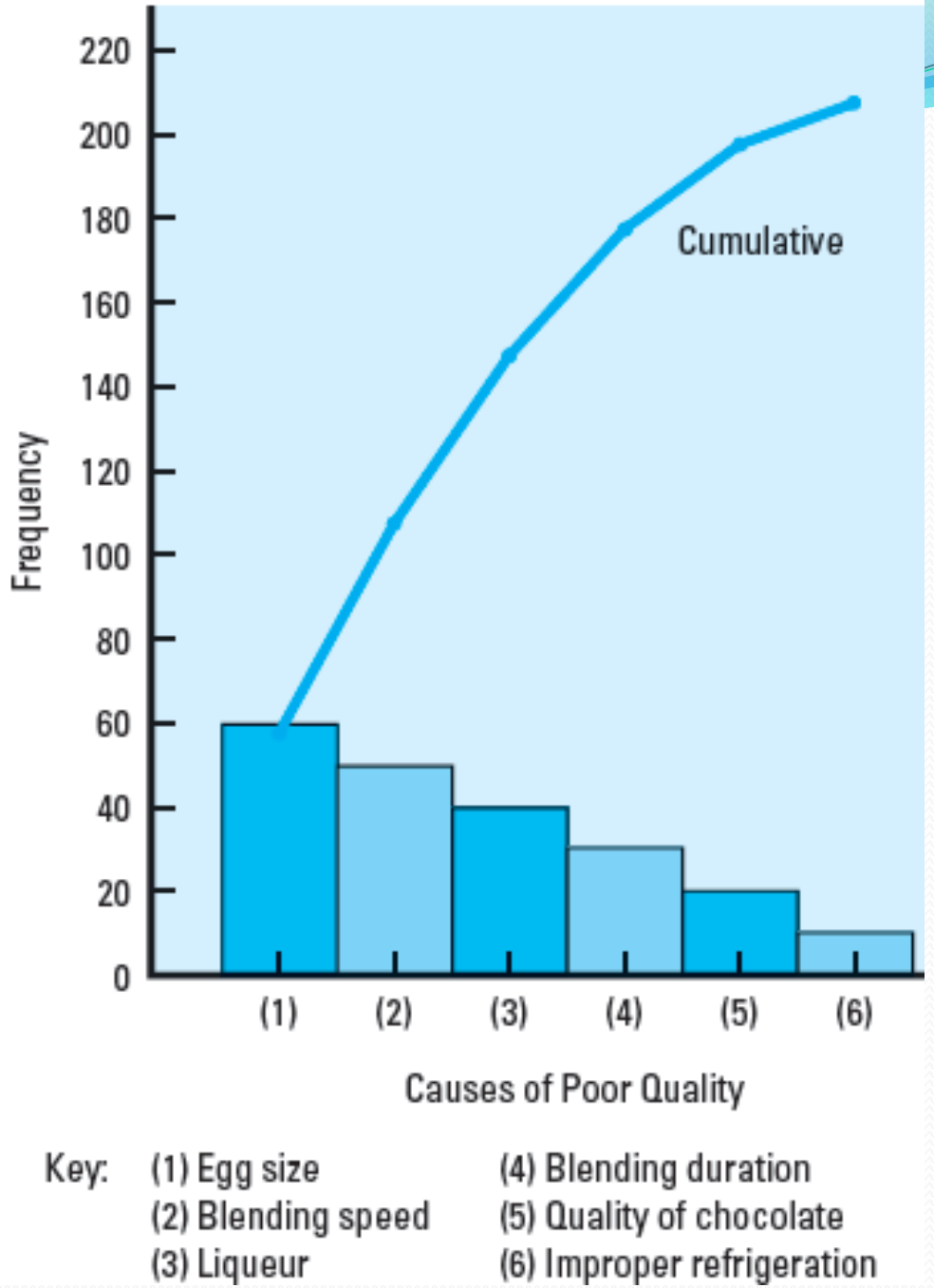
The circled observations are unacceptable, that is, they suggest an out-of-control process. Management may want to investigate the underlying causes of these observations and take appropriate corrective action.

Histogram

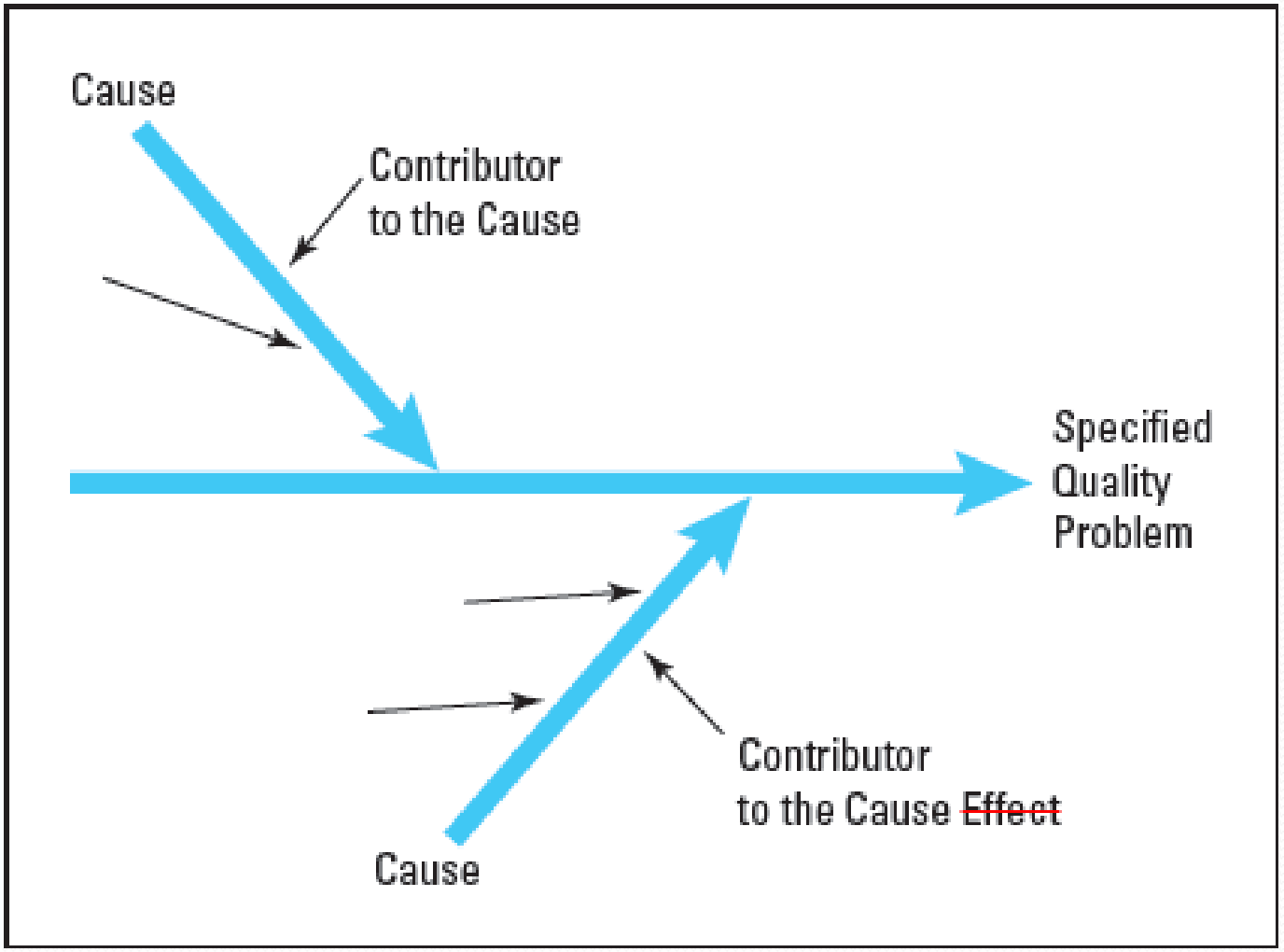


1 = Quality of chocolate; 2 = Liqueur; 3 = Egg size; 4 = Blending speed; 5 = Blending duration; 6 = Improper refrigeration

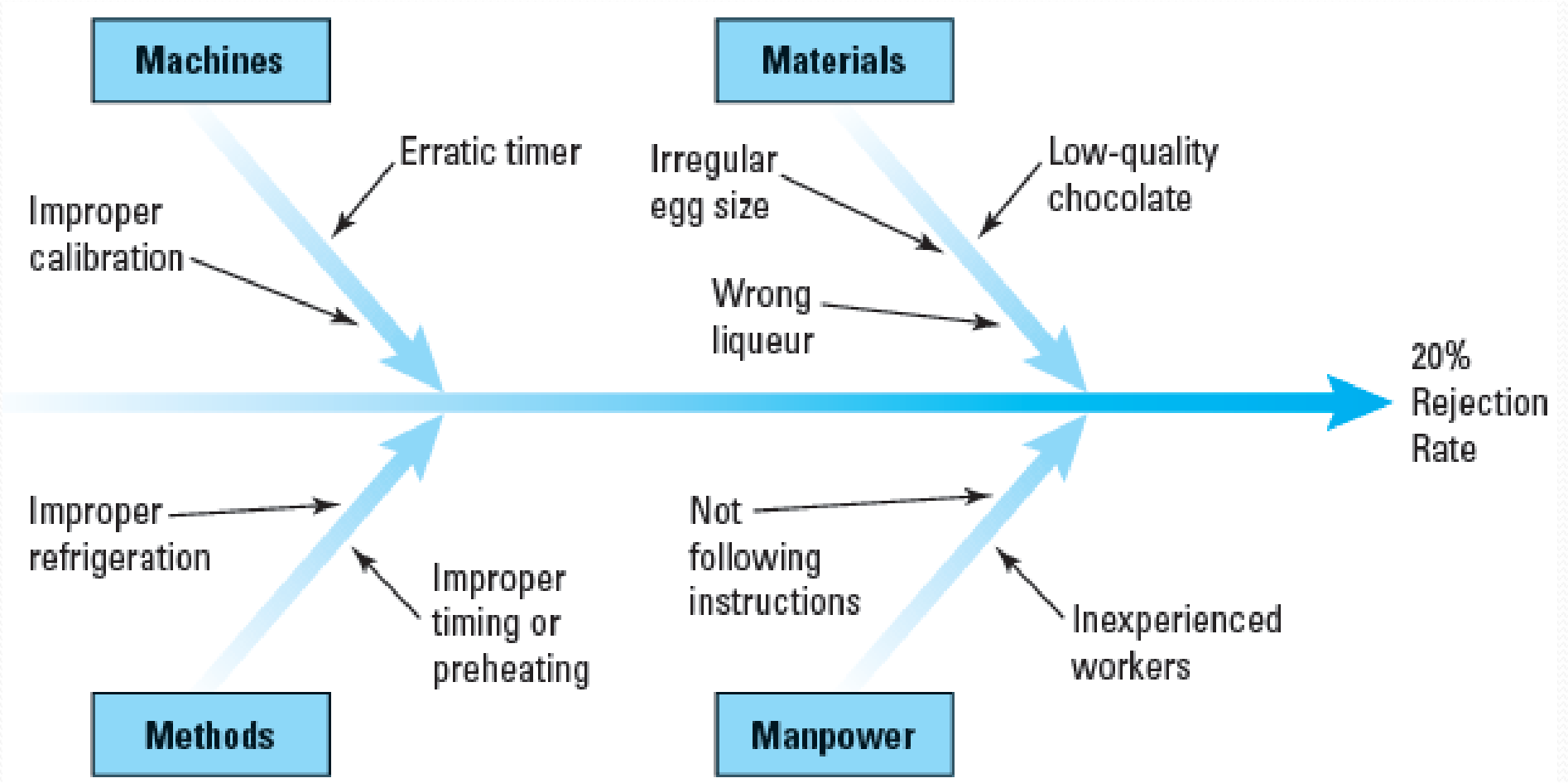
Pareto Diagram



Cause-and-Effect ("fish-bone") Diagram



Chocolate Mousse
Cause-and Effect Diagram



Lean Manufacturing and Accounting for Lean

Lean Manufacturing ("lean" for short)— reconfiguring the manufacturing process to increase product flow and product quality, reduce inventories, improve decision-making, and enhance profitability

Five Principles of Lean Manufacturing:

- Value
- Value Stream
- Pull and Flow
- Empowerment
- Perfection

Lean Manufacturing and Accounting for Lean

Accounting for Lean:

- Dysfunctional (or limiting or inhibiting) nature of traditional control mechanisms?

Value-Stream Income Statements:

- Definition of "value stream"?
- Intended to support/encourage/recognize the value of "lean"
- Generate a more refined measure of "operating income"

Sample Value-Stream Income Statement

RIMMER COMPANY
Value-Stream Income Statement

	Digital Cameras		Video Cameras		Total
Sales		$585,000		$540,000	$1,125,000
Operating costs:					
Materials	$ 25,200		$ 12,800		
Labor	168,000		88,000		
Equipment related costs	92,400		48,400		
Occupancy costs	11,200		4,800		
Total operating costs		296,800		154,000	$ 450,800
Less other value-stream costs:					
Manufacturing	120,000		240,000		
Selling and administration	10,000	130,000	10,000	250,000	380,000
Value-stream profit before inventory change		158,200		136,000	294,200
Less: Cost of decrease in inventory		(10,000)		(20,000)	(30,000)
Value-stream profit		$148,200		$116,000	$ 264,200
Less nontraceable costs					
Manufacturing					155,000
Selling and administration					54,000
Total nontraceable fixed costs					209,000
Operating income					$ 55,200

Summary

- We defined an appropriate role for accounting in terms of the management & control of quality
- We defined "quality" and its two major components, conformance quality and design quality
- We developed and discussed a comprehensive framework for the management & control of quality, and the role of accounting within this framework
- We discussed two different approaches for setting quality-related goals (Six Sigma and Goalpost versus Absolute Conformance)

Summary

- We discussed two areas where financial information can be supplied by the accountant to support TQM initiatives:
  - Relevant cost information for decision-making purposes
  - Cost of Quality (COQ) Reporting
- We discussed the use of both internal and external *nonfinancial quality metrics*

Summary

- We described techniques, borrowed from operations management, that can be used for detecting & then correcting quality problems (including control charts, statistical control charts, histograms, Pareto charts, and cause-and-effect diagrams)
- We described the term “lean manufacturing” and offered some insights as to changes to management accounting systems needed to support “lean” initiatives of management (e.g., the switch to “value-stream” income statements)

Summary

- Finally, we explored a way to estimate a quadratic loss functions (in conjunction with the use of absolute conformance standards); also showed how the Taguchi quality loss function can be used to set *tolerances* for an operation

Case study, problems and exercises

Day 5

Linking strategy to actions: Beyond costing

Shortcomings of traditional approaches to measurement

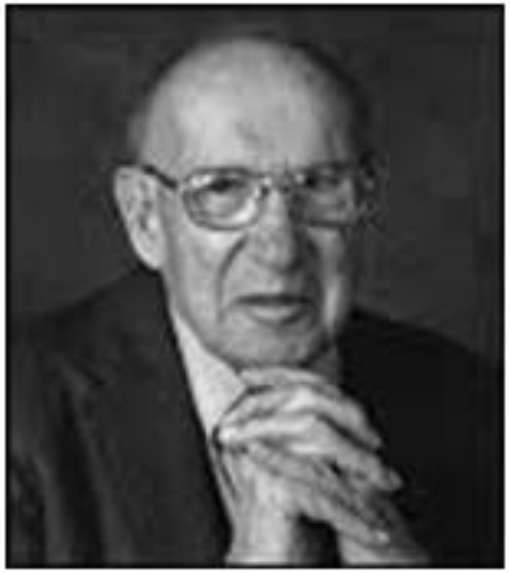
- Budgeting is the bane of corporate America'
-
    - Jack Welch, ex-CEO, General Electric



– 'The process of management is not about administering fixed budgets, it is about the dynamic allocation of resources'
–
  - Lord Browne, ex-CEO, BP



- 'Uncertainty…has become so great as to render futile, if not counterproductive, the kind of planning most companies still practice; forecasting based on probabilities'
-
  - Peter Drucker



The smallest problem…



73% of companies need more than 3 months to complete the annual budget.

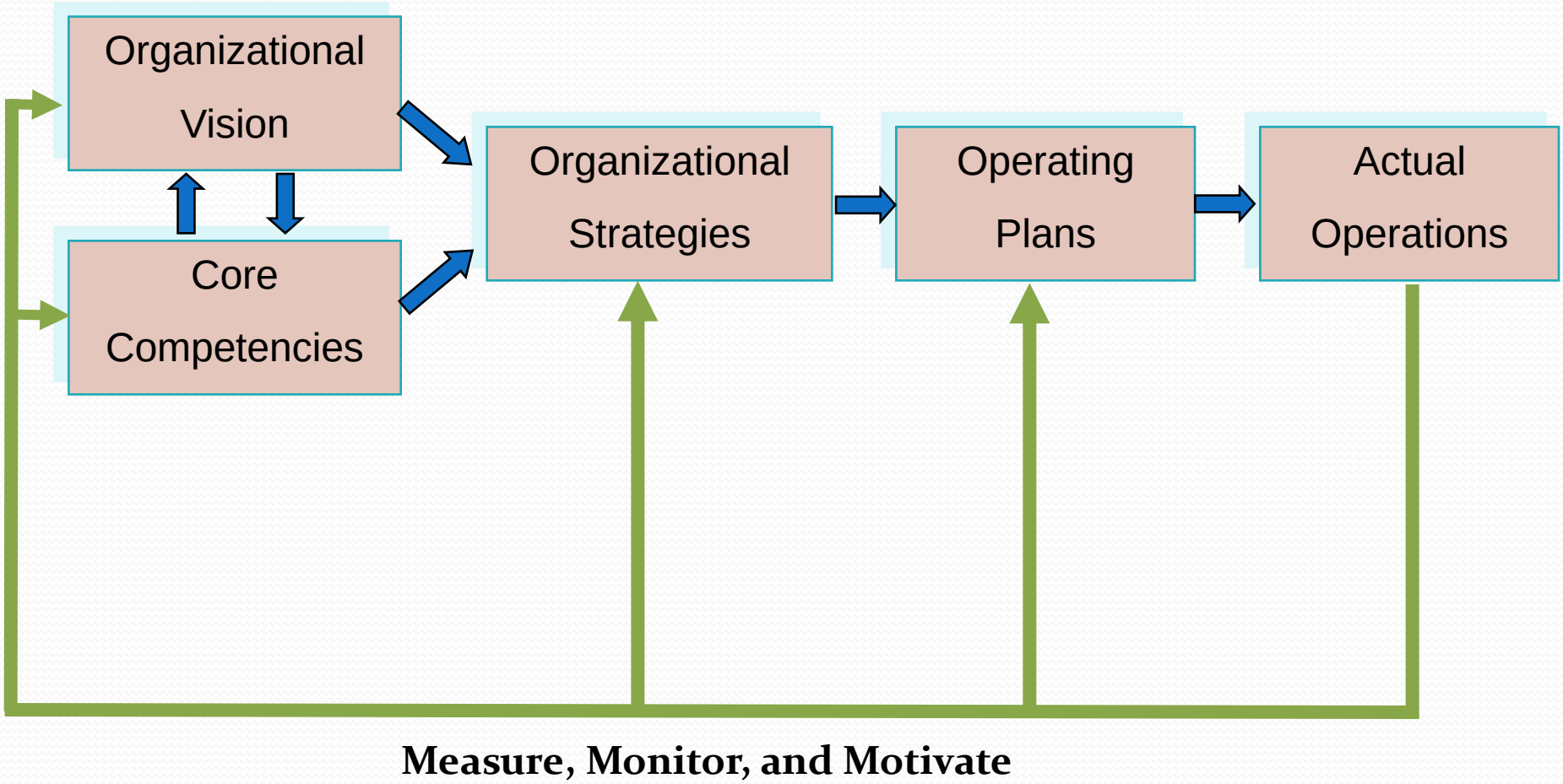
Hackett Group 2008

Budgets are bad for business?

Main criticisms of budgets are

- *Too resource and time consuming*
- *Slow to detect problems*
- *Not reliable for performance evaluation*
- *Quickly out of date*
- *Game Playing (Agency Problem)*
- *Financial targets overwhelming what is good for the business and ultimately shareholders*
- *Over emphasis on short term financial measures*
- *Departmental budgets may encourage "silo" thinking*
- *Disrupts cooperation*
- *Discourages innovation and adaption to changing conditions and opportunities*
- *Process lacks rigor*

Overview of Management Decision Making



Strategic Decision Making

- Managers determine performance objectives to monitor the results of actual operations.
- Performance objectives are specific goals.
- Measurements of the performance objectives are compared to management's expectations.
- Adjustments are made to either change operations or adjust the long-term strategies.

Performance Measures

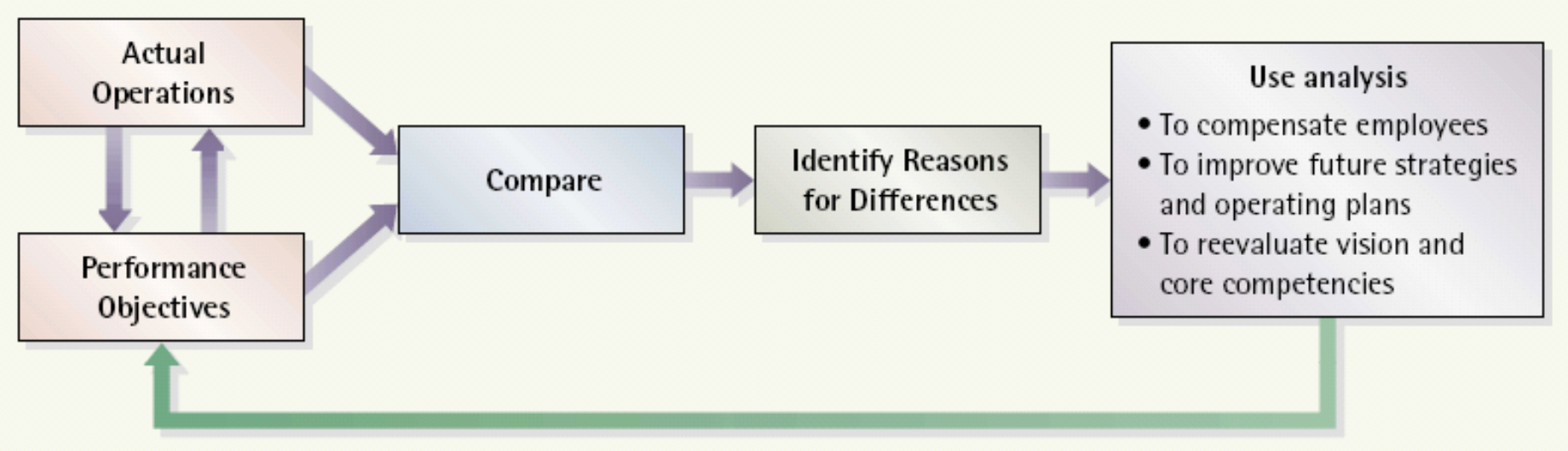
Financial Measures

Information measured in dollars or ratios of dollars

Nonfinancial Measures

Information that cannot be measured in dollars

Monitoring Measurable Performance Objectives



Financial Performance Measures

- Financial measures provide information in dollars or ratios of dollars.
  - These measures come from the accounting information system.
  - Traditionally these often were the only measures used.
- Examples include:
  - division revenue,
  - division profit margin or return on sales, and
  - variances of actual operating results from the budget.

Nonfinancial Performance Measures

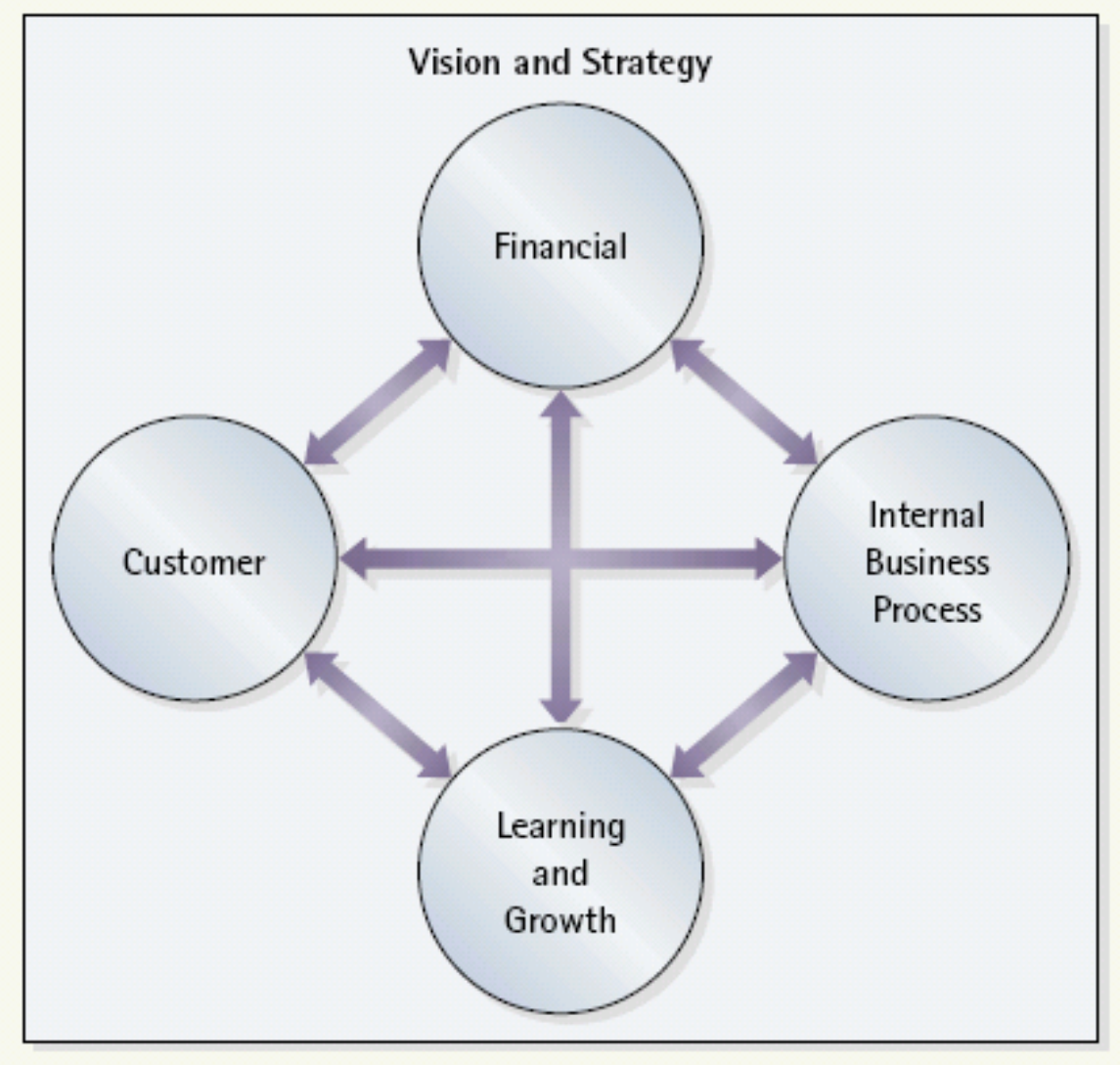
- Nonfinancial measures cannot be measured in dollars.

- Examples include:
  - Defect rates,
  - Customer satisfaction levels,
  - Number of days from a candidate's interview to his or her start date,
  - Average service time, and
  - Employee satisfaction levels.

Balanced Scorecard

- The balanced scorecard is a method of organizing the financial and nonfinancial performance measures used to monitor operations.
- The chosen measures are carefully related to the organization's vision and long-term strategies.
- The balanced scorecard serves as a means of communicating the organization's strategies throughout the organization.

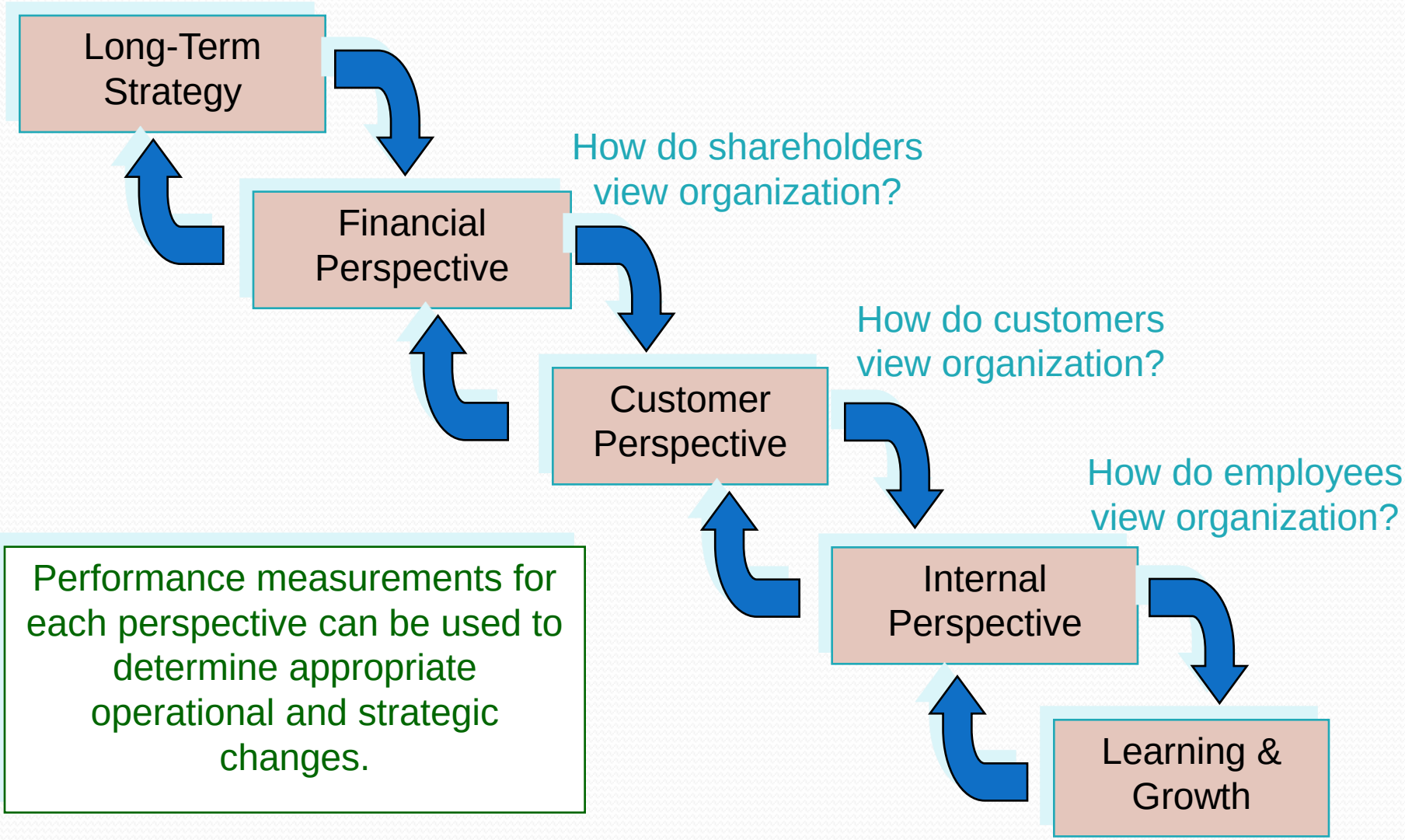
Balanced Scorecard



Balanced Scorecard (BSC) Perspectives

- A balanced scorecard usually consists of four categories of measures, with 4 ~ 5 specific measures per category.
- The four common categories are called the balanced scorecard perspectives.
  1. The financial perspective measures progress towards the organization's financial goals.
  2. The customer perspective evaluates the organization's performance from the viewpoint of customers.
  3. The internal business process perspective assesses the organization's ability to produce and deliver goods and services.
  4. The learning and growth perspective measures the organization's ability to change and develop improved strategies.

The BSC Translates Strategy to a Series of Cause and Effect Relationships



Performance measurements for each perspective can be used to determine appropriate operational and strategic changes.

BSC Example

The School for Future Artists is a private, for-profit, high school for students that are gifted in painting, drawing, and sculpture. Its mission is to train students in techniques and give them the confidence to be innovative, while at the same time preparing them to earn a living. Students are admitted to the school after a review of their portfolios. Half of the students are given full scholarships and the parents of the other half pay the expensive tuition. Parents who are paying tuition are given the opportunity to pay reduce tuition if they become shareholders. The School also receives donations from successful alumni. Identify some performance measures the School might use for the financial perspective on its balanced scorecard.

- Operating income
- Return on equity
- Donations as a percent of total revenues
- Variances between actual and budgeted expenditures
- Dollar amount of state and federal grant money received this year

BSC Example

Identify some performance measures the School for Future Artists might use for the customer perspective on its balanced scorecard.

- Percent of graduates who eventually complete masters degrees in fine arts or related fields
- Percent of graduates who eventually become art professors
- Number of graduates who were involved in art expositions this year
- Number of graduates who received federal or state grants this year
- Number of families with 2 or more children at the school
- Responses to satisfaction surveys given to students and parents

BSC Example

Identify some performance measures the School for Future Artists might use for the 3 categories of the internal business processes perspective on its balanced scorecard.

Innovation cycle

- Number of new courses developed
- Course development time

Operations cycle

- Percent of students who graduate
- Art supply costs per student

Post-sales service cycle

- Accounts receivable turnover ratio
- Results of alumni satisfaction surveys

BSC Example

Identify some performance measures the School for Future Artists might use for the learning and growth perspective on its balanced scorecard.

- Teacher turnover
- Number of training workshops attended by teachers this year
- Results of teacher satisfaction surveys
- Teacher and student use of newly purchased kiln equipment
- Number of management efficiency and leadership conferences attended by administrators this year

Balanced Scorecard Implementation

- A BSC implementation includes the following stages:
  - Clarify vision, competencies, and strategies.
  - Analyze the four BSC perspectives to develop objectives and measures.
  - Communicate the components of the BSC throughout the organization.
  - Establish performance targets and action plans.
  - Collect and analyze scorecard data.
  - Investigate variances and reward employees.
  - Provide feedback and refine the scorecard.

Barriers to Implementing Strategies

Vision Barrier

- People in the organization do not understand the strategy
- BSC helps engage people throughout the organization

People Barrier

- Employee incentives are not linked to strategy
- BSC can integrate operating plans and employee performance evaluation

Resource Barrier

- Organization resources are not linked to strategy
- BSC can focus resource allocations to areas that align with strategy

Mgmt Barrier

- Top managers do not spend enough time discussing strategy
- BSC engages managers in discussion on strategy and the interactions between financial and non financial measurements

Balanced Scorecard Strengths

- The greatest strength of the BSC is the communication of strategies throughout the organization.
- The BSC forces top management to clarify the vision and strategies of the organization.
- The BSC links employee rewards to performance objectives that are linked to the organization's vision and strategies, so short-term and long-term strategies are more likely to be in alignment.

Balanced Scorecard Potential Weaknesses

- If based on inappropriately defined visions and strategies, the BSC provides the wrong incentives for managers.
- Sometimes performance measures are chosen because the data is easy to obtain and familiar, rather than because they are linked to the vision and strategies.
- Managers may focus on measurements that are already successful rather than areas that need improvement.
- If performance measure targets are unattainable, employees may not buy in to the BSC initiative.

Future Direction of Cost Accounting

- Information technology advances free accountants from preparing detailed reports.
- More time is available to concentrate on providing the best information possible to support management decision making.
- Accountants increasingly need to become aware of and understand emerging management tools (such as the balanced scorecard).

Management Compensation

- **Recruiting, motivating, rewarding, and retaining effective managers is critical to the success of all firms**

- ***Management compensation* = policies and procedures for compensating managers; they include one or more of the following:**

  - A fixed payment (called *salary)*
  - A *bonus* (based on the achievement of performance goals for the period)
  - *Benefits* (also referred to as *perks,* such as travel, membership in a fitness club, medical benefits, and other extras paid for by the firm)

The Strategic Role of Management Compensation

- Top management should consider the specific strategic conditions facing the firm as a basic consideration in developing the compensation plan and making changes as strategic conditions change
- Top management can manage risk aversion effectively by carefully choosing the mix of salary and bonus in total compensation
- There is concern that executive pay is high compared to that of lower-level employees

Management Compensation and the Sales Life Cycle

Sales Life Cycle Phase	Salary	Bonus	Benefits
Product Introduction	High	Low	Low
Growth	Low	High	Competitive
Maturity	Competitive	Competitive	Competitive
Decline	High	Low	Competitive

The Objectives of Management Compensation

… are consistent with the three objectives of management control :

- To *motivate* managers to exert a high level of effort to achieve the goals set by top management (bonuses)
- To provide the *incentive* for managers, acting autonomously, to make decisions consistent with the goals set by top management
- To develop fairly the rewards earned by managers for their effort and skill and the effectiveness of their decision-making

Bonus Plans

- **Bonus compensation is the fastest growing element of total compensation and is often the largest part**
- **Bonus plans can be categorized according to three aspects:**
  - The *base of compensation*, that is, how the bonus pay is determined
  - *Compensation pools*, that is, the source from which the bonus pay is funded
  - *Payment options*, that is, how the bonus is to be awarded

Base of Compensation

- **Bonus compensation can be determined on the basis of (among other bases):**
  - Stock price
  - Strategic performance measures (cost, revenue, profit, or investment centers)
  - Performance measured by the balanced scorecard (CSFs)
- The choice of a base comes from a consideration of the compensation objectives of the firm
- Once the base is chosen, the firm must choose a method for calculating the amount of the bonus based on the actual level of performance relative to the target

Bonus Compensation Pools

Bonus compensation pools are either unit-based or firm-wide:

- A *unit-based pool* is based on the performance of the manager's unit; the amount of the bonus for any one manager is independent of the performance of other managers
- A *firm-wide pool* contains the amount of bonus available to all managers; bonuses depend on the firm's performance as a whole

Bonus Payment Options

The four most common *payment options* are as follows:

- *Current bonus* (cash and/or stock) based on current performance—the most common form of bonus payment
- *Deferred bonus* (cash and/or stock) earned currently but not paid for two or more years
- *Stock options* confer the right to purchase stock at some future date at a predetermined price
- *Performance shares* grant stock for achieving certain performance goals over two years or more

Tax Planning and Financial Reporting

- In addition to achieving the three main objectives of compensation plans, firms attempt to choose plans that reduce taxes for both the firm and the manager
- Many perks are deductible by the firm but are not considered income to the manager (e.g., club memberships, company cars, and entertainment)
- Firms also attempt to design compensation plans to have a favorable effect on the firm's financial reports

Business Analysis

- ***Business analysis* includes a set of tools used to evaluate the firm's competitiveness and financial performance**

- **Three tools for business analysis:**
  - The balanced scorecard (BSC)
  - Ratios to measure the performance of individual SBU managers and of the entire company
  - Economic Value Added (EVA®)

The Balanced Scorecard (BSC)

- The use of the BSC to evaluate a firm is similar to the use of CSFs in evaluating and compensating an individual manager
- A favorable evaluation results when the CSFs are superior to the benchmarks and to prior years' performance
- For example, assume EasyKleen, a manufacturer of cleaning products, sets its benchmark at 90% of the best performance in the industry (see next slide for company data)

EasyKleen Company Financial Statements

EASYKLEEN COMPANY
Summary of Selected Financial Information
For the Year Ended December 31, 2013

Financial Statements	2013		2012
Current assets			
Cash	$ 50,000		$ 70,000
Accounts receivable	100,000		80,000
Inventory	50,000		60,000
Total current assets	$ 200,000		$210,000
Long-lived assets	200,000		180,000
Total assets	$ 400,000		$390,000
Current liabilities	$ 50,000		$ 60,000
Long-term debt	150,000		200,000
Total liabilities	$ 200,000		$260,000
Shareholders' equity	200,000		130,000
Total liabilities and equity	$ 400,000		$390,000
Sales	$1,000,000	(50% are credit sales)	
Cost of sales	500,000		
Gross margin	$ 500,000		
Operating expense	300,000		
Operating income	$ 200,000		
Income tax (50%)	100,000		
Net income	$ 100,000		

EasyKleen: Additional Performance Data

Additional Financial Information		
Depreciation expense	$30,000	
Capital expenditures	$50,000	
Dividends	$30,000	
Year-end share price	$ 16.25	
Number of outstanding shares	50,000	
Interest expense	$10,000	($5,000 after-tax)
Training expenses	$30,000	($15,000 after-tax; 26 hours per employee)
Quality defects	350	ppm (parts per million)
Weighted-average cost of capital (WACC)	6%	

Cash Flow from Operations	
Net income	$100,000
Depreciation expense	30,000
Decrease (increase) in accounts receivable	(20,000)
Decrease (increase) in inventory	10,000
Increase (decrease) in current liabilities	(10,000)
Total cash flow from operations	$110,000

Free Cash Flow	
Cash flow from operations	$110,000
Less: Capital expenditures	50,000
Less: Dividends	30,000
Free cash flow	$ 30,000

EasyKleen has three CSFs:

1) **Return on total assets** (financial performance)
2) **Number of quality defects** (business processes)
3) **Number of training hours for plant workers** (human resources)

BSC Performance Analysis for EasyKleen

EasyKleen Company
Balanced Scorecard
For the Year Ended December 31, 2013

Category	CSF	Target Perf.	Actual Performance	Variance	
Financial Operations	Return on total assets	22%	25.3%	3.3%	exceeded
Operations	Quality defects	300 ppm	350 ppm	50 ppm	unmet
Human Resources	Training hours	32 hrs/employee	26 hours per employee	6 hours	unmet

Financial Ratio Analysis

Financial ratio analysis uses financial statement data to evaluate performance, often in the areas of *liquidity* and *profitability*:

- *Liquidity* refers to the firm's ability to pay its current operating expenses and maturing debt (one year or less); liquidity ratios include selected cash flow ratios
- Key liquidity and cash flow measures:
  - Accounts receivable turnover
  - Inventory turnover
  - Current ratio
  - Quick ratio
  - Cash-flow ratios for operating cash flows and free cash flow

Financial Ratio Analysis for EasyKleen

For the Year Ended December 31, 2013

Ratio	Benchmark	Actual	Percent Achievement	
Liquidity Ratios				
A/R turnover	7	5.56	79%	unmet
Inventory turnover	8	9.09	114%	met
Current ratio	2	4	200%	met
Quick ratio	1	3	300%	met
Cash Flow Ratios				
Cash flow ratio	2.5	2.2	88%	unmet
Free cash flow ratio	0.5	0.6	120%	met
Profitability Ratios				
Gross margin %	35%	50%	143%	met
Return on assets	22%	25.3%	115%	met
Return on equity	44%	60.6%	138%	met
Earnings per share	$2.15	$2.00	93%	unmet

Economic Value Added (EVA®)

- EVA® is a business unit's income after taxes and after deducting the cost of capital
- EVA® approximates a firm's "economic profits"
- EVA® requires adjustments to financial accounting data to "correct" for accounting "distortions"
- EVA® focuses managers' attention on creating value for shareholders
- By earning higher profits than the firm's cost of capital, the firm increases its internal resources available for dividends and/or to finance its continued growth

EVA® for EasyKleen Company

EVA® for EasyKleen is determined as follows, with *invested capital* defined as total assets less current liabilities(CL)

EVA® = EVA® net income - (Cost of capital x Invested capital)
= Net income + Training and interest expenses after tax
- .06 x (Average total assets + Training expenses - CL)
= $100,000 + $15,000 + $5,000 - 0.06 x
[($400,000 + $390,000)/2 + $30,000 - $50,000]
= $97,500

Note: Training expenses are added to total assets and to net income for EVA® calculations since training expenses are considered an investment for EVA® purposes

Business Valuation

- ***Business valuation*** **examines the value of a company, to come up with a dollar amount to represent the company's worth**

- **The value of a business can be approached in two different ways**

  - **From the viewpoint of the owner, shareholder, or interested investor,** i.e., the value of the firm's shareholder equity
  - **From the viewpoint of a potential buyer** – what one would one pay to purchase the entire company--debt, equity, and assets

Business Valuation

Four approaches to measuring the value of shareholders' equity:

- The ***book value method*** is the quickest and easiest method and is equivalent to the value that appears on the balance sheet for stockholders' equity
- The ***market value method*** is the market value of the firm's common equity, directly from the current market value of the firm's shares (market capitalization)
- The ***discounted cash flow method*** measures the firm's equity value as the discounted present value of its estimated future cash flows
- The ***multiples-based approach*** uses a ratio of stock price to some financial measure to determine the value of the firm's equity

The Discounted Cash Flow (DCF) Method

Four steps in the application of the DCF method:

1. Forecast *free cash flows* (operating cash flow less capital expenditures and less dividends paid) over a finite horizon (usually 5 to 10 years)
2. Forecast free cash flows beyond the finite horizon, using some simplifying assumption (e.g., cash flows will continue on indefinitely)
3. Discount free cash flows at the firm's weighted-average cost of capital (WACC)
4. Calculate the value of equity by adding the values calculated in step 3 to current nonoperating investments and then subtracting the market value of long-term debt

Using Multiples for Valuation

- The multiples-based valuation uses the ratio of stock price to a key financial measure to determine a multiple that is used in valuation
- Key financial measures used in multiples-based valuation include
  - Earnings
  - Sales
  - Cash Flow

Enterprise Value (EV)

- **Enterprise value (EV)** is another measure of what the market says a company is worth, but this time in an acquisition
- EV is measured as the market value of the firm's equity (market capitalization) plus debt, and less cash (cash is available after the acquisition to pay off debt or for other uses)
- EV is used by investors and shareholders when an acquisition is being considered

Financial and Nonfinancial performance Measures

- Many organizations record financial and nonfinancial performance measures for their subunits on a balanced scorecard. The scorecards of different organizations emphasize different measures but the measures are always derived from a company's strategy. In a balanced scorecard, the four perspectives are:
  1. Financial
  2. Customer
  3. Internal business process
  4. Learning and growth

Accounting-Based Performance Measures

- Requires several steps:
  1. Choose performance measures that align with the firm's financial goals.
  2. Choose the details of each performance measure.
  3. Choose a target level of performance and a feedback mechanism for each performance measure.

Four common measures of economic performance:

1. Return on investment
2. Residual income
3. Economic value added
4. Return on sales (this measure does not account for investment)

Return on Investment (ROI)

- ROI is an accounting measure of income divided by an accounting measure of investment.

$$\text{ROI} = \frac{\text{Income}}{\text{Investment}}$$

ROI, cont'd

- Most popular metric for two reasons:
  1. Blends all the ingredients of profitability (revenues, costs, and investment) into a single percentage
  2. May be compared to other ROI's both inside and outside the firm
- Also called the accounting rate of return (ARR) or the accrual accounting rate of return (AARR)

ROI, concluded

- ROI may be decomposed into its two components as follows:

$$\frac{\text{Income}}{\text{Investment}} = \frac{\text{Income}}{\text{Revenues}} \times \frac{\text{Revenues}}{\text{Investment}}$$

- ROI = Return on Sales X Investment Turnover.
- This approach is known as the DuPont Method of Profitability Analysis. It recognizes the two basic ingredients in profit making: increasing income per dollar of revenue and using assets to generate more revenues. An improvement to either with no change in the other will increase ROI.

Residual Income

- Residual income (RI) is an accounting measure of income minus a dollar amount for required return on an accounting measure of investment.
- RI = Income – (RRR X Investment)
  - RRR = Required Rate of Return
- Required rate of return times the investment is the imputed cost of the investment.
  - Imputed costs are costs recognized in some situations, but not in the financial accounting records.

Economic Value Added (EVA)

- EVA is a variation of RI used by many companies. It is calculated as follows:

$$\text{EVA} = \text{After-tax Operating Income} - \{\text{Weighted-Average Cost of Capital} \times (\text{Total Assets} - \text{Current Liabilities})\}$$

- Weighted average cost of capital equals the after-tax average cost of all long-term funds in use.

Return on Sales (ROS)

- Return on sales is also known as the income-to-revenues ratio or the sales ratio
- It is frequently used, simple to compute, and widely understood.
- It does not take into account investment.
- It measures how effectively costs are managed

It is calculated by taking Operating Income / Revenues and is expressed as a percentage.

Comparing performance measures

- Using the example of the hotels from our textbook, we see the results using each of our methods: (in parentheses are the ranks)

Hotel	ROI	RI	EVA	ROS
SF	24% (1)	$120,000 (2)	$68,250 (2)	20% (2)
Chicago	15% (3)	$ 60,000 (3)	$15,750 (3)	21% (1)
New Orleans	17% 92)	$150,000 (1)	$73,500 (1)	16% (3)

Choosing details of the measure

How should each measure be computed? Several questions should be answered to begin:

- What is the time horizon?
- Which definition of investment will be used?
- How shall we calculate various components of each performance measure such as the measurement of assets.
- Let's now discuss each of these measurement details.

Alternative Time Horizons

An important element in designing accounting-based performance measures is choosing the time horizon of the performance measures.

- Multiple periods of evaluation are sometimes appropriate.
- ROI, RI, EVA, and ROS all basically evaluate one period of time.
- ROI, RI, EVA, and ROS may all be adapted to evaluate multiple periods of time.

Benefits of multiyear analysis

There are several benefits to multiyear analysis:

- Benefits of actions taken in the current period may not show up in short-run performance measures.
- If managers use NPV for investment decisions, then using a multiyear RI for performance achieves goal congruence.
- Motivates managers to take a long-run perspective by compensating them on changes in market price.

Choosing Alternative Definitions for Performance Measures

- Four common alternative definitions of investment:
  1. Total assets available – all assets.
  2. Total assets employed – all assets less idle assets and assets purchased for future expansion.
  3. Total assets employed minus current liabilities – total assets employed less assets financed by short-term creditors.
  4. Stockholder's equity – assign liabilities to subunits and deduct from total assets.

Alternative asset measurements

- Possible alternative asset measurements include:
  1. Current cost – cost of purchasing an asset today identical to the one currently held.
  2. Gross value of fixed assets – historical cost.
  3. Net book value(NBV) of fixed assets – historical cost.

  (Historical cost is used to calculate ROI and there is always a question whether to use gross or net book value. NBV is the measure most commonly used by companies for internal performance evaluation.)

Target levels of performance and feedback

- Choosing target levels of performance:
  - Establish target ROIs using historical-cost-based measures.
  - Set continuous improvement targets.
  - Use balanced scorecards to establish targets.
- Choosing the timing of feedback (depends on):
  - How critical the information is for the success of the organization.
  - The management level receiving feedback.
  - The sophistication of the organization's information technology.

Performance Measurement in Multinational Companies

- Additional difficulties faced by multinational companies:
  - The economic, legal, political, social, and cultural environments differ significantly across countries.
  - Import quotas and tariffs range widely from country to country.
  - Availability of materials and skilled labor, as well as costs of materials, labor, and infrastructure also differ significantly across countries.
  - Divisions operating in different countries account for their performance in different currencies and inflation and fluctuation in foreign-currency exchange rates affect performance measurement.

Distinguishing Between performance of Managers and their subUnits

- The performance evaluation of a manager should be distinguished from the performance evaluation of that manager's subunit, such as a division of the company.
- The reason for this is to recognize that a company may put the most skilled division manager in charge of the division with the poorest return in an effort to improve that division and that may take years.

The Trade-Off: Creating Incentives vs. Imposing Risk

- An inherent trade-off exists between creating incentives and imposing risk.
  - An incentive should be some reward for performance.
  - An incentive may create an environment in which suboptimal behavior may occur: the goals of the firm are sacrificed in order to meet a manager's personal goals.
  - The motivation for having some salary and some performance-based compensation is to balance the benefit of incentives against the extra cost of imposing risk on a manager.

Moral Hazard

- Moral hazard describes a situation in which an employee prefers to exert less effort compared with the effort the owner desires because the owner cannot accurately monitor and enforce the employee's effort.

Intensity of Incentives

- Intensity of incentives—how large the incentive component of a manager's compensation should be relative to their salary component.
- The tradeoff between considerations of sensitivity and risk, on the one hand, and the congruence of goals, on the other, determines the effective intensity of incentives placed on each measure of performance.

Benchmarks and relative performance evaluation

- Benchmarks are metrics that correspond to the best practices of organizations and may be available inside or outside of the organization.

Performance Measures at the Individual Activity Level

- Managers need to do two things when designing the measures used to evaluate performance of individual employees:
  1. Design performance measures for activities that require multiple tasks.
  2. Design performance measures for activities done in teams.

Compensation for Multiple Tasks & team-based

- Employers want employees to allocate their time and effort intelligently among various tasks or aspects of their jobs.
- A team achieves better results than individual employees acting alone.[1] Many companies reward employees on teams based on how well their team performs.

Executive Compensation Plans

- Based on both financial and nonfinancial performance measures, and include a mix of:
  - Base salary.
  - Annual incentives, such as cash bonuses.
  - Long-run incentives, such as stock options.
- Well-designed plans use a compensation mix that balances risk (the effect of uncontrollable factors on the performance measure, and hence compensation) with short-run and long-run incentives to achieve the firm's goals.

Strategy and Levers of Control

Performance evaluation measures help managers track their progress toward achieving a company's strategic goals.

- Because these measures help diagnose whether a company is performing to expectations, they are collectively called Diagnostic Control Systems.
- Companies motivate managers by holding them accountable and rewarding them for meeting goals.

Strategy and Levers of Control, concluded

To prevent unethical and outright fraudulent behavior, companies balance the push for performance (resulting from Diagnostic Control Systems) with three other levers of control:

- Boundary systems.
- Belief systems.
- Interactive control systems.

- Each lever is important and needs to be monitored.
- Levers should be interdependent and collectively represent a living system of business conduct.

Boundary Systems

- Boundary systems describe standards of behavior and codes of conduct expected of all employees.
  - Highlights actions that are “off-limits.”
  - A code of conduct describes appropriate and inappropriate individual behaviors.

Belief Systems

- Belief systems articulate the mission, purpose, and core values of a company.
- They describe the accepted norms and patterns of behavior expected of all managers and other employees when interacting with one another, shareholders, customers, and communities.

Interactive Control Systems

- Interactive control systems are formal information systems that managers use to focus the company's attention and learning on key strategic issues.
- Helps managers create open dialog and eliminate or manage an excessive focus on diagnostic control systems.
- Tracks strategic uncertainties that businesses face.

Summary

- Compensation plans are policies and procedures for compensating managers
  - A *salary* is a fixed (usually monthly) payment
  - A *bonus* is based on the achievement of performance goals for the period
  - *Benefits* (also referred to as perks) include travel, membership in a fitness club, medical benefits, and other extras paid for by the firm
- In addition to achieving the three main objectives, firms attempt to choose compensation plans that reduce or avoid taxes for both the firm and the manager

Summary

A wide variety of bonus plans exists, but can be categorized according to three aspects:

- The *base of compensation*, that is, how the bonus pay is determined (e.g., stock price, strategic performance measures (cost, revenue, profit, or investment center), or the balanced scorecard (CSFs))
- *Compensation pools*, that is, the source from which the bonus pay is funded (unit-based or firm-wide)
- *Payment options*, that is, how the bonus is to be awarded

Summary

In recent years, the use of different payment options for bonus compensation plans has greatly increased, but the four most common payment options are as follows:

- *Current bonus* (cash and/or stock) based on current performance - most common form
- *Deferred bonus* (cash and/or stock) earned currently but not paid for two or more years
- *Stock options* confer the right to purchase stock at some future date at a predetermined price
- *Performance shares* grant stock for achieving certain performance goals over two years or more

Summary

- *Business analysis* includes a set of tools used to evaluate the firm's competitiveness and financial performance

- There are three tools for business analysis:
  - The balanced scorecard (BSC)
  - Financial Ratios to measure the performance of individual SBU managers and of the entire company
  - Economic Value Added (EVA®)

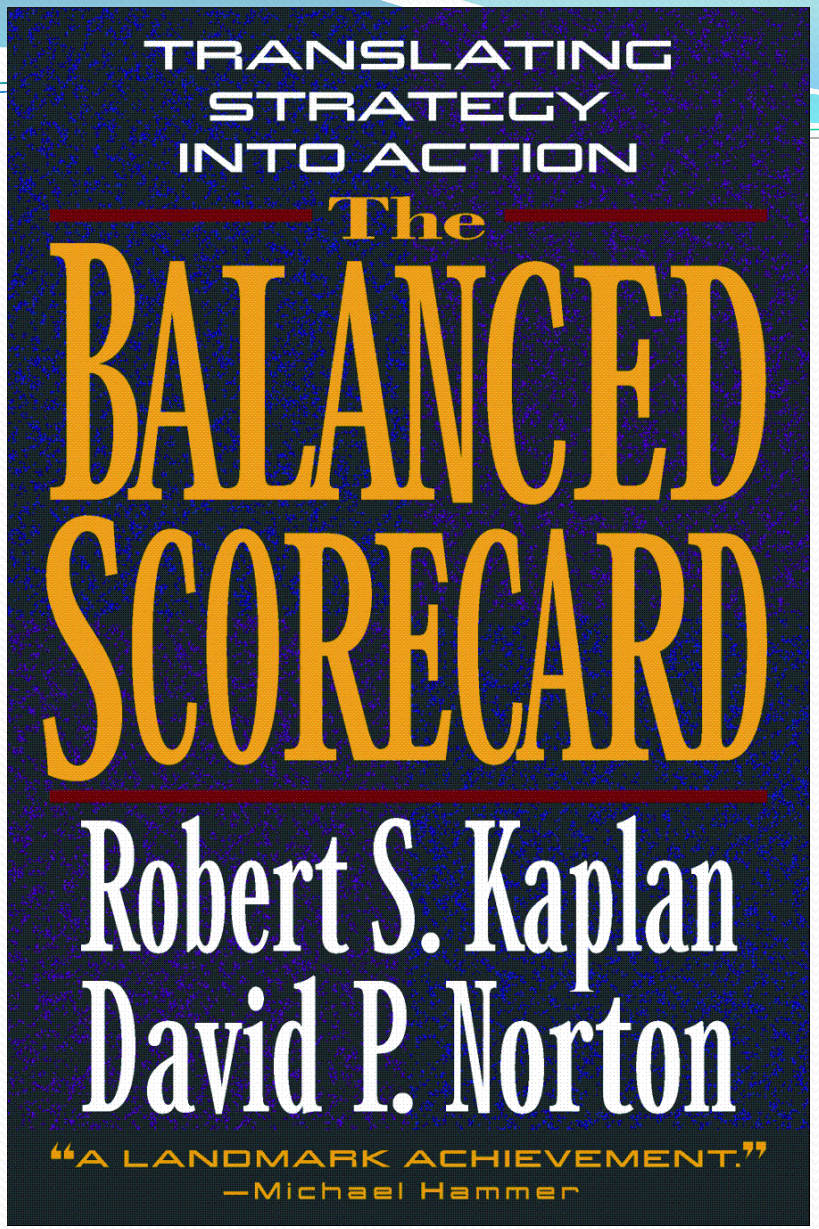
Summary

- Business valuation examines the value of a company, to come up with a single dollar figure of worth

- There are four approaches to equity valuation
  - The *book value method*
  - The *market value method* (market capitalization)
  - The *discounted cash flow method*
  - The *multiples-based approach*

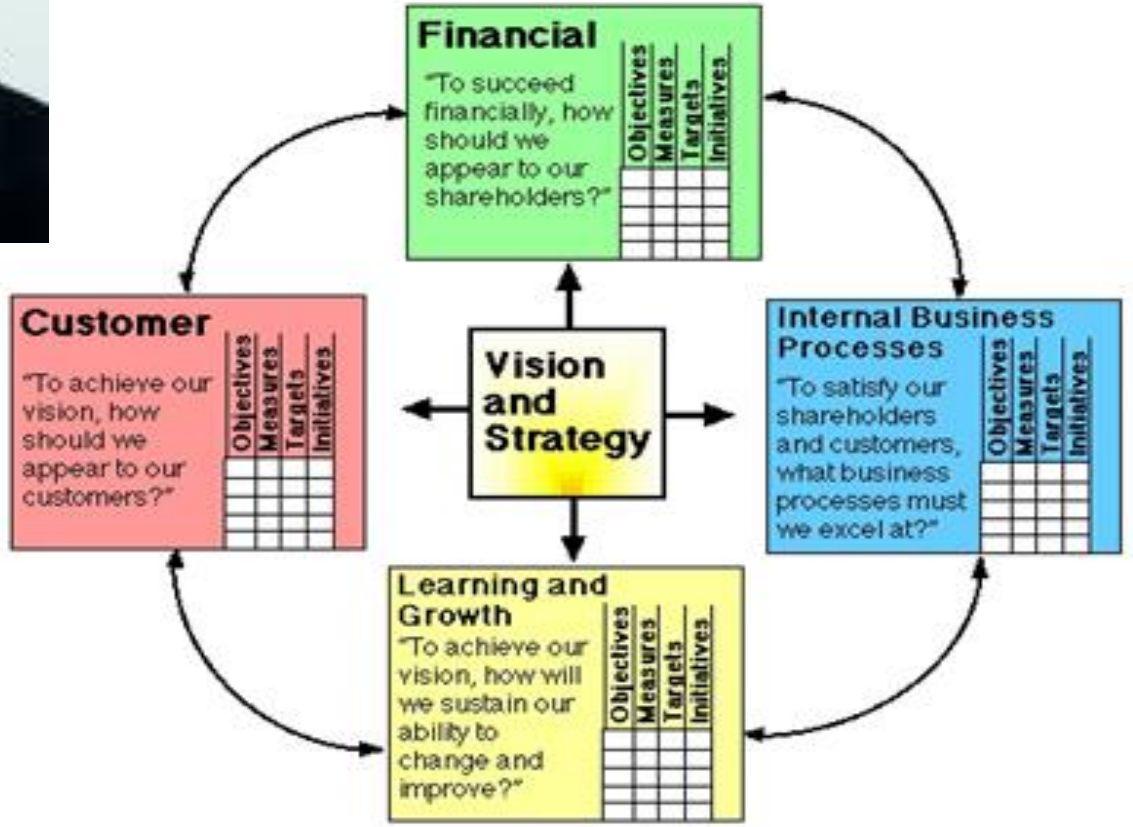
- Enterprise value (EV) is a measure of what the market says a company is worth for acquisition purposes

The Balanced Scorecard: linking Strategy to Performance Measurement


TRANSLATING
STRATEGY
INTO ACTION
The
BALANCED
SCORECARD
Robert S. Kaplan
David P. Norton
"A LANDMARK ACHIEVEMENT."
—Michael Hammer

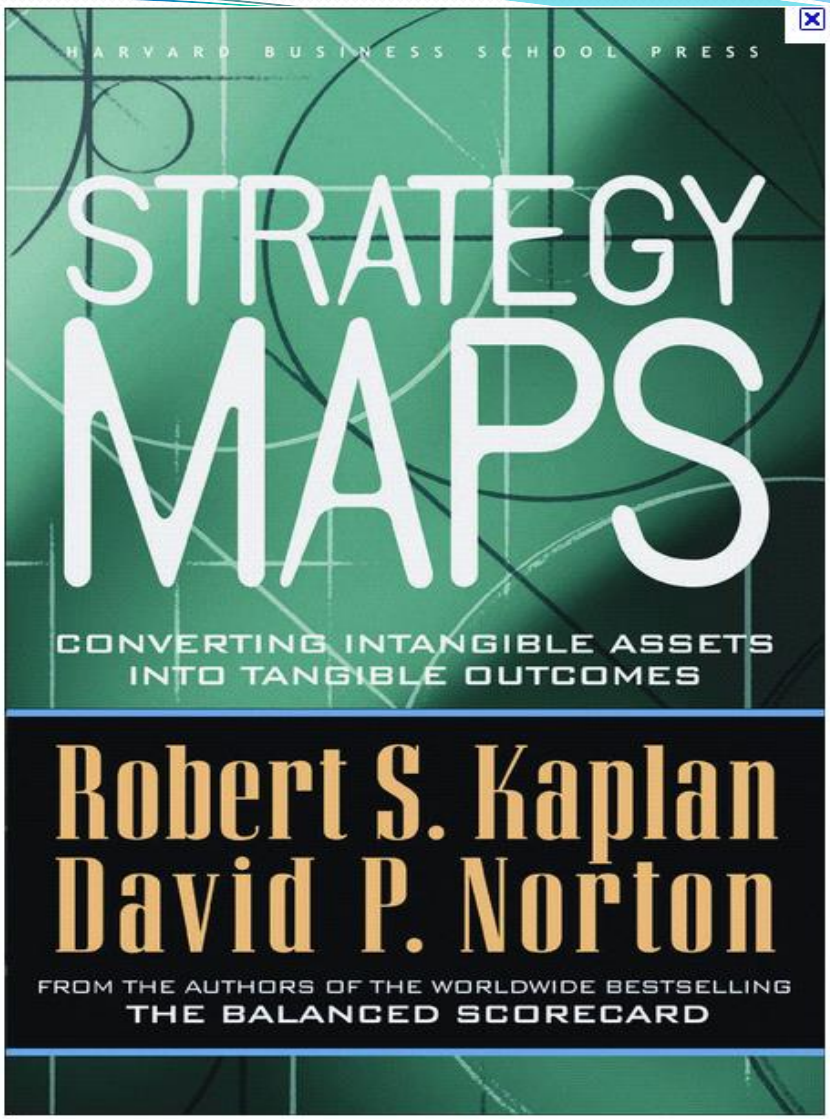


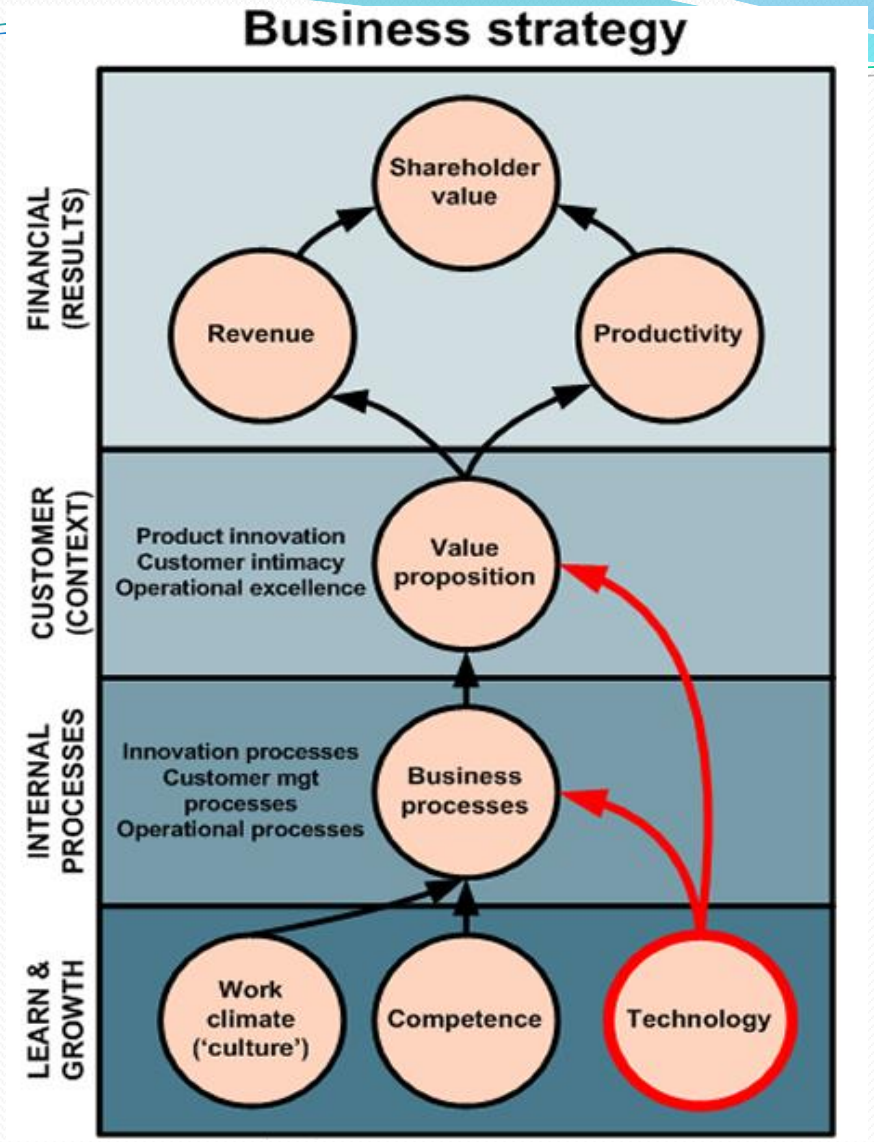
ced Scorecard



Adapted from Robert S. Kaplan and David P. Norton, "Using the Balanced Scorecard as a Strategic Management System," Harvard Business Review (January-February 1996): 76.


COMMUNITY
ACTIVELY SUPPORTING LOCAL COMMUNITIES
BUYING AND SELLING OUR PRODUCTS RESPONSIBLY
CARING FOR THE ENVIRONMENT
GIVING CUSTOMERS HEALTHY CHOICES
CREATING GOOD JOBS AND CAREERS
CUSTOMER
FINANCE
PEOPLE
OPERATIONS
Every little helps


HARVARD BUSINESS SCHOOL PRESS
STRATEGY MAPS
CONVERTING INTANGIBLE ASSETS INTO TANGIBLE OUTCOMES
Robert S. Kaplan
David P. Norton
FROM THE AUTHORS OF THE WORLDWIDE BESTSELLING
THE BALANCED SCORECARD


Business strategy
FINANCIAL (RESULTS)
Shareholder value
Revenue
Productivity
CUSTOMER (CONTEXT)
Product innovation
Customer intimacy
Operational excellence
Value proposition
INTERNAL PROCESSES
Innovation processes
Customer mgt processes
Operational processes
Business processes
LEARN & GROWTH
Work climate ('culture')
Competence
Technology

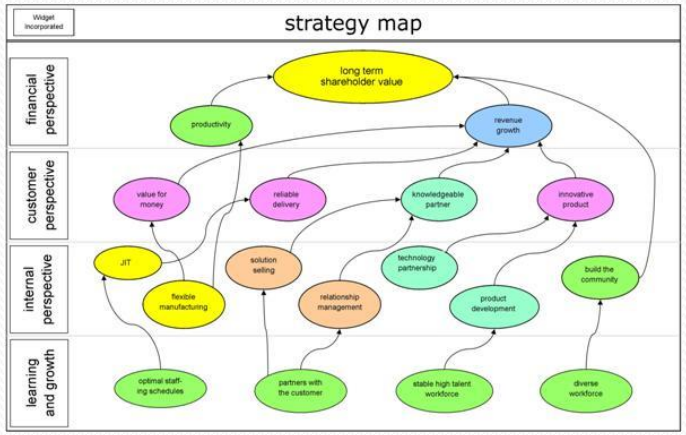
CAUSE & EFFECT Diagramme

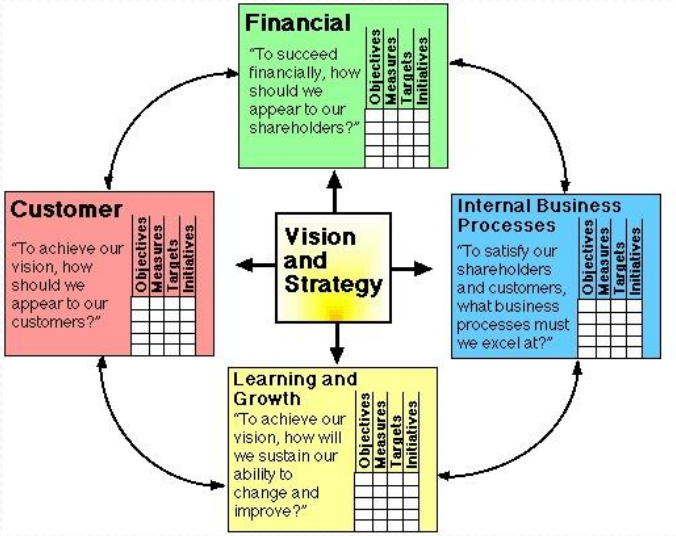
- What we need to deliver in one “perspective” to effect another “perspective” to deliver..
- Ultimate to deliver our corporate objectives – Shareholder Value?
- Underpinned by our values, driven by our mission and vision

The strategy map – a ‘picture’ of the strategy’



Managing the business using a BSC approach

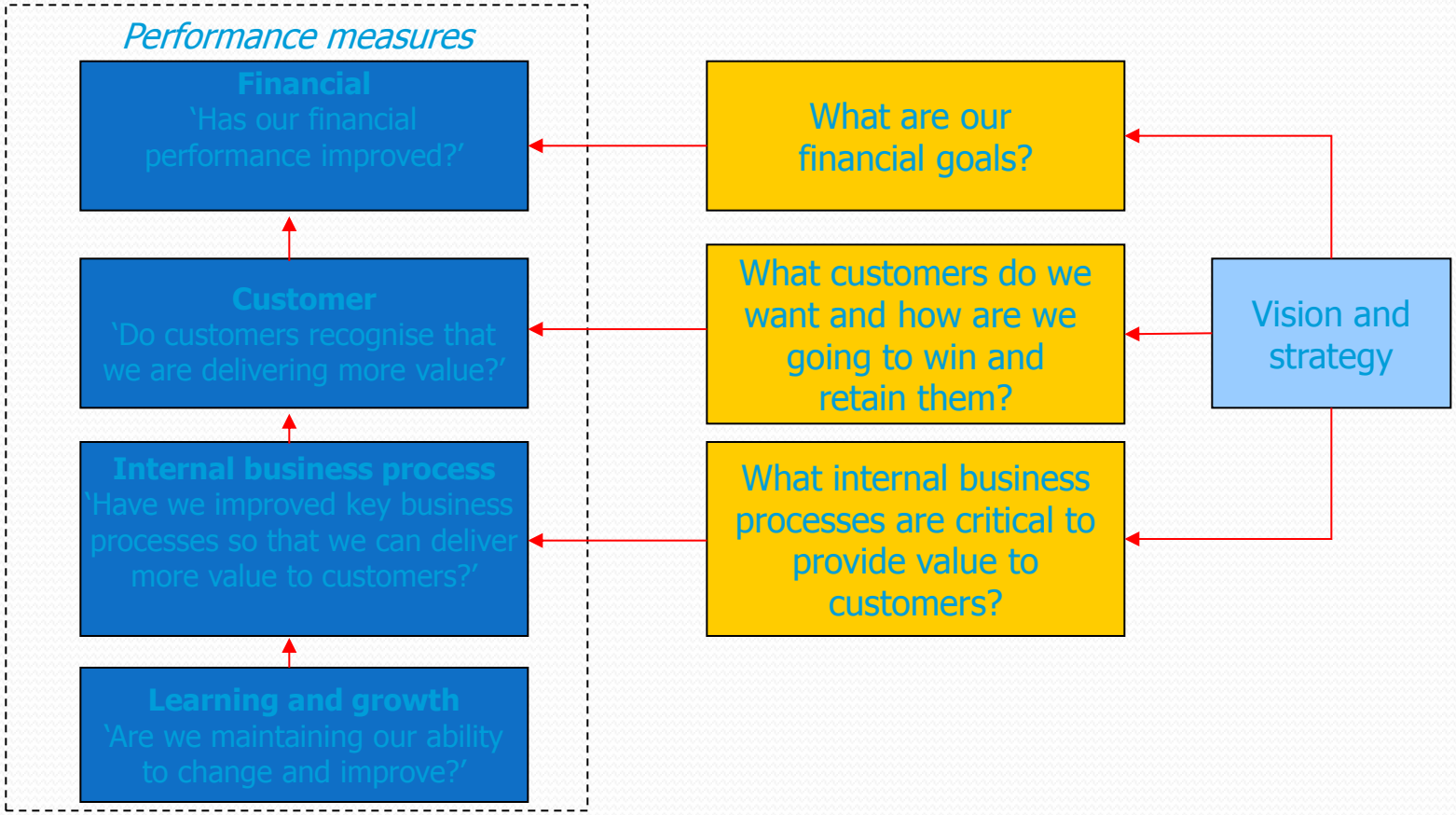




'Describe the strategy'

'Measure the strategy

Designing the Scorecard - from Strategy to Performance Measurement



Balanced Scorecard
Top 10 Implementation issues

1. No executive sponsorship
2. Lack of education and training
3. No strategy
4. No clear objectives for programme
5. Timing
6. Inconsistent management practices
7. No new measures – mainly focused on finance / process
8. Terminology
9. Lack of effective cascading
10. Poor understanding of cause and effect

Balanced Scorecard – The Benefits

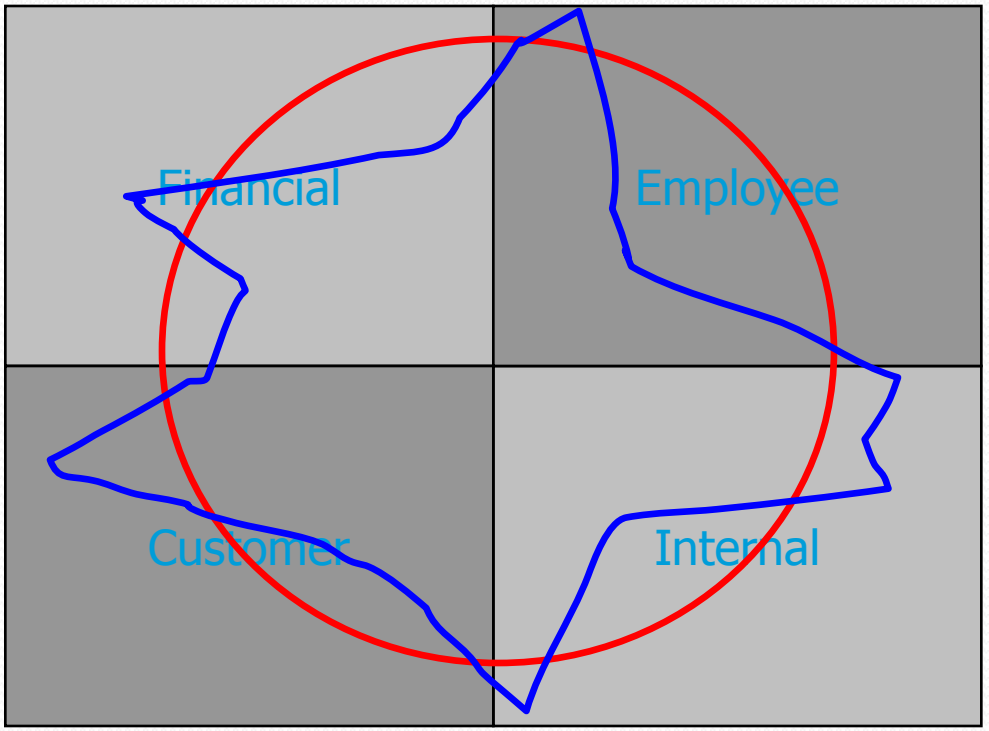
- PUT STRATEGY IN BUDGETS
- Translating Strategy into Action
- Improved Resource Allocation
- Enhances Management Strategic Feedback & Learning
- Clear communication of Strategy may highlight divergent views on strategy
- Can result in a re-design / simplification of the Budget Process

Presentation
KPI wheel & RAG Status Traffic Lights

Actual

Target





Quality as a Competitive Tool

- Quality—the total features and characteristics of a product or a service made or performed according to specifications to satisfy customers at the time of purchase and during use.
- Companies find that a focus on the quality of a product or service generally builds expertise in producing it, lowers the cost of providing it, creates higher satisfaction for customers using it and generates higher future revenues for the company selling it.

Quality as a Competitive Tool

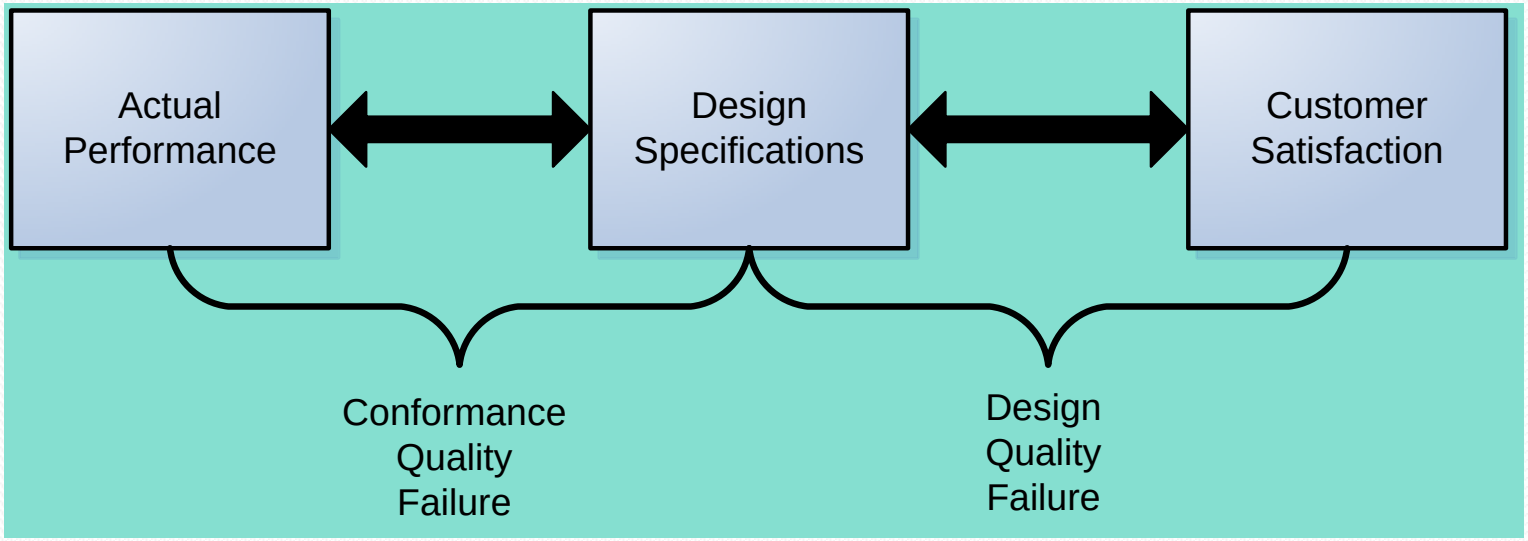
- Companies are also using quality management and measurement practices to find cost-effective ways to reduce the environmental and economic costs of air pollution, wastewater, oil spills, and hazardous waste disposal.
- Product quality can also be an important engine for environmental progress.

Two Basic Aspects of Quality

1. Design quality—refers to how closely the characteristics of a product or service meet the needs and wants of customers.
2. Conformance quality—refers to the performance of a product or service relative to its design and product specifications.

Quality has both financial and nonfinancial components relating to customer satisfaction, improving internal quality processes, reducing defects and the training and empowering of workers. Let's look at it from the four perspectives of the balanced scorecard.

Quality and Failure



Four Perspectives of the Balanced Scorecard

1. Financial
2. Customer
3. Internal business process
4. Learning and growth

The Financial Perspective: Costs of Quality (COQ)

- Four categories of quality costs:
  1. Prevention costs—costs incurred to preclude the production of products that do not conform to specifications.
  2. Appraisal costs— costs incurred to detect which of the individual units of products do not conform to specifications.
  3. Internal failure costs—costs incurred on defective products before they are shipped to customers.
  4. External failure costs—costs incurred on defective products after they are shipped to customers.

Items pertaining to Costs-of-Quality Reports

Prevention Costs	Appraisal Costs	Internal Failure Costs	External Failure Costs
Design engineering	Inspection	Spoilage	Customer support
Process engineering	Online product manufacturing and process inspection	Rework	Manufacturing/ process engineering for external failures
Supplier evaluations	Product testing	Scrap	Warranty repair costs
Preventive equipment maintenance		Machine repairs	Liability claims
Quality training		Manufacturing/ process engineering on internal failures	
Testing of new materials			

Determining COQ by adapting the seven-step Activity-Based Costing approach

1. Identify the chosen cost object.
2. Identify the direct costs of the quality of the product.
3. Select the activities and cost-allocation bases to use for allocating the indirect costs of quality to the product.
4. Identify the indirect costs of quality associated with each cost-allocation base.
5. Compute the rate per unit of each cost-allocation base.

Determining COQ using Activity-Based Costing, concluded

6. Compute the indirect costs of quality allocated to the product.
7. Compute the total costs of quality by adding all direct and indirect costs of quality assigned to the product.

Activity-Based COQ Analysis example

File Edit View Insert Format Tools Data Window Help

	A	B	C	D	E	F	G
1	**PANEL A: COQ REPORT**						**Percentage of**
2		**Cost Allocation**		**Quantity of Cost**		**Total**	**Revenues**
3	**Cost of Quality and Value-Chain Category**	**Rate[a]**		**Allocation Base**		**Costs**	**(5) = (4) ÷**
4	**(1)**	**(2)**		**(3)**		**(4) = (2) x (3)**	**$300,000,000**
5	*Prevention costs*						
6	Design engineering (R&D/Design)	$ 80	per hour	40,000	hours	$ 3,200,000	1.1%
7	Process engineering (R&D/Design)	$ 60	per hour	45,000	hours	2,700,000	0.9%
8	Total prevention costs					5,900,000	2.0%
9	*Appraisal costs*						
10	Inspection (Manufacturing)	$ 40	per hour	240,000	hours	9,600,000	3.2%
11	Total appraisal costs					9,600,000	3.2%
12	*Internal failure costs*						
13	Rework (Manufacturing)	$100	per hour	100,000	hours	10,000,000	3.3%
14	Total internal failure costs					10,000,000	3.3%
15	*External failure costs*						
16	Customer support (Marketing)	$ 50	per hour	12,000	hours	600,000	0.2%
17	Transportation (Distribution)	$240	per load	3,000	loads	720,000	0.2%
18	Warranty repair (Customer service)	$110	per hour	120,000	hours	13,200,000	4.4%
19	Total external failure costs					14,520,000	4.8%
20	Total costs of quality					$40,020,000	13.3%
21							
22	[a]Amounts assumed.						
23							
24	**PANEL B: OPPORTUNITY COST ANALYSIS**						
25						**Total Estimated**	**Percentage**
26						**Contribution**	**of Revenues**
27	**Cost of Quality Category**					**Margin Lost**	**(3) = (2) ÷**
28	**(1)**					**(2)**	**$300,000,000**
29	*External failure costs*						
30	Estimated forgone contribution margin						
31	and income on lost sales					$12,000,000[b]	4.0%
32	Total external failure costs					$12,000,000	4.0%
33							
34	[b]Calculated as total revenues minus all variable costs (whether output-unit, batch, product-sustaining, or facility-sustaining) on						
35	lost sales in 2008. If poor quality causes Photon to lose sales in subsequent years as well, the opportunity costs will be						
36	even greater.						

Cost of Quality-opportunity costs

- Opportunity costs result from poor quality:
  1. Contribution margin and income foregone from lost sales.
  2. Lost production.
  3. Lower prices.
- These opportunity costs are not recorded in the financial accounting systems.

The Customer Perspective

- Nonfinancial measures of customer satisfaction include:
  - Market research information on customer preferences for and customer satisfaction with specific product features.
  - Market share.
  - Percentage of highly satisfied customers
  - Number of defective units shipped to customers as a percentage of total units shipped.
  - Number of customer complaints.
  - Percentage of products that fail soon after delivery.
  - Average delivery delays.
  - On time delivery rate

The Internal-Business- Process Perspective

- Three techniques for identifying and analyzing quality problems:
  1. Control charts.
  2. Pareto diagrams.
  3. Cause-and-effect diagrams.

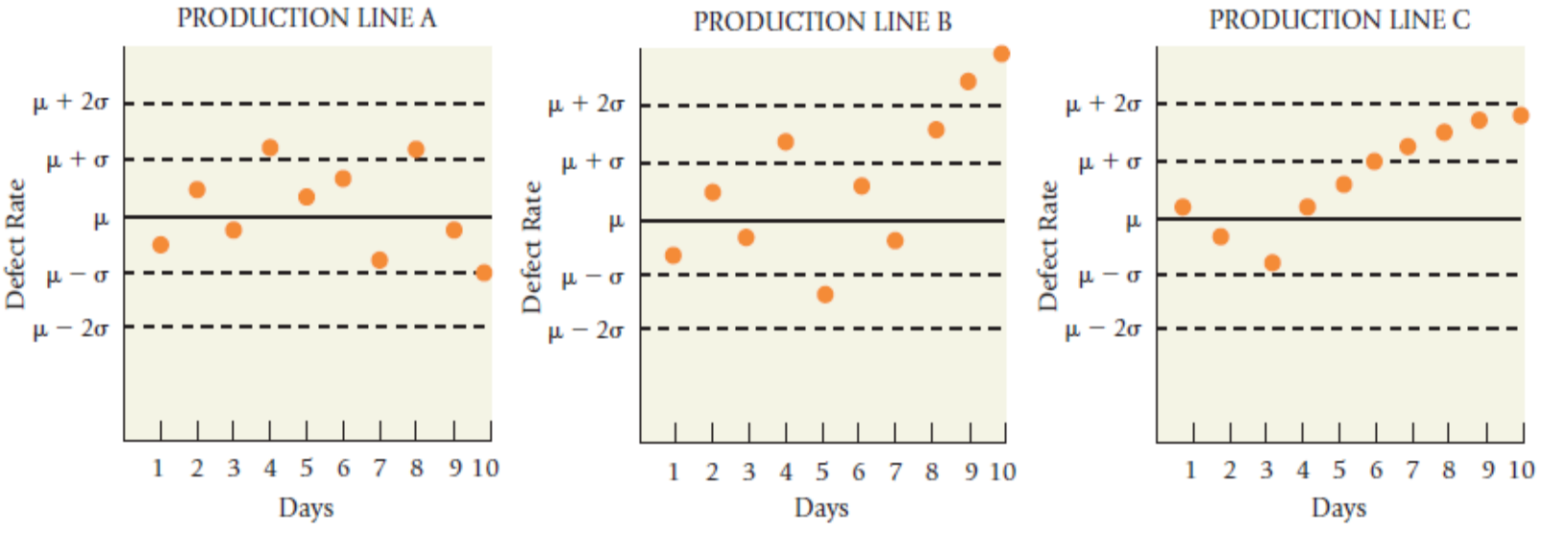
Control Charts

- Statistical quality control (SQC) is a formal means of distinguishing between random and nonrandom variations in an operating process.
- Random variations occur, for example, when chance fluctuations in the speed of equipment cause defective products to be produced.
- Nonrandom variations occur when defective products are produced as a result of a systematic problem such as an incorrect speed setting, a flawed part design, or mishandling of a component part.

Control Charts, concluded

- Control charts are a graph of a series of successive observations of a particular step, procedure, or operation taken at regular intervals of time.
- Each observation is plotted relative to specified ranges that represent the limits within which observations are expected to fall.
- Only those observations that fall outside the control limits are regarded as nonrandom and worth investigating.

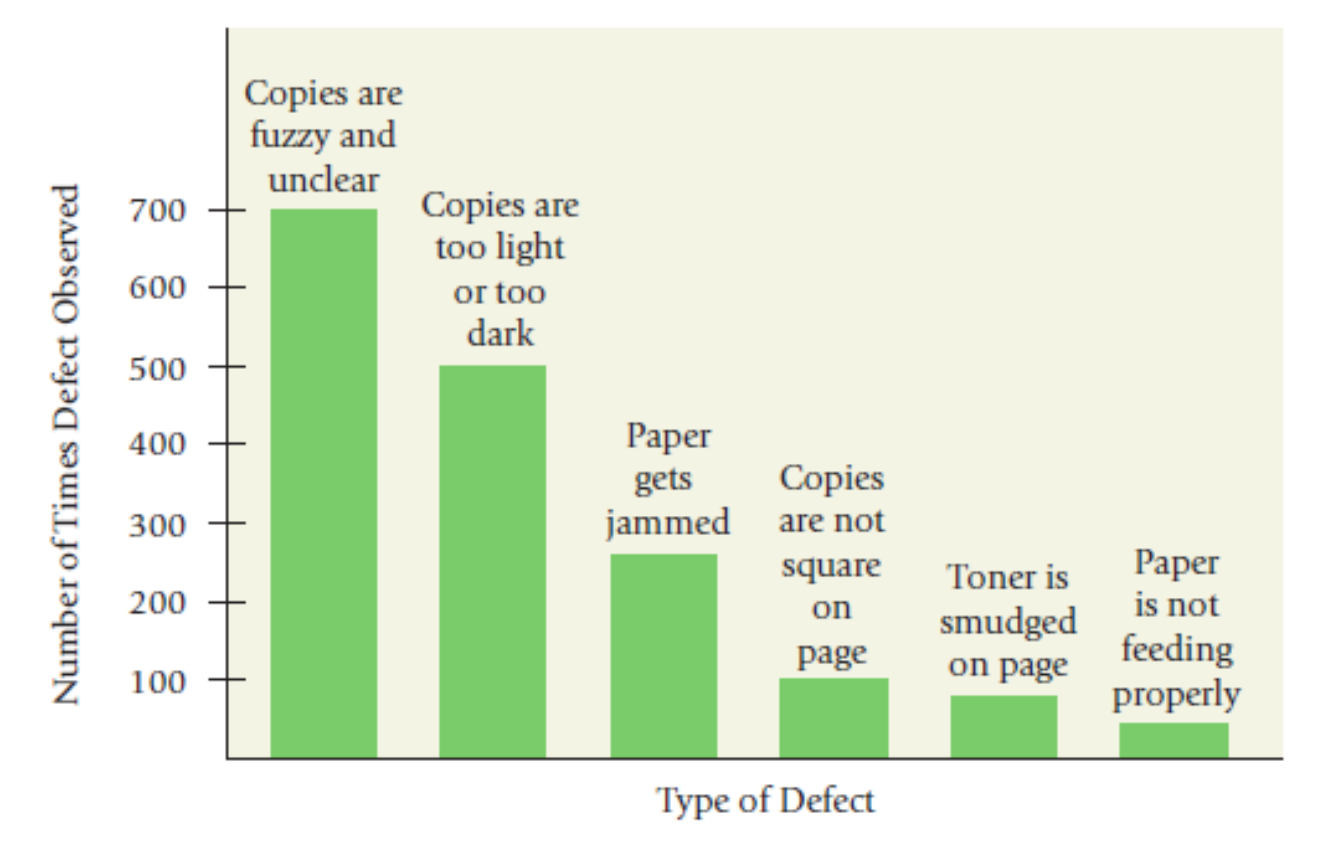
Quality Control Charts examples



Pareto Diagrams

- Observations outside control limits serve as inputs for Pareto diagrams.
- Pareto diagram—a chart that indicates how frequently each type of defect occurs, ordered from the most frequent to the least frequent.

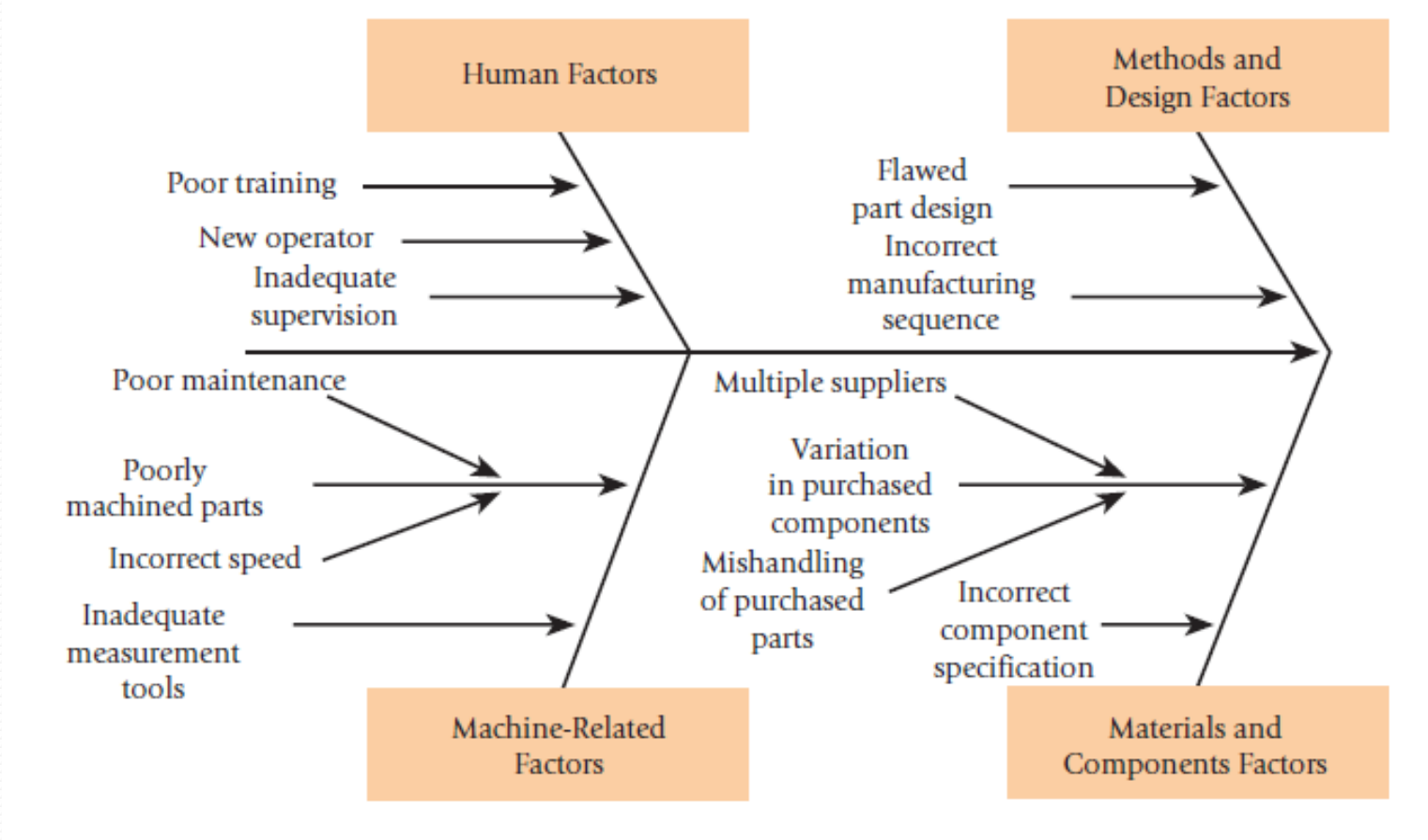
Pareto Diagram example



Cause-and-Effect Diagrams

- Identifies potential causes of defects.
- Problems identified by the Pareto diagram are analyzed using cause-and-effect diagrams.
- Also called fishbone diagrams because they resemble the bone structure of a fish.
- The large “bones” coming off the backbone represent the main categories of potential causes of failure.
- The four categories are: human factors, methods and design factors, machine-related factors and materials and components factors.

Cause-and-Effect Diagram example



Nonfinancial Measures of Internal-Business-Process Quality

- Percentage of defective products manufactured.
- Percentage of reworked products.
- Number of different types of defects analyzed using control charts, Pareto diagrams and cause-and-effect diagrams.
- Number of design and process changes made to improve design quality or reduce the costs of quality.

The Learning-and-Growth Perspective for Quality

- Experience and qualifications of design engineers.
- Employee turnover ratio.
- Employee empowerment.
- Employee satisfaction.
- Employee training.

Weighing the costs and benefits of improving quality

- When faced with a quality issue, managers should evaluate each alternative identifying the relevant costs and benefits for each alternative.
- Ask: How total costs and total revenues will change under each alternative.

Advantages of COQ (Financial) Measures

- COQ focuses managers' attention on how poor quality affects operating income.
- COQ help managers aggregate costs to evaluate the tradeoffs of incurring prevention costs and appraisal costs to eliminate internal and external failure costs.
- COQ measures assist in problem solving by comparing costs and benefits of different quality-improvement programs and by setting priorities for cost reduction.

Advantages of Nonfinancial Measures of Quality

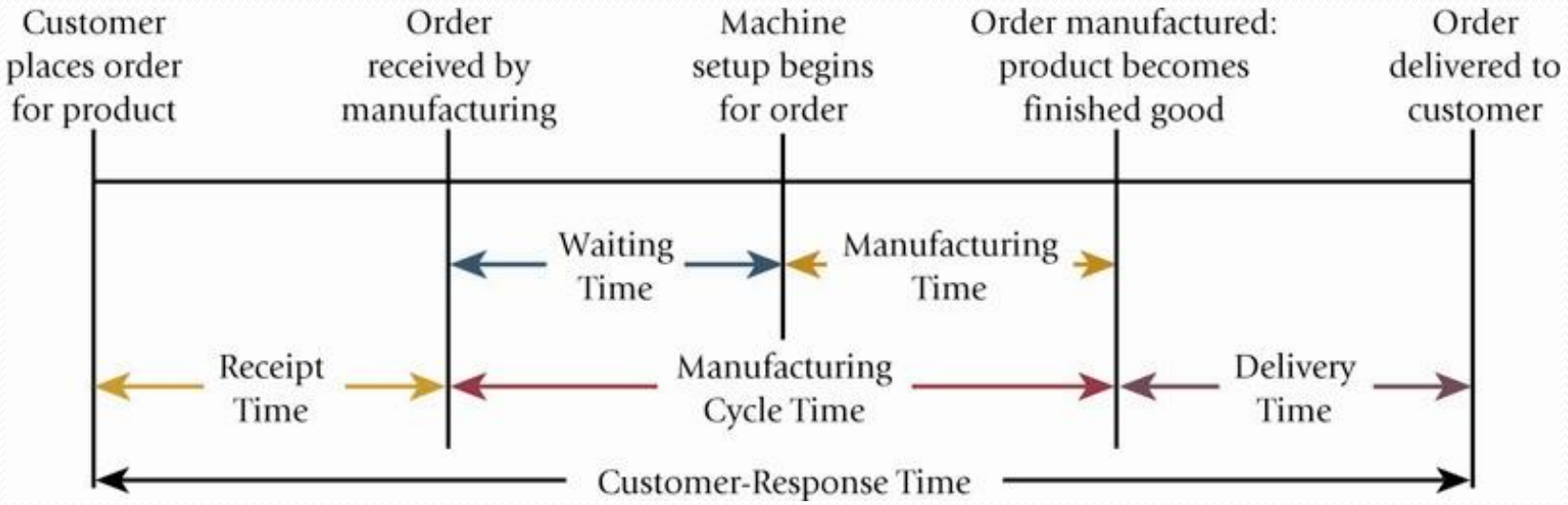
- Nonfinancial measures of quality are often easy to quantify and understand.
- Nonfinancial measures direct attention to physical processes and to areas that need improvement.
- Nonfinancial measures provide immediate short-run feedback on whether quality-improvement efforts are succeeding.
- Nonfinancial measures are useful indicators of future long-run performance.

Time as a Competitive Tool

- Companies view time as a driver of strategy.
- Managers need to measure time properly to manage it.
- Two operational measures of time:
  - Customer response time: how quickly companies respond to customers' demands for their products and services.
  - On-time performance: indicates how reliably companies meet their scheduled delivery dates.

Managers also measure the causes and costs of delays.

Customer-Response Time Illustrated



Time Drivers

- A time driver is any factor that causes a change in the speed of an activity when the factor changes.
- Two time drivers:
  1. Uncertainty about when customers will order products and services.
  2. Bottlenecks due to limited capacity. A bottleneck occurs in an operation when the work to be performed approaches or exceeds the capacity available to do it.

Managers should use the five-step decision-making process to exam opportunities.

Relevant revenues and costs of delays

- Manufacturing cycle times affect both revenues and costs.
- Revenues are affected because customers are willing to pay a higher price for faster delivery.
- Relevant costs will likely include inventory carrying costs.

The Balanced Scorecard and Time-based Measures

We'll use the structure of the balanced scorecard perspectives to summarize how financial and nonfinancial measures of time relate to one another, reduce delays, and increase the output of bottleneck operations.

- Financial measures:
  - Revenue gains or price increases from fewer delays.
  - Carrying costs of inventories.
- Customer measures:
  - Customer-response time.
  - On-time performance

The Balanced Scorecard and Time-based Measures, cont'd

- Internal-business-process measures:
  - Average manufacturing time for key products.
  - Manufacturing cycle efficiency for key processes.
  - Defective units produced at bottleneck operations.
  - Average reduction in setup time and processing time at bottleneck operations.

The Balanced Scorecard and Time-based Measures, concluded

- Learning and growth measures:
  - Employee satisfaction.
  - Number of employees trained in managing bottleneck operations.

Managers use both financial and nonfinancial measures to manage the performance of their firms along the time dimension.

Financial perspective, Customer perspective

Financial Perspective

Examples of objectives:

Targets for profits, income, accounting return measures, cash flows, or other operating ratios

Examples of measures:

Economic profit

Income from operations

ROI, residual income, EVA©

Operational cash flow

Inventory turns

The Financial Perspective

Objectives:

- Maximize Profit
- Maximize Cash
- Control Costs
- Effective Investment Utilization
- Minimize Inventory

Measurements:

- Income from operations
- ROI, residual income, EVA©
- Working capital
- Operational cash flow
- Inventory turns

Customer Perspective

Examples of objectives:

Improve customer satisfaction, targets for market share, repeat order rate or number of complaints

Examples of measures:

Rank in customer surveys

Market share

Repeat order rate

Number of complaints

The Customer Perspective

Objectives:

- Improve customer satisfaction
- Increase market share
- Increase repeat customers

Measurements:

- Customer survey ratings
- Market share
- Airline passenger loads
- Customer retention rates
- New customer acquisitions

Internal Business Process perspective, Learning and growth perspective

Internal Business Process Perspective

Examples of objectives:

Reduce process cycle time, number of engineering changes, and order response time, increase capacity utilization

Examples of measures:

Percentage reduction in process cycle time

Number of engineering changes

Order response time

Capacity utilization

The Internal Business Process Perspective

- The internal business process perspective contains three stages:
  - In the innovation cycle, customer preferences are determined and the products are designed.
  - In the operations cycle, goods and services are produced and delivered to the customer.
  - The post-sales service cycle supports the customer after the sale.

The Internal Business Process Perspective

Objectives:

- Reduce cycle time
- Reduce engineering changes
- Improve order response time
- Efficient capacity utilization
- Minimize waste

Measurements:

- # of engineering changes
- Order response time
- Cycle time
- Defects per million
- Warranty costs
- # of returns

Learning and Growth Perspective

Examples of objectives:

Reduce turnover percentage of protected patents, improve employee training, improve quality.

Examples of measures:

Percentage of patent-protected turnover

Training days per employee

Quality improvement team participation, or number of quality improvement suggestions, or defect rate

Learning & Growth Perspective

Objectives:

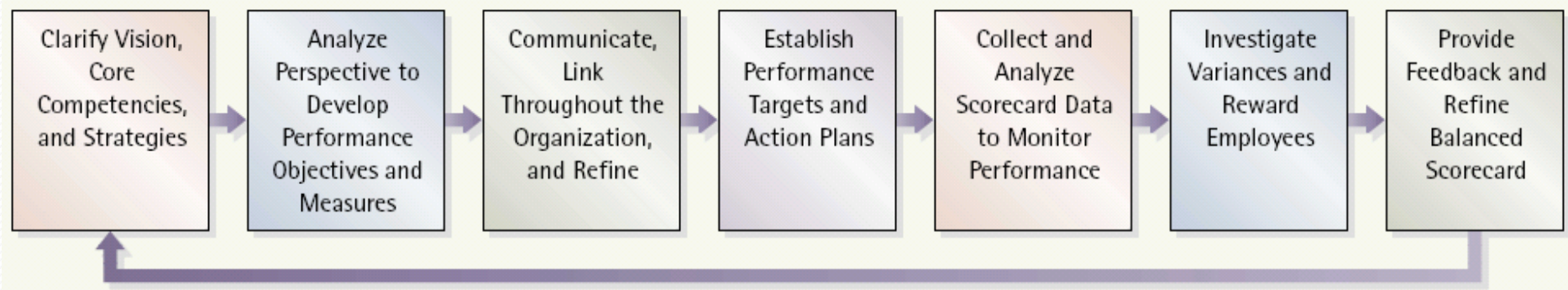
- High quality employee training
- Minimize turnover
- Develop efficient information systems

Measurements:

- Training hours per employee
- Retention rate
- Specific skill development metrics
- Number of information systems

Developing and adapting scorecard

Implementing a Balanced Scorecard



Limitations

- **Expensive to implement**
  - Consultants
  - Management and employee time
- **Difficult to find appropriate weighting of measures in compensation package**
- **Managers may choose measures that reflect strengths**
- **Is there a lead and lag relationships between measures?**

Building the Balanced Scorecard

Introduction

- Balanced Scorecards provide a framework for communicating strategy in operating terms (measurements and targets).
- You must communicate strategy in operating terms if you expect people to execute on your strategy.
- When people are asked about strategy, they reach for their balanced scorecard.

Agenda

- This slide presentation will outline the major steps for building a balanced scorecard.
- How you execute these steps will depend upon many factors: Company culture, tolerance for change, leadership, etc.
- However, please try to follow the same sequence, focusing on the strategic maps.

Overview

- Balanced Scorecards are constructed from strategic maps
- Throughout the process, we will refer back to these maps, making sure everything is linked. This is very important since we want to capture a “cause and effect” relationship in building the scorecard.

Why the Balanced Scorecard

- Improves how you communicate strategy
- Superimposes a discipline whereby you capture cause-effect; otherwise you create pockets of under-performance.
- Also forces you to think about strategic measurement as opposed to tactical or operating type measurements

Start with Strategy

- Begin with your strategic plan – what things are critical to future success?
- Focus on customers – what values will we add to our customers
- Define the processes – how will we deliver these services to our customers
- Build the organization – what capabilities must we put in place

Strategic Goals

- The first components of your strategy are goals.
- Strategic goals establish direction in concrete terms.
- Strategic goals anchor the rest of the process.
- Strategic goals should fit with the vision and mission of the organization.

Goal Attributes

- Very short statement
- Directly relates to the mission
- Broad in scope
- Covers long time period (such as 3 years)
- Examples:
  - Improve Customer Service
  - Leverage Core Competencies
  - Develop more innovative products

Strategic Objectives

- Once we establish our first anchor (goals), we can develop a set of strategic objectives.
- Strategic objectives define what actions must be taken to reach the strategic goals.
- Objectives are critical to future success. For example, in order to grow revenues, we must introduce new products and expand our market share.

Objective Attributes

- Longer statement than goal statement
- More specific than goal statement
- Indirect relationship to mission
- Covers shorter time period than goal (such as 6 months or 1 year)
- Example:

  - We will expand call center services to include technical support

Strategic Themes

- Based on strategic goals, three to five strategic themes should emerge.
- From these themes, we will develop a strategic map.
- Four common strategic themes are: Operating Efficiencies, Customer Relations, Product Innovation, and Growing the Business.

Strategic Model

- Strategic Models can emerge from four principles:

1. Translate strategies into operating terms.
2. Link strategies throughout the entire organization.
3. Commit everyone to implementing strategy.
4. Make strategizing a continuous process of learning and adjusting to change.

Four Perspectives

- Before we build strategic maps, we need to define four perspectives:

Financial: Top layer in the map, represents financial outcomes (profits, revenues, etc.)

Customer: Next layer down, enables financial results (service, image, price, quality, etc.)

Internal Processes: The values added to customers, such as delivery, production, distribution, etc.

Learning & Growth: The people, systems, and organization that enable processes.

Strategic Mapping

- Strategic Maps are the foundation of the Balanced Scorecard.
- You will need one strategic map for each strategic theme.
- Maps are constructed over four perspectives.
- Strategic objectives are mapped over the four perspectives, linked together.

Linking

- Strategic objectives need to be placed in the Strategic Map according to which perspective fits with the objective.
- Objectives may cross over more than one perspective.
- We usually start at the top with outcomes and work our way down, looking at what enables (drives) the outcome.

Approval

- Once you have completed the strategic maps, you will need to get approval from executive management. Does this map accurately tell the “story” of our strategy?
- If management disagrees with the map, go back and redo the maps. We need to get this step right since it represents the foundation for the entire scorecard.

Measurements

- For each strategic objective, you need one measurement.
- Measurement provides us with feedback on meeting the strategic objective.
- Most organizations will use many of their existing measurements.
- Organizations requiring major change should include driver type measurements.

Measurement Criteria

- Measurements should drive change, providing teeth to our strategy.
- Measurements define objectives in specific terms. A good measurement should tell you what your objective is – this is an indicator of good linkage.
- Measurements should be repeatable, quantifiable, and verifiable.

Good Measurements

- Customer satisfaction:
  - Response time to service customer
  - Satisfaction survey scores
- Process Efficiency:
  - Cycle time
  - Downtime
  - Number of Restarts

Lead and Lag Measurements

- Leading measurements are drivers behind performance and provide some predictability (forward looking)
- Lagging measurements are usually final outcomes that look back, such as customer satisfaction or return on investment
- Balanced scorecards should include both leading and lagging type measurements

Targets

- Once you establish measurements, you need to set a target for each measurement.
- Targets push the organization to a required level of performance.
- Targets put focus on the strategy, expressing the specifics of the strategy.
- When an organization hits its targets, then it has successfully implemented its strategy.

Examples of Targets

- Total Time to Recruit New Employees: Less than 40 days by year-end
- Utilization of rental facilities: Increase to 85% during peak summer months
- Growth in top line revenues: 10% increase over last year
- Improve overall customer satisfaction: Total scores exceed 90%

Initiatives

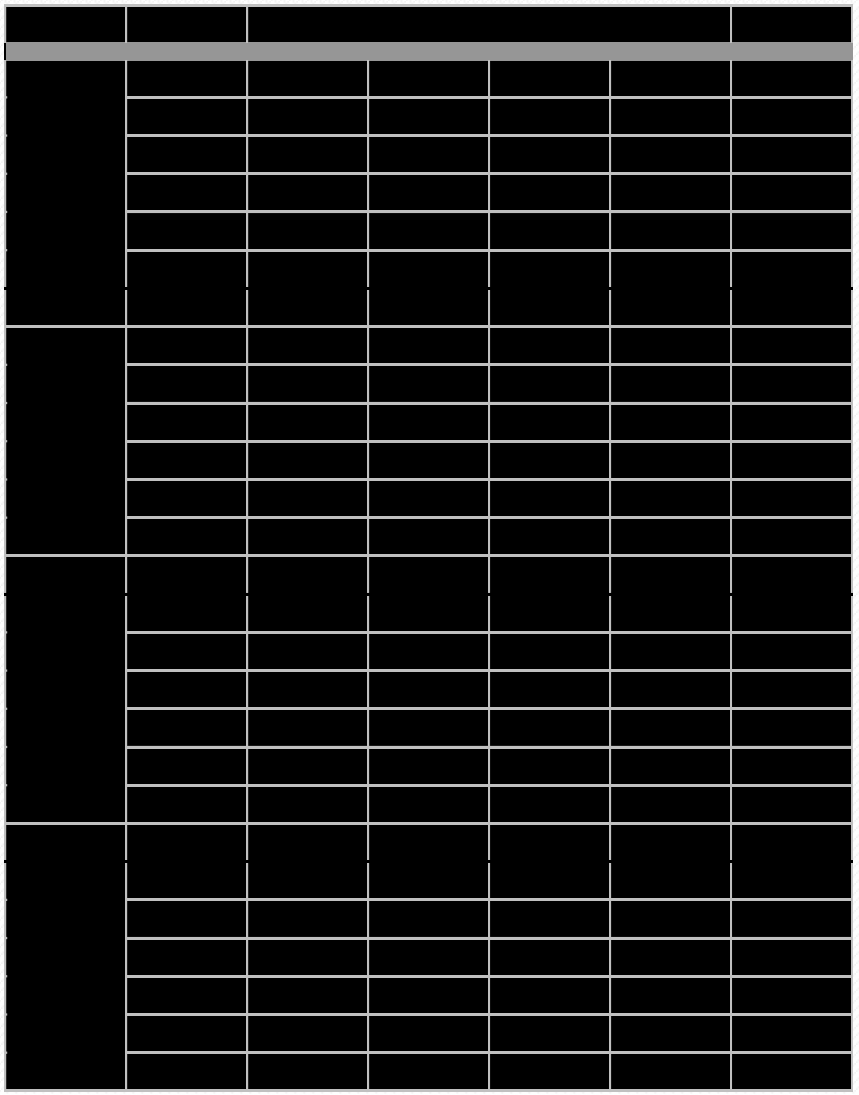
- In order for things to happen in an organization, you must initiate major projects or programs. For example, improving customer service may require a new customer management system.
- Once you launch appropriate initiatives, you should be able to meet your strategic objectives. This closes the loop, everything is now linked and away we go!

Initiative Attributes

- Sponsored by senior management
- Designated owners manage project(s)
- Includes deliverables or milestones
- Usually has some time deadlines
- Could be difficult to launch – lack of support, no funding, poorly defined, etc.

Templates

Throughout this process, we will use templates to capture, analyze and document data. Templates are used for strategic mapping, defining measurements, etc.



Other Important Steps

- Scorecards are built around three teams: Leadership Team (upper level management), Core Team (middle level management) and Measurement Team (lower level functional personnel).
- Scorecards are built around at least four group meetings: Kick Off Meeting followed by at least one meeting for each of the three teams.

Implementation

- The minimum time for developing a balanced scorecard is three months.
- Full deployment of scorecards throughout the entire organization can take more than one year.
- The best place to start building a scorecard is where all components of the value chain are in place: Customer, Innovation, Production, Delivery, Services, etc.

Summary

- Balanced Scorecards are the best way of communicating strategy.
- Scorecards rely on a fully integrated approach: Goals, Objectives, Mapping, Measurements, Targets, and Initiatives.
- The building of a balanced scorecard can be experimental, whereby you test your strategies, refine, and make changes as you get feedback and learn what works.

Concluding Remarks

Understanding & working with costs

Cost	v	Value
Relevant	v	Irrelevant
Controllable	v	Uncontrollable
Capital	v	Revenue
Planned	v	Unplanned
Essential	v	Discretionary
Direct	v	Indirect/overhead
Fixed	v	Variable

Standard Cost

Opportunity Costs (Cost of Lost Opportunity)

Sunk Costs (Irrecoverable Costs)

Failure Costs (Cost of errors)

Activity Costs (Costing Complexity & Variety)

Activity Analysis (*Time is money* – What are our people spending our time or cost on? Is it the best use of their time?)

Resource costing and comparison

Benchmarking

Resource Substitution

Resource Sharing – Strategic Alliances

Value Based Pricing v Cost Plus Based Pricing

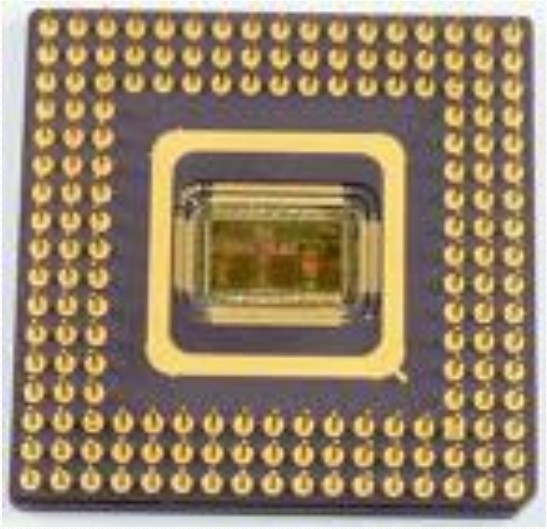
Cost Based	Value Based
Internal Focus	Customer / Market Focus
Inputs	Results
	Target Costing?

Price, Cost & Value

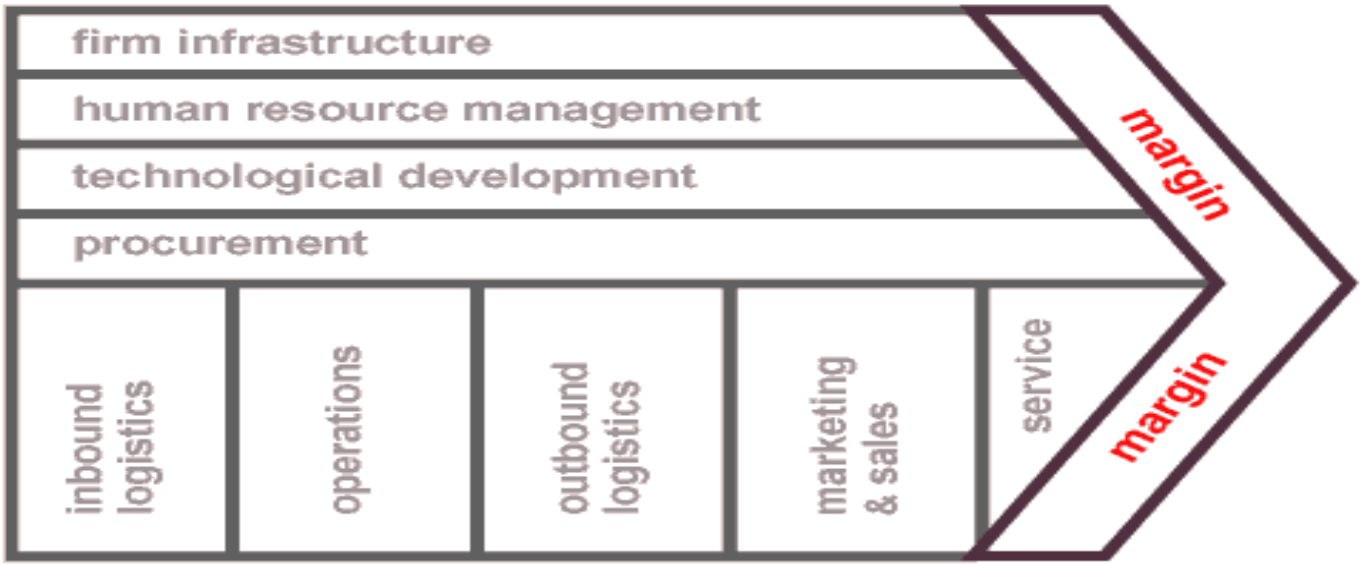
Coffee & Chips

- Cost is not Value
- Price can be used to gauge value
- Pricing can influence perceived “Value”





Value Chain – Michael Porter



Value Analysis / Engineering

Taking out cost without destroying value.

“Discovered” by GE in WWII – when searching for substitute materials



Traditional Absorption Costing v ABC

- "Traditional"
- OHR – typically based on labour
- Arbitrary cost allocation and absorption
- Simple
- Proven?
- Irrelevant
- Misleading

- ABC
- Allocate and apportion costs to activity pools
- Use Drivers to charge activity costs to costs units
- More Systematic?
- More Complex
- More Expensive
- Absorption Costing Re-invented

Cost Reduction under ABC

- Understand & Manage Costs
- Reduce Non Value Adding Cost
- Reduce Activity Cost
- Reduce (Needless) Activity

Lean Manufacturing

- Toyota Production System (TPS)
- Kaizen
- 5S
- Kanban
- Six Sigma
- Visual Factory
- Design v Delivery

Toyota Production System (TPS)

- Best Quality – Right first time
- Lowest Cost
- Shortest lead time
- JIT – Just in Time
- Standardise
- Eliminate Waste
- Motivate people to care



Toyota Production System (TPS)

Reduce

Overburden Muri,

Inconsistency - Mura

Eliminate waste - Muda.



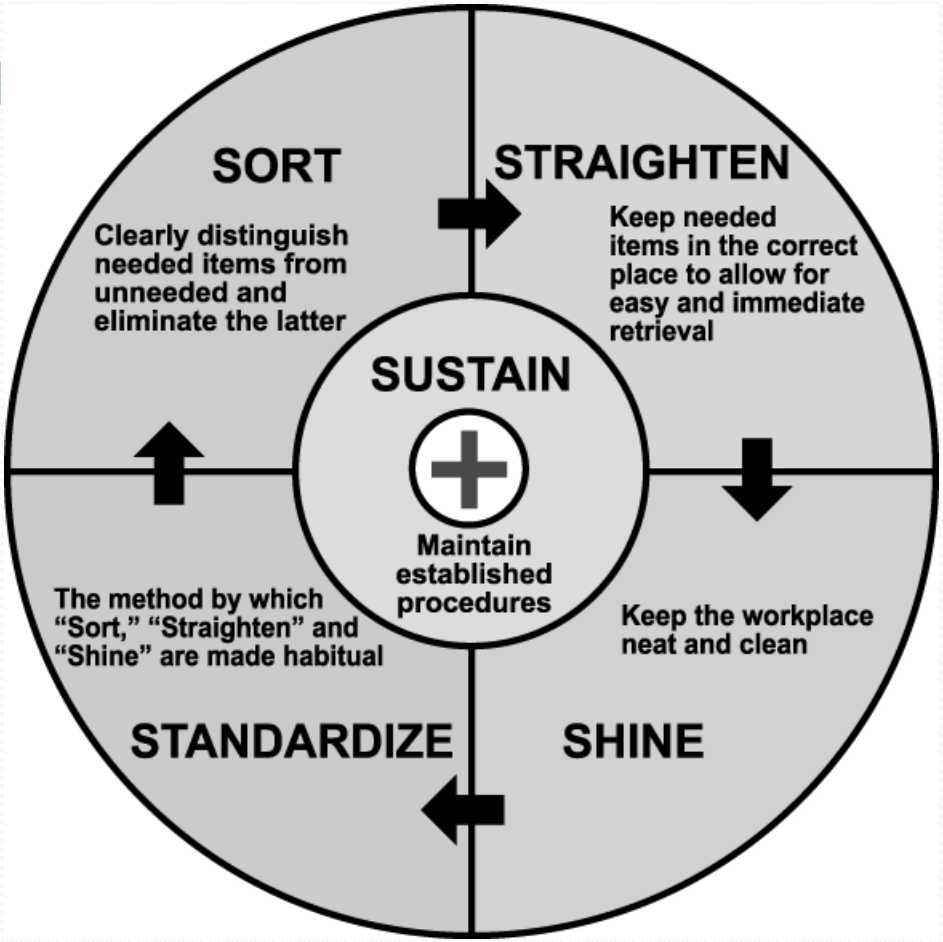
Eliminate Waste – Not Just Scrap
7 Wastes (Muda) under TPS



Kaizen

- Traditional Western Approach – If it isn't broke – don’t fix it
- Japanese Kaizen Approach – all can contribute, all the time to continuous improvement – do it better, improve it – however small

5 S - Lea


SORT
Clearly distinguish needed items from unneeded and eliminate the latter
STRAIGHTEN
Keep needed items in the correct place to allow for easy and immediate retrieval
SUSTAIN
Maintain established procedures
The method by which "Sort," "Straighten" and "Shine" are made habitual
Keep the workplace neat and clean
STANDARDIZE
SHINE

Ford - CANDO

- CANDO program (Cleaning up, Arranging, Neatness, Discipline, Ongoing Improvement),

Six Sigma

- *Developed By Motorola*
- *Then GE*

Six Sigma

- "...Six Sigma is a highly disciplined process that helps us focus on developing and delivering near-perfect products and services
- To achieve Six Sigma Quality, a process must produce no more than 3.4 defects per million opportunities."

From GE

Design v Delivery

Cheaper & Better by Design

- More and more costs are set at the design stage rather than at delivery (Manufacture)
- Cost Reduction should be included in design – Target Costing

Failure Costs!

- Right first time
- Poka-Yoke – zero defects objective



Alliance / Partnering

A **Strategic Alliance** is a mutually beneficial long-term formal relationship formed between two or more parties to pursue a set of agreed upon goals or to meet a critical business need while remaining independent organizations.

Alliance / Partnering

Example of Strategic Alliances

Airlines
Code Sharing
Integrated schedules

Mobile Phones
Roaming
Infrastructure sharing
Example – T-Mobile – Virgin Mobile



- **Getting your team to deliver more for less**
- Developing a cost conscious culture
- Cost – Outcome Impact Model
- Economy
- Efficiency
- Effectiveness
- Capacity and Risk
- “Quicker Faster Better Cheaper” Motivating and encouraging people to effectively manage cost and value
- Internal service level and internal markets agreements – Pros and Cons

VFM - Value For Money

3 Es

A Public Sector Model / But Good for Cost Centres?

- Economy
- Efficiency
- Effectiveness



VFM - Value For Money

- Cost – Input
- Resources
- Output
- Outcomes



VALUE FOR MONEY

ECONOMY

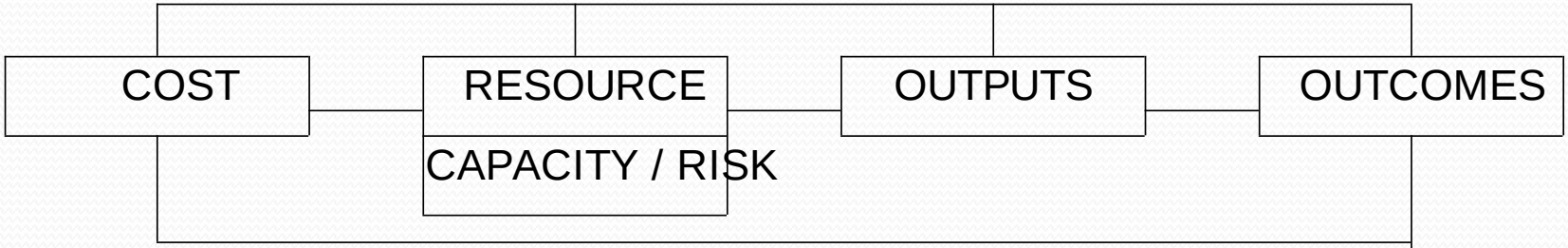
RESOURCE / COST

EFFICIENCY

OUTPUT / RESOURCE

EFFECTIVENESS

OUTCOME / OUTPUT



VFM - VALUE FOR MONEY

OUTPUT / COST

DOES IT ADD VALUE?

$$\text{VFM} = \frac{\text{RESOURCE}}{\text{COST}} \times \frac{\text{OUTPUT}}{\text{RESOURCE}} \times \frac{\text{OUTCOME}}{\text{OUTPUT}} = \frac{\text{OUTCOME}}{\text{COST}}$$

ECONOMY **EFFICIENCY** **EFFECTIVENESS**

OBJECTIVES

Economy

- Minimising the costs of resources used within the public sector, but having regard to quality.
- Better Prices!

Efficiency

- The relationship between output, in terms of goods, services or other results, and the resources used to produce them.
- Example - Get staff to be more productive – deliver more

Effectiveness

- The extent to which objectives have been achieved. The relationship between the intended impacts and actual impacts of an activity
- Delivering the required result!

VFM – Value For Money

4th E

EVIDENCE

Cost Reduction ideas
In your business

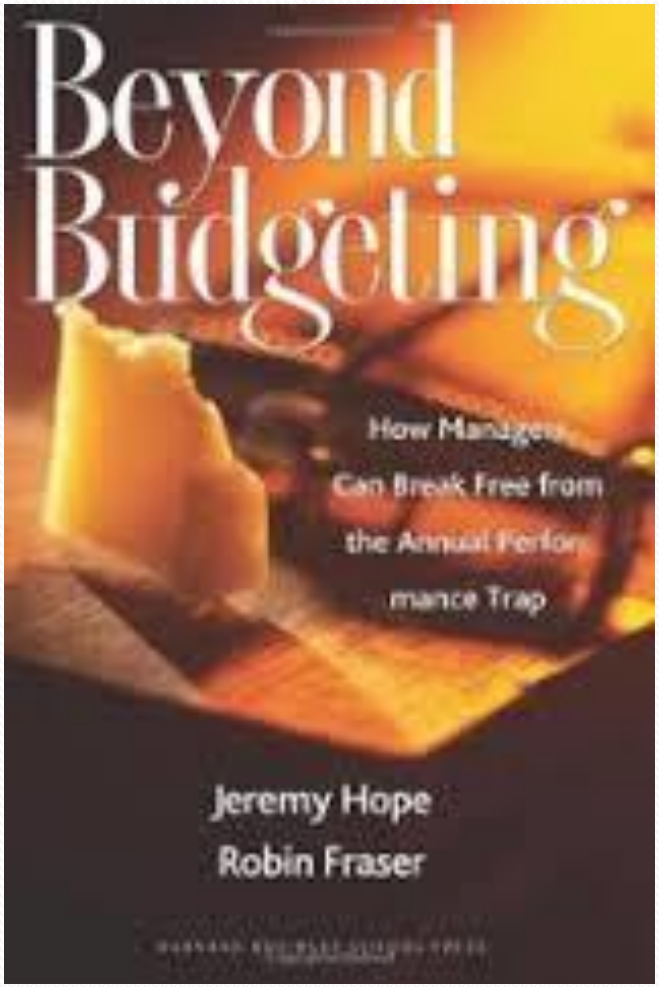
Have a think

Cost Control (Management Ideas) In your business

Have a think

Case study illustration

Beyond Budgeting



Beyond Budgeting – Key Cases



Svenska Handelsbanken 1972

Statoil

BOREALIS

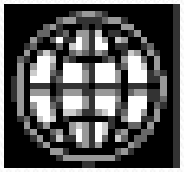
Borealis 1995

Beyond Budgeters?



































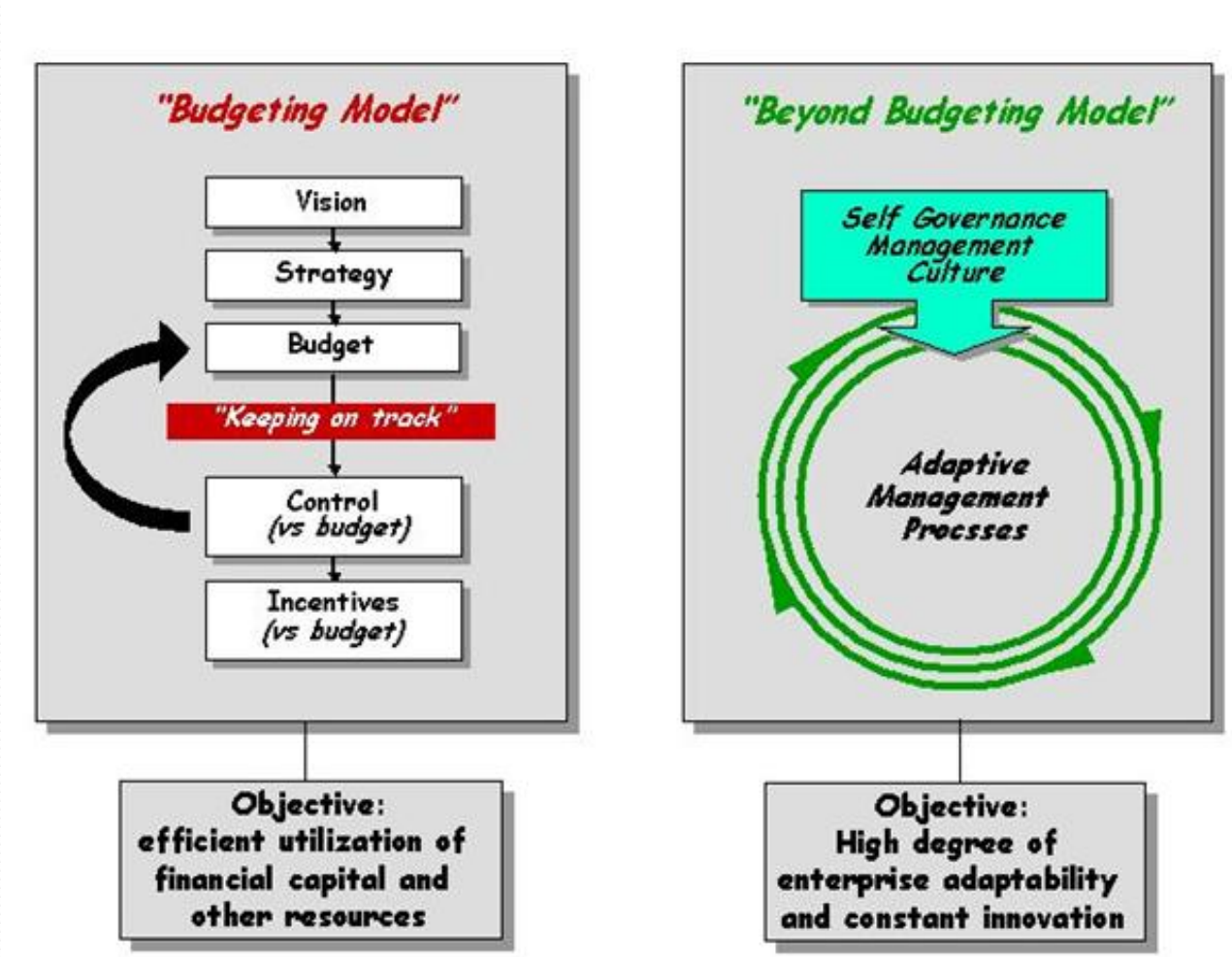






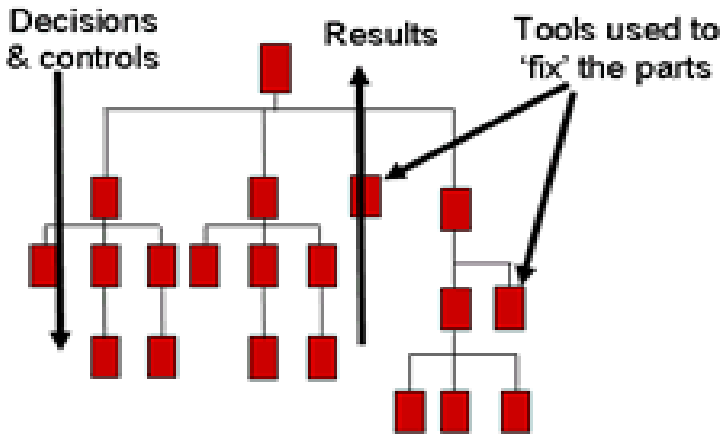


Traditional v Beyond Budgeting



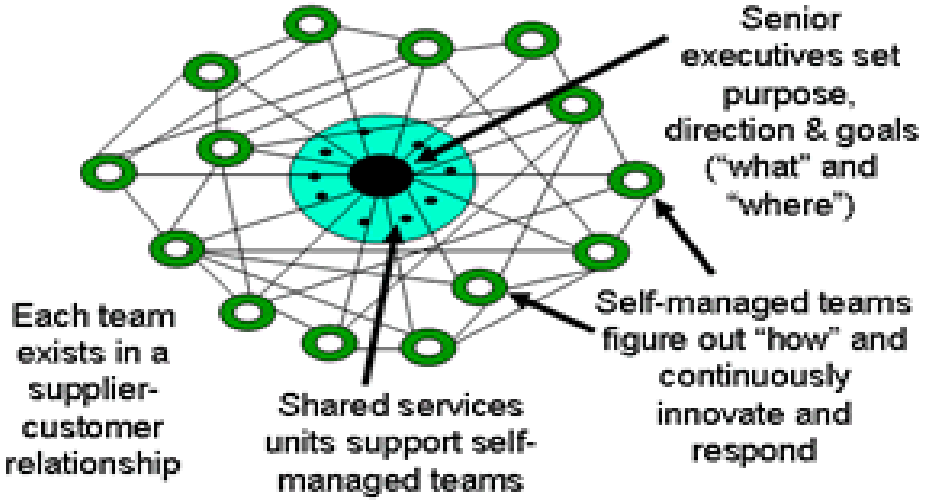
Alternative Management Models

The 'Command and Control' Model



- Organizations are obedient machines
- Organizations are a collection of replaceable parts (parts determine performance of the whole)
- Organizations comprise of 'cause-and-effect' relationships that are predictable
- Organization need central planning, coordination and control
- Change is reactive and project-driven

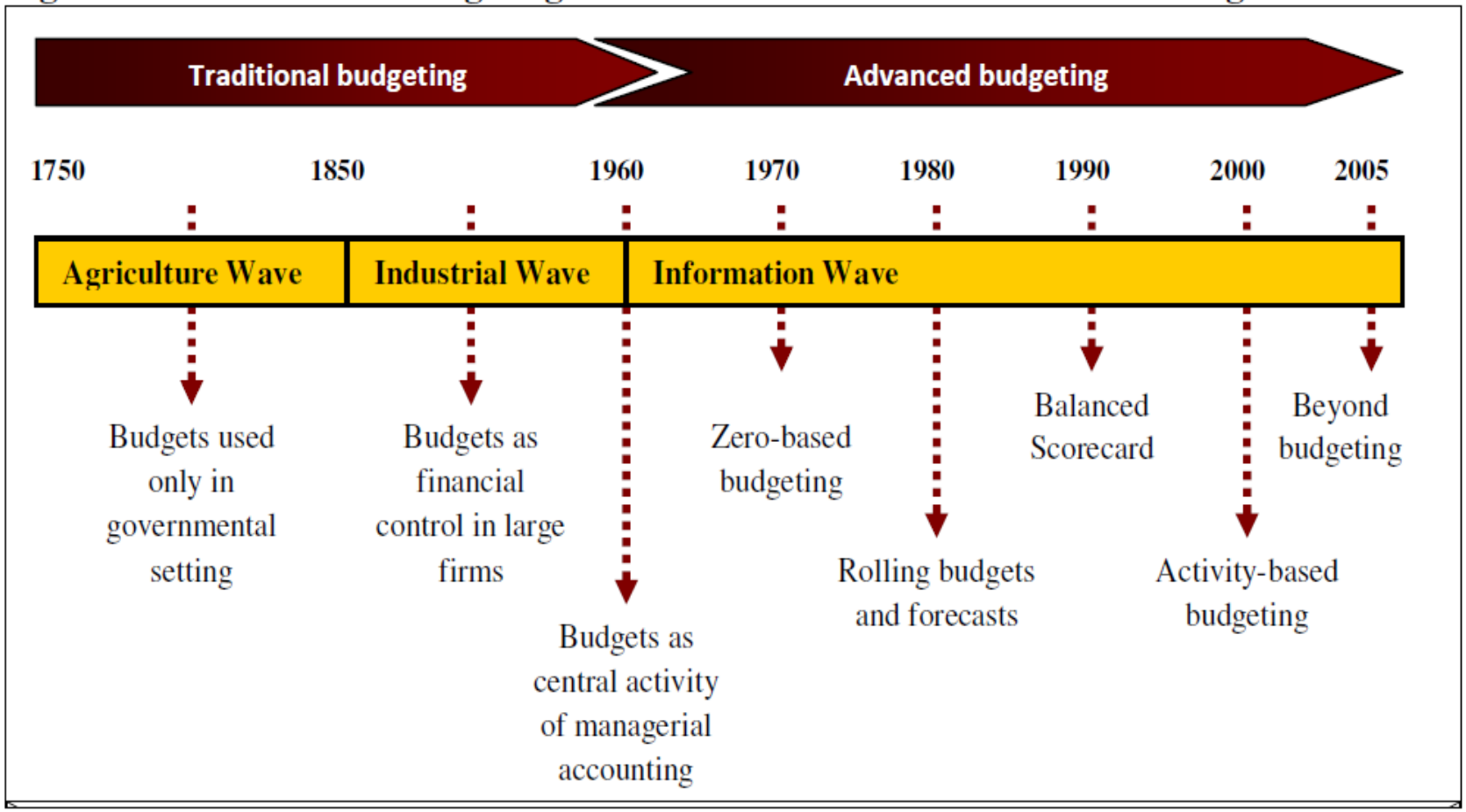
The 'Beyond Budgeting' Model



- Organizations are adaptive systems
- Organizations are holistic systems (whole system determines performance)
- Organizations are webs of relationships that are unpredictable
- Organization are self-organizing and self-regulating
- Change is integrative and adaptive

The 12 'beyond budgeting' (or 'adaptive') model principles	
Process principles	
1. Goals	Set aspirational goals aimed at continuous relative improvement, ***not*** *fixed annual targets*
2. Rewards	Reward shared success based on relative performance, ***not*** *on meeting fixed targets*
3. Planning	Make planning a continuous and inclusive process, ***not*** *an annual event*
4. Controls	Base controls on relative KPIs and performance trends, ***not*** *variances against plan*
5. Resources	Make resources available as needed, ***not*** *through annual budget allocations*
6. Coordination	Coordinate cross organisation interactions dynamically, ***not*** *through annual planning cycles*
Leadership principles	
1. Customers	Focus everyone on improving customer outcomes, ***not*** *on meeting internal targets*
2. Accountability	Create a network of teams accountable for results, ***not*** *centralized hierarchies*
3. Performance	Champion success as winning in the marketplace, ***not*** *on meeting internal targets*
4. Freedom to act	Give teams the freedom and capability to act, ***don't*** *merely require adherence to plan*
5. Governance	Base governance on clear values and boundaries, ***not*** *detailed rules and budgets*
6. Information	Promote open and shared information, ***don't*** *restrict it to those who 'need to know'*

Figure 3.1: Evolution of budgeting within the three waves of economic change



Source: Hope and Hope, 1997; Banovic, 2005.



"Managing the Numbers"

"Managing the Drivers of Business Performance"

But are - Are all decentralised organisations necessarily successful?

	Traditional (budget based) Mgmt. Model	BBM Model
Target & rewards	• Incremental targets • Fixed incentives	• Stretch goals • Relative rewards
Planning & controls	• Fixed annual plans • Variance controls	• Cont. planning • KPI's & rolling forecasts
Resources & coordination	• Pre-allocated resources • Central coordination	• Resources on demand • Dynamic coordination
Organ. & culture	• Central control • Focus on managing #s	• Local control of goals/plans • Focus on value creation

Governance and transparency

1. Values	Bind people to a common cause; not a central plan
2. Governance	Govern through shared values and sound judgement; not detailed rules and regulations
3. Transparency	Make information open and transparent; don't restrict and control it

Accountable teams

4. Teams	Organize around a seamless network of accountable teams; not centralized functions
5. Trust	Trust teams to regulate their performance; don't micro-manage them
6. Accountability	Base accountability on holistic criteria and peer reviews; not on hierarchical relationships

Goals and rewards

7. Goals	Encourage teams to set ambitious goals, don't turn goals into fixed contracts
8. Rewards	Base rewards on relative performance; not on fixed targets

Planning and controls

9. Planning	Make planning a continuous and inclusive process; not a top-down annual event
10. Coordination	Coordinate interactions dynamically; not through annual budgets
11. Resources	Make resources available just-in-time; not just-in-case
12. Controls	Base controls on fast, frequent feedback; not budget variances

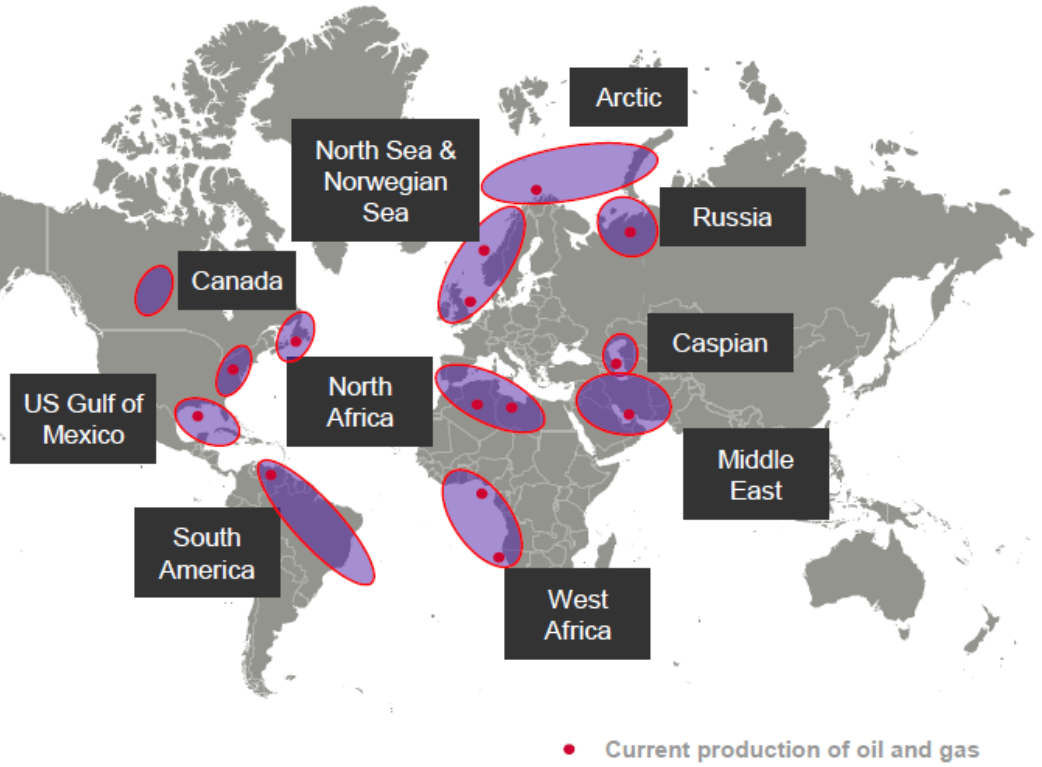
Beyond Budgeting Example - StatOil

- Model about people and behaviour more than P & L?

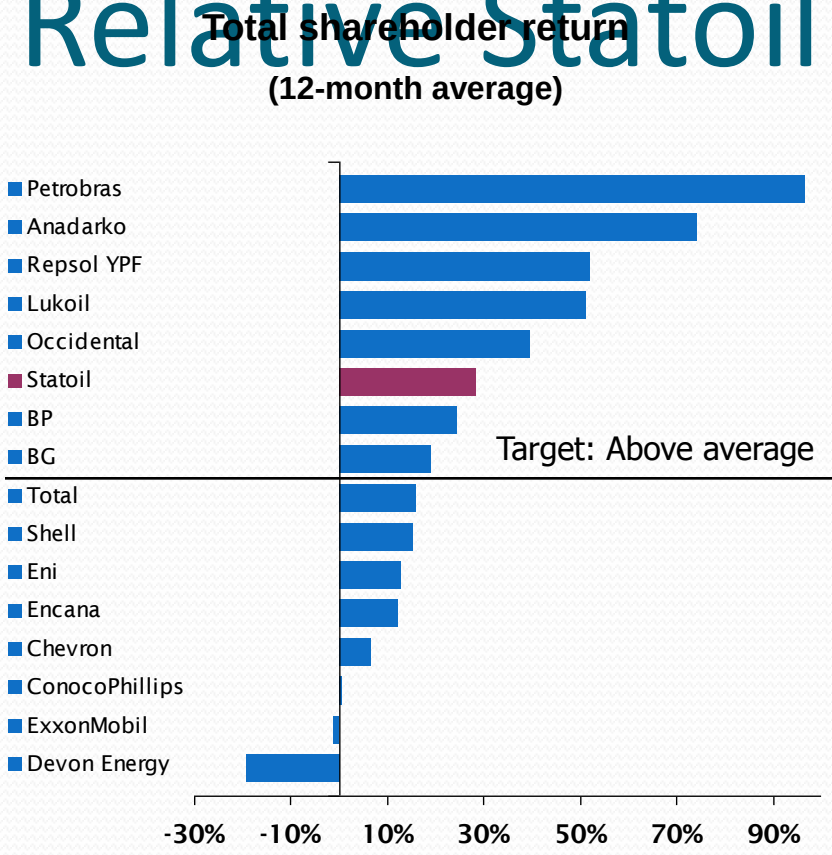
Stat Oil

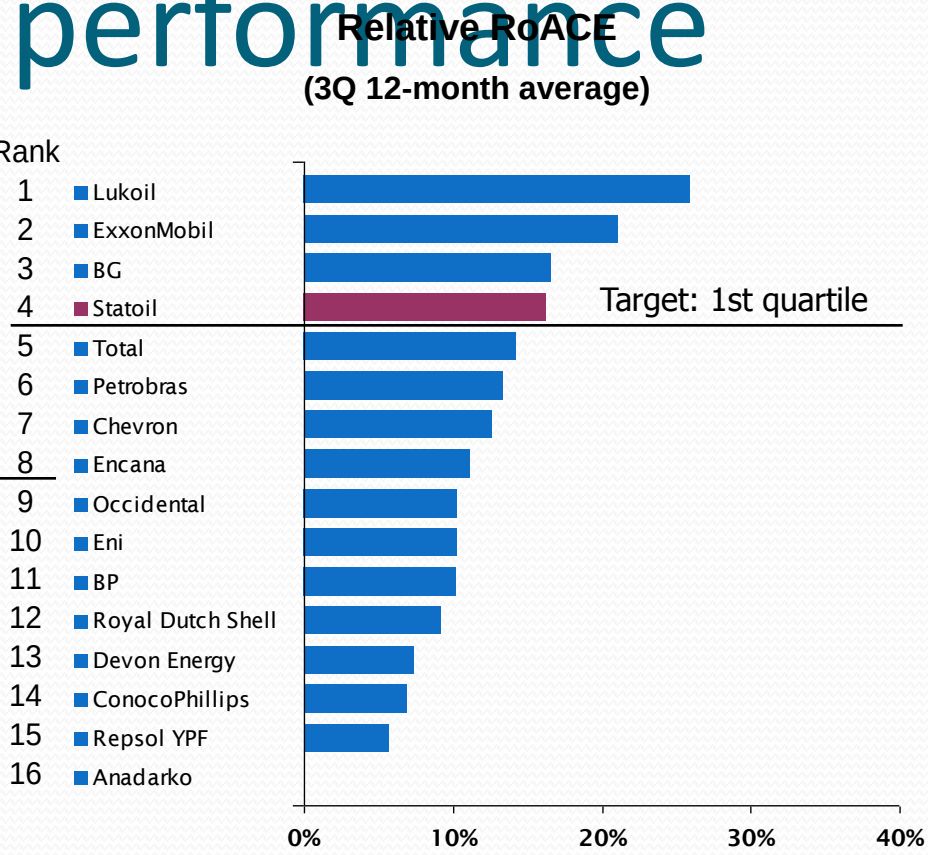
Statoil in brief

- Turnover and market cap approx. 80 bn. USD
- 20.000 employees in 34 countries
- World's largest offshore operator
- Europe's second largest gas supplier
- The world's third largest crude oil seller
- Listed in New York and Oslo

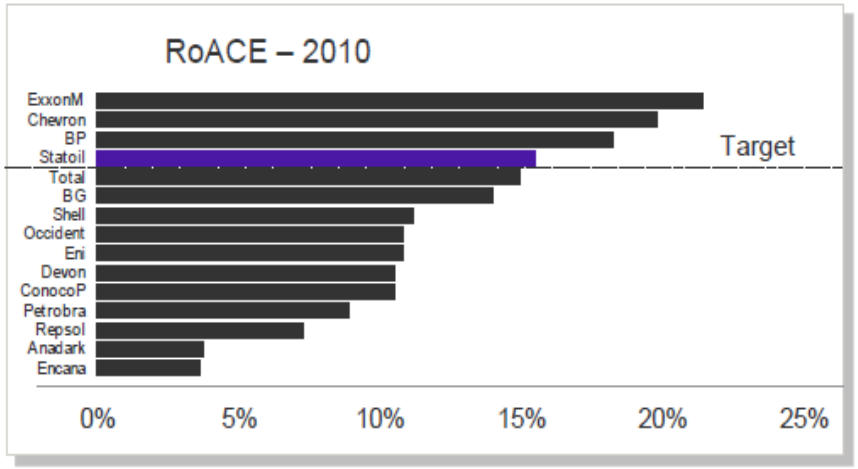


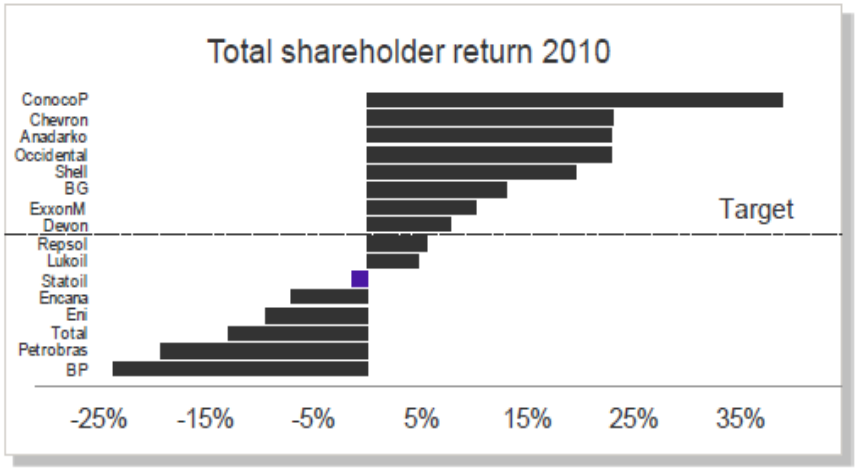
Relative Statoil performance

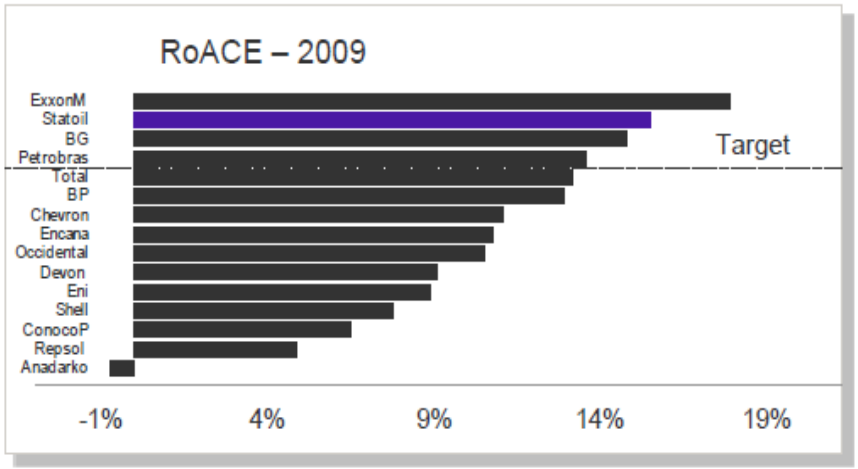


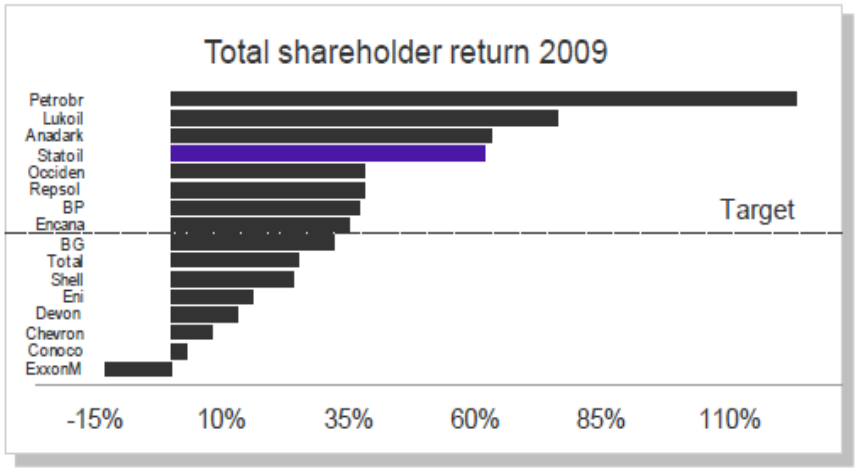


Relative Statoil performance



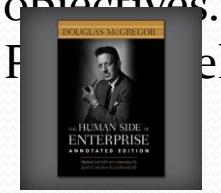






What is your view on people?

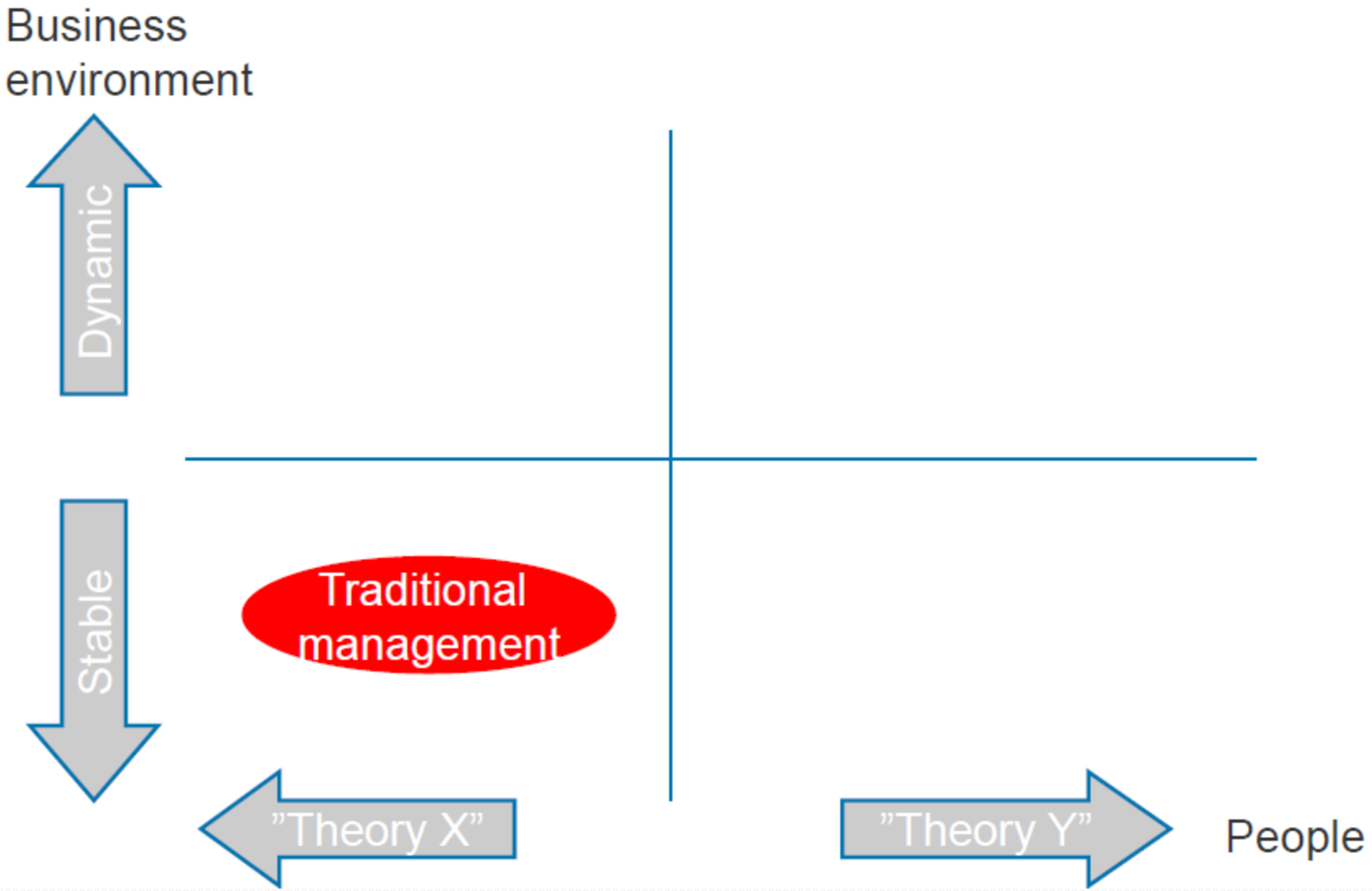
- **Theory X?**
- People prefer to be directed, do not want responsibility, and have little or no ambition.
- People have an inherent dislike for work and will avoid it whenever possible.
- People must be coerced, controlled, directed, or threatened with punishment in order to get them to achieve the organizational objectives.
- P ek security above all else.



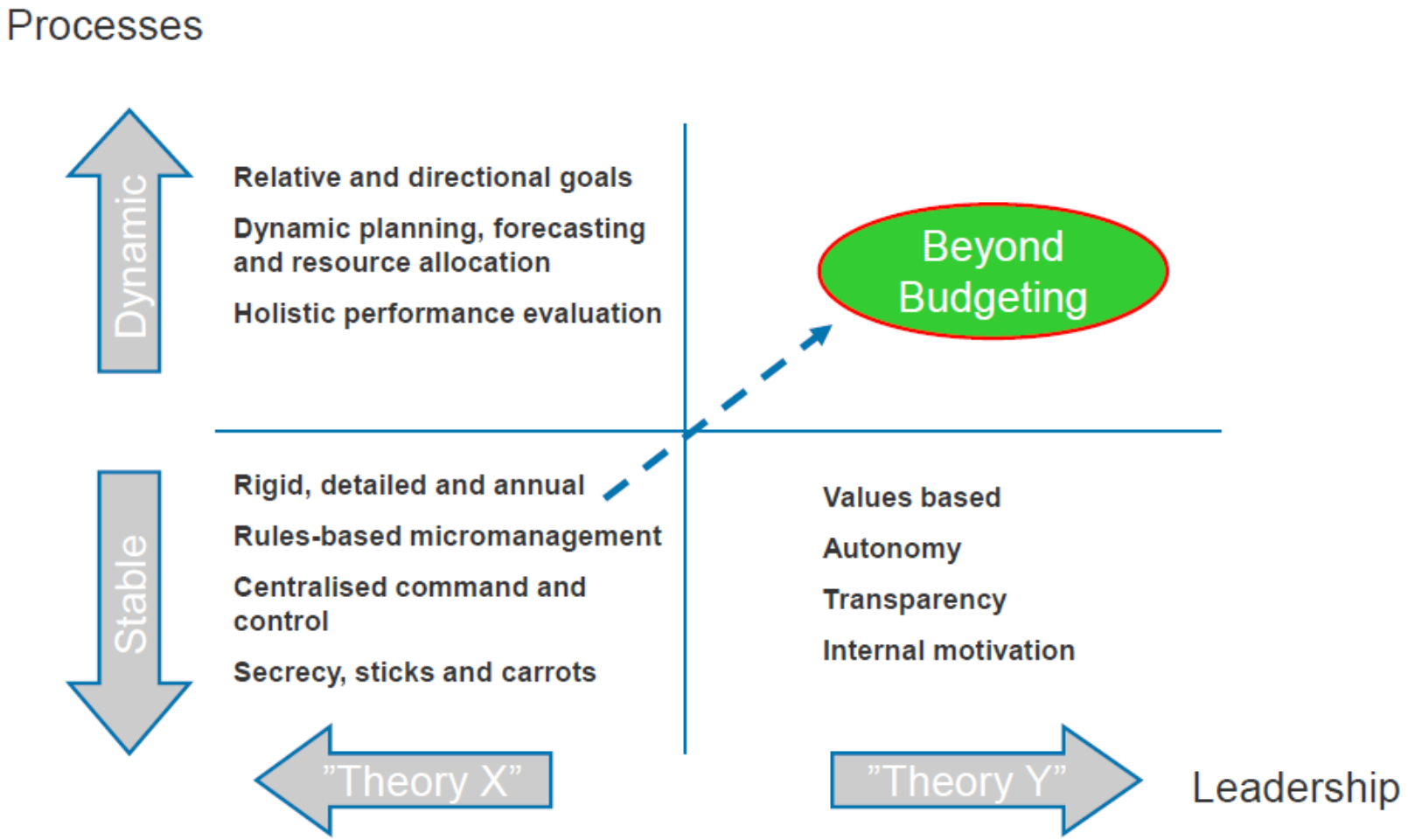
- **Theory Y?**
- Work is as natural as play and rest.
- People will exercise self-direction if they are committed to the objectives (they are not lazy).
- Creativity, ingenuity, and imagination are widely distributed among the population. People are capable of using these abilities to solve an organizational problem.
- People learn to accept and seek responsibility
- People have potential.

Douglas McGregor – ”The human side of enterprise” (1960)

The world has changed
- what about the way we lead and manage?



We must address both processes and leadership



The Beyond Budgeting principles

Change in *leadership*

1. Values - Govern through a few clear values, goals and boundaries, **not** detailed rules and budgets
2. Performance - Create a high performance climate based on relative success, **not** on meeting fixed targets
3. Transparency - Promote open information for self management, **don't** restrict it hierarchically
4. Organization - Organize as a network of lean, accountable teams, **not** around centralized functions
5. Autonomy - Give teams the freedom and capability to act; **don't** micro-manage them
6. Customers - Focus everyone on improving customer outcomes, **not** on hierarchical relationships

Change in *processes*

7. Goals - Set relative goals for continuous improvement, **don't** negotiate fixed performance contracts
8. Rewards - Reward shared success based on relative performance, **not** on meeting fixed targets
9. Planning - Make planning a continuous and inclusive process, **not** a top-down annual event
10. Coordination - Coordinate interactions dynamically, **not** through annual planning cycles
11. Resources - Make resources available as needed, **not** through annual budget allocations
12. Controls - Base controls on relative indicators and trends, **not** on variances against plan

StatOil Model – "Ambition to A

Key principles – Ambition to action

- Performance is ultimately about **performing better** than those we **compare** ourselves with
- **Do the right thing** in the actual situation, guided by the Statoil Book, your Ambition to action, decision criteria & authorities and sound business judgement
- Within this framework, **resources** are made available or allocated case-by-case
- Business follow up is **forward looking** and **action** oriented
- Performance evaluation is a **holistic** assessment of delivery and behaviour

Principle 1

- Performance should be about beating similar companies' performance not a fixed budget. You might remember the excellent quote from Jack Welch beat the competition "not the budget". Performance measurement should be based on some relative measure of performance against comparable businesses.

Principle 2

- Managers should be encouraged to do the “right thing”. Managers are guided as to what is the right thing by the following:

- The StatoilHydro book – this book lays out the values and principles and policies of Statoil Hydro.
- “Ambition to Action” – This is The StatoilHydro’s equivalent of Professor Robert Kaplan’s Balanced Scorecard – it translates strategy and “ambition” into actions and measures.
- Decision Criteria - the rules under which decisions are justified and made.
- Authorities – even without budgets managers have limited authority.
- Sound business judgement – This suggests a business “common sense” check on decisions and actions.

- There is of course a cultural aspect of doing the “right thing”, no doubt some of the managers in Lehman brothers, WorldCom and Enron all believed they were doing the “right thing” for their businesses and making sound business decisions. What is deemed appropriate attitude and behaviour changes over time. Managers need to be educated in what complies with the ethics of their business. StatoilHydro presents its view of what is “right” in this StatoilHydro book. Think about the different business you have worked with or know, do they have different ideas of what behaviour is “right”? Grand statements of standards and ethics are not necessarily reality, Enron’s motto "Respect, Integrity, Communication and Excellence" did not quite match their true culture.

Principle 3

- Resources are not allocated by a budget but on a case-by-case basis. This requires an ongoing review process or a well designed set of decision criteria (i.e. what a business case needs to demonstrate to win approval)

Principle 4

- When reviewing performance, managers should look to the future and what actions they are going to take rather than dwelling on the past. This is a principle which we advocate when managing conventional budgets. Under the beyond budgeting regime, budgets are scrapped and forecasts developed. If you are still like most companies using the conventional approach to budgets you can still supplement this with the use of forecasts to encourage managers to be more forward thinking and proactive in their management of resources.

Principle 5

- Performance evaluation assesses what has been delivered and how managers have behaved. Under Jack Welch's regime at GE managers were rewarded for delivering and harshly punished for failing. Within StatoilHydro the evaluation of managers' performance is only partly dependent on what they deliver, there are also rewarded for how they behave. Jack Welch is very critical of statements about "values" which are often full of platitudes, despite being heavily focused around delivering the traditional "bottom line" performance he also believes it's important not to talk about values but to talk about "behaviours".

- Within Bjarte Bogsnes's book he stresses that the success or failure of beyond budgeting is more likely to be down to its implementation rather than its design. Within StatoilHydro he describes how different individuals embraced the beyond budgeting principles at different rates with different levels of enthusiasm. It is probably inevitable that some managers will find it difficult to move from the world of budgets that they have been used to further whole working lives. The transition should include education and support for managers to help them change attitudes and behaviour.

The CEO on Ambition to action



CEO Helge Lund

"We have a management model which is very well-suited to dealing with turbulence and rapid change. It enables us to act and reprioritise quickly so that we can fend off threats or seize opportunities. This is much more difficult in a traditional «budget world».

"One of the main principles in our Ambition to action concept is that Statoil consists of mature, professional and able people who both can and want to accept responsibility."

Ambition to action - a process which…

…is integrated - from strategy to people

…but provides sufficient freedom and flexibility

…and activates our values and leadership principles

Strong performance

Sustainable results

Strategic objectives → KPIs → Actions & forecasts → Individual goals

Where are we going - what does success look like?

- Most important strategic change areas
- Medium term horizon

How do we measure progress?

- Indicative measure of strategic delivery
- 10-12 KPIs, annual/ longer term targets

How do we get there?

- Concrete actions and expected delivery (forecast)
- Clear deadlines and accountabilities

What is my contribution?

- **My Performance Goals (MPG)**
- Delivery
- Behaviour

Ambition to action example



Globally competitive – an exceptional place to perform and develop

Strategic objectives	Performance indicators	Actions (top 5)
People and organisation		
A value based and performance driven organisation.	Living the values	Complete the integration and ensure a successful post-merger process (31.12.2010)
	Progress PO action plan	Ensure right capacity and competence (31.12.2010)
		Consistent execution of the Statoil Hydro book ensuring alignment and compliance (31.12.2010)
		Simplify and improve the People@StatoilHydro process and strengthen [illegible] (31.12.2010)
		Strengthen capability and diversity in leadership pipeline, and build strong leadership teams (31.12.2010)
Health, safety and environment		
Industry leader in HSE	Serious incident frequency	Improve HSE leadership and compliance to our management system (31.12.2010)
No integrity violations	Climate [illegible]	Increased focus on technical integrity and barriers (31.01.2010)
Remain [illegible] industry leader in terms of having a low climate impact [illegible] where we are engaged	TTS Observations and actions	Implement operationalisation of HSE requirements (31.12.2010)
		Operationalise climate policy and technology (31.12.2010)
Operation		
Optimise performance and portfolio across the value chains	PE EPN	Secure optimal scope of CCS and handle communication challenge (20.12.2009)
	Product [illegible]	Ensure successful deliveries from corporate initiatives on IOR, IO and exploration (20.12.2009)
	Product [illegible] cost (USD/boe)	Forcefully execute programs to improve production efficiency and drilling performance (20.12.2009)
	Finding cost exploration (USD/boe)	Improve execution abilities through quality in the CVP decision process (20.12.2009)
Market		
Exploration success outperforming peers	NCS resources (quality marker)	Secure access to quality acreage on NCS (20.12.2009)
Maximise value creation through our value chains	Reserves [illegible]	Improve downstream profitability and portfolio robustness (31.12.2009)
A balanced portfolio set to grow long-term value in line with the first quartile of our peers	Downstream NOI (NOK bn)	Optimise strategic rig capacity (20.12.2009)
		Execute the technology strategy (20/12/2009)
		Utilize market conditions to continuously secure StatoilHydro competitive prices from our suppliers (20.12.2009)
Finance		
Competitive shareholder return	Relative RoACE	Continuously monitor and build flexibility in the portfolio (20.12.2009)
Realise the full potential from the merger	Relative Shareholder Return	Improve compliance within intellectual service and maintain focus on SOX (20.12.2009)
Maintain financial robustness through cycles	Merger value capture (NOK bn)	Improve the cost mindset in the organisation and deliver on cost improvements (20.12.2009)

Where are we going?

”Strategic objectives”

How do we measure progress?

”Key Performance Indicators”

How do we get there?

”Actions”

More than 1100 "Ambition to actions" across the company



.....and more

Solving a serious budget conflict

Traditional budget / plan

Step 1: Separate

Step 2: Improve

Budget / plan =
- •Target
- •Forecast
- •Resource allocation

"Same number – conflicting purposes"



Target
- •Front-loaded
- •Ambitious
- •Relative if possible



Forecast
- •Business driven not calendar driven
- •Expected outcome – early warning
- •Frequency and time horizon – lead time and target horizon driven
- •Limited detail



Resource allocation
- •Dynamic - no pre-allocation
- •Projects - decision gates & criteria
- •Operations - relative KPIs etc.
- •Monitoring - intervention if needed only

"Different numbers"

A forecast is not a promise or a target …





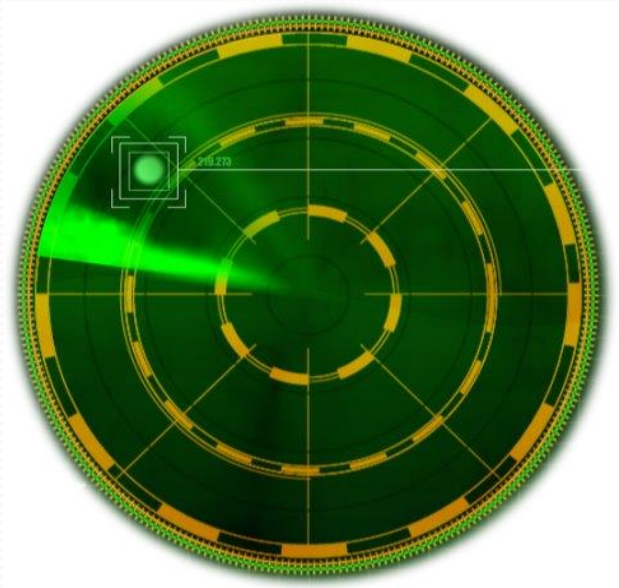
…nor is it an application for resources

A forecast is a call to action

Get issues on the radar screen early enough…

…..to be able to take corrective actions



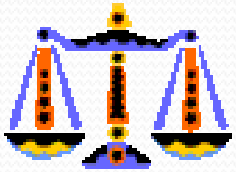


A forecast should:

- be brutally honest and unbiased
- be done for yourself more than for others
- be actionable
- have the right time horizon and detail level
- include an uncertainty analysis where relevant

Relative performance

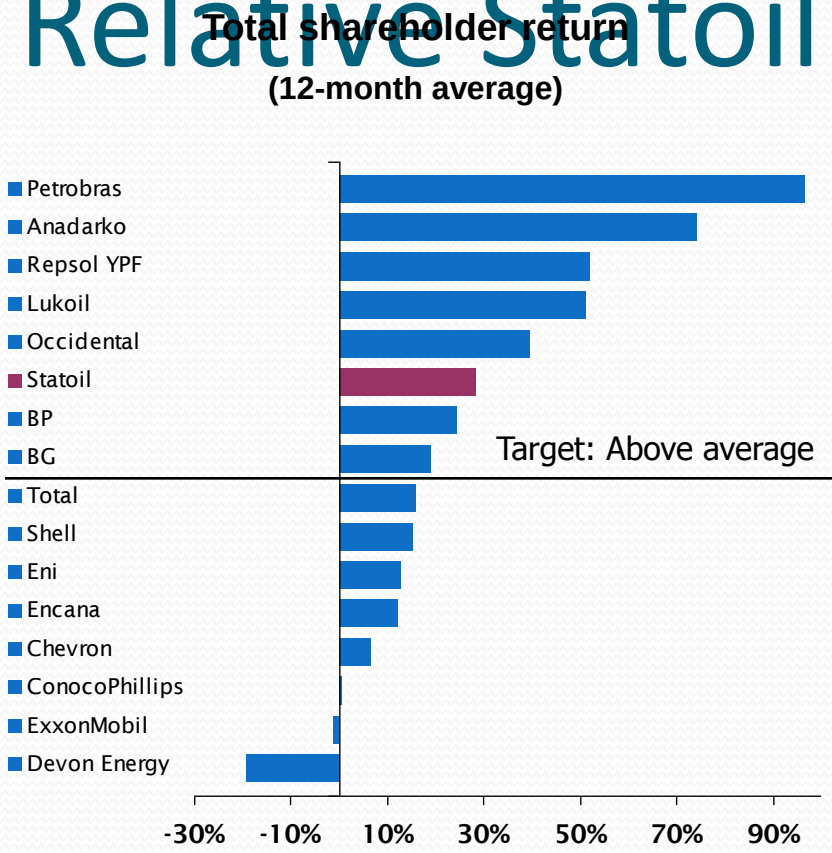
- Connect input with output

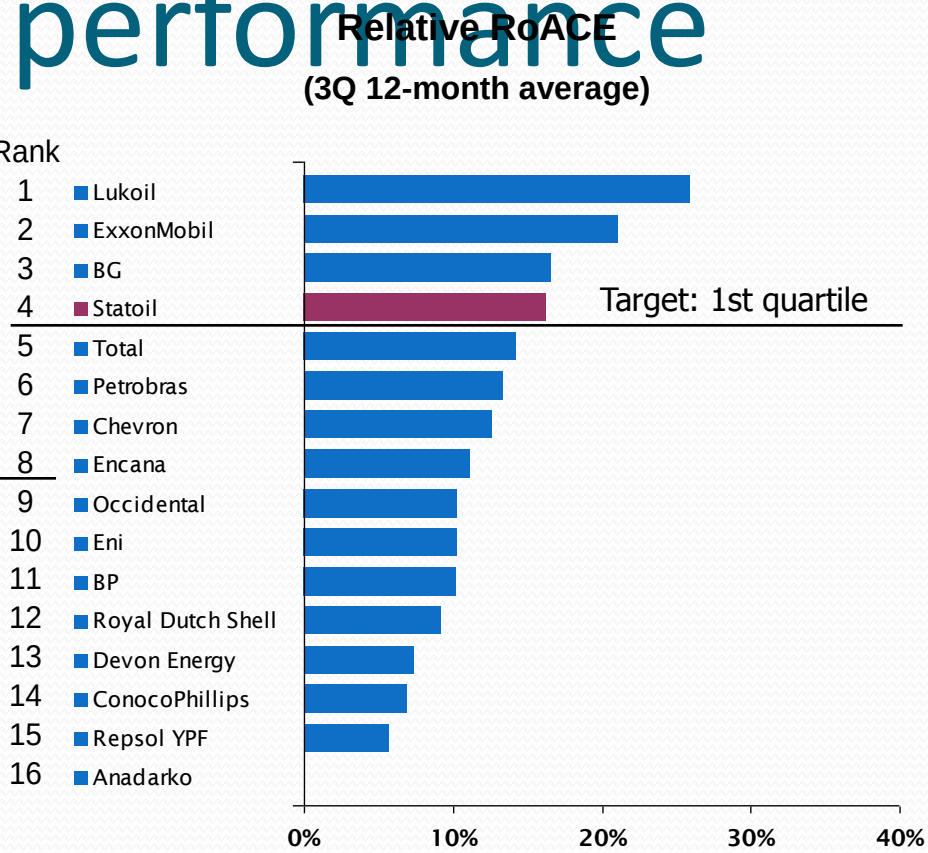


- Compare with others

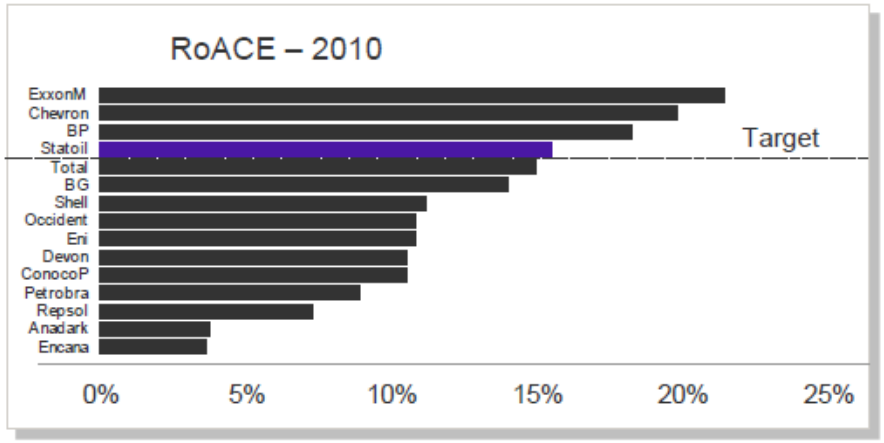


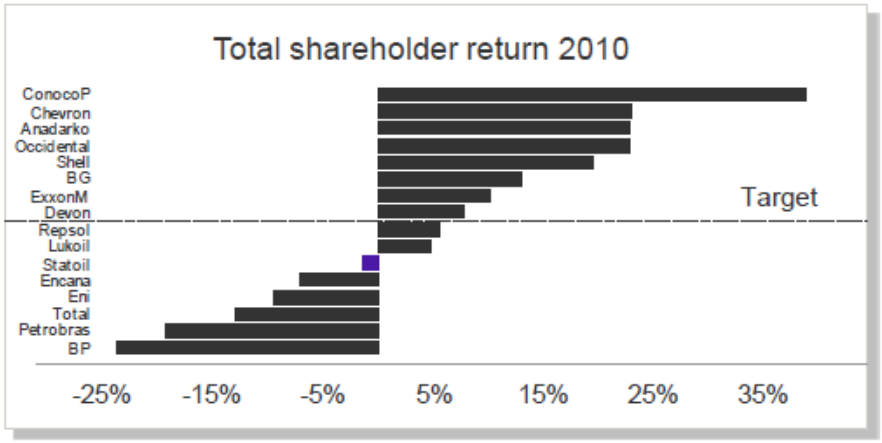
Relative Statoil performance

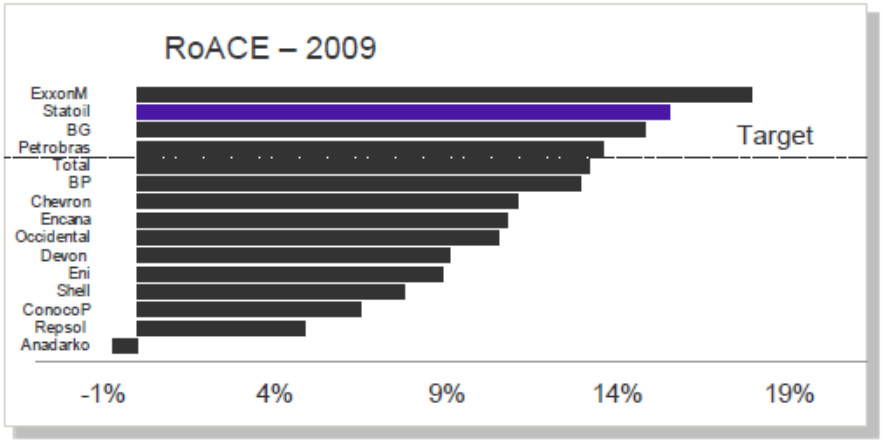


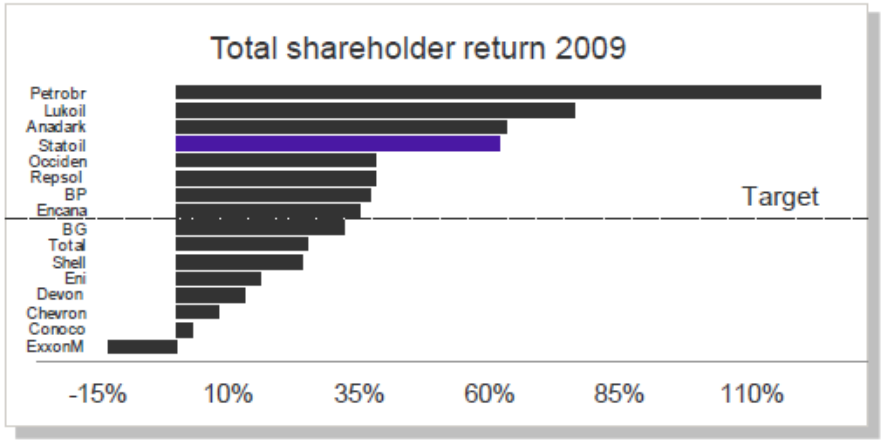


Relative Statoil performance





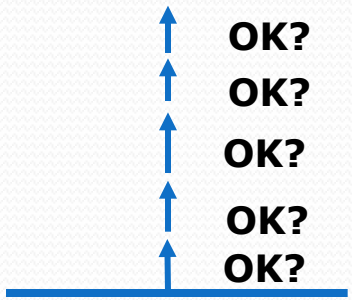




Dynamic resource allocation:
A different mindset - cost conscious from the first penny







Dynamic resource allocation – other costs

Absolute KPIs		Relative KPIs			No KPIs
Traditional cost budget	Absolute cost KPI	Unit cost input/output	Unit cost vs peers	Bottom line focus only	Strategic objectives or actions only
Xx Xx Xx Xx Xx Xx Xx Xx 1000	1000	 ”USD/bbl” ”USD/customer” ”USD/employee”	 ”1. quartile” ”Above average”	EBIT ROCE (abs/rel)	”Cost effective and competitive operations” ”More video –less travel” ”Reduce consultancy spending”

Increasing freedom and flexibility

Increasing need for strong values and clear direction

Monitoring of actual development, intervention if needed only

Select based on what is right and works for your organisation

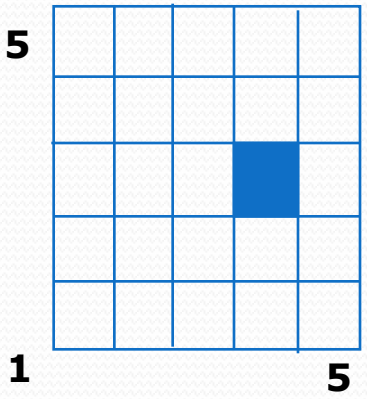
A new performance language
- from mechanical measurement to a holistic assessment

(Previously only KPI targets)

"Ambition to Action"

- Strategic objectives
- KPI targets
- Actions

Delivery



Pressure testing KPI results:

- Deliver towards the strategic objectives?
- How ambitious KPI targets?
- Changed assumptions, with positive or negative effect?
- Agreed actions implemented, or corrective actions initiated as needed?
- Delivered results sustainable?

50/50

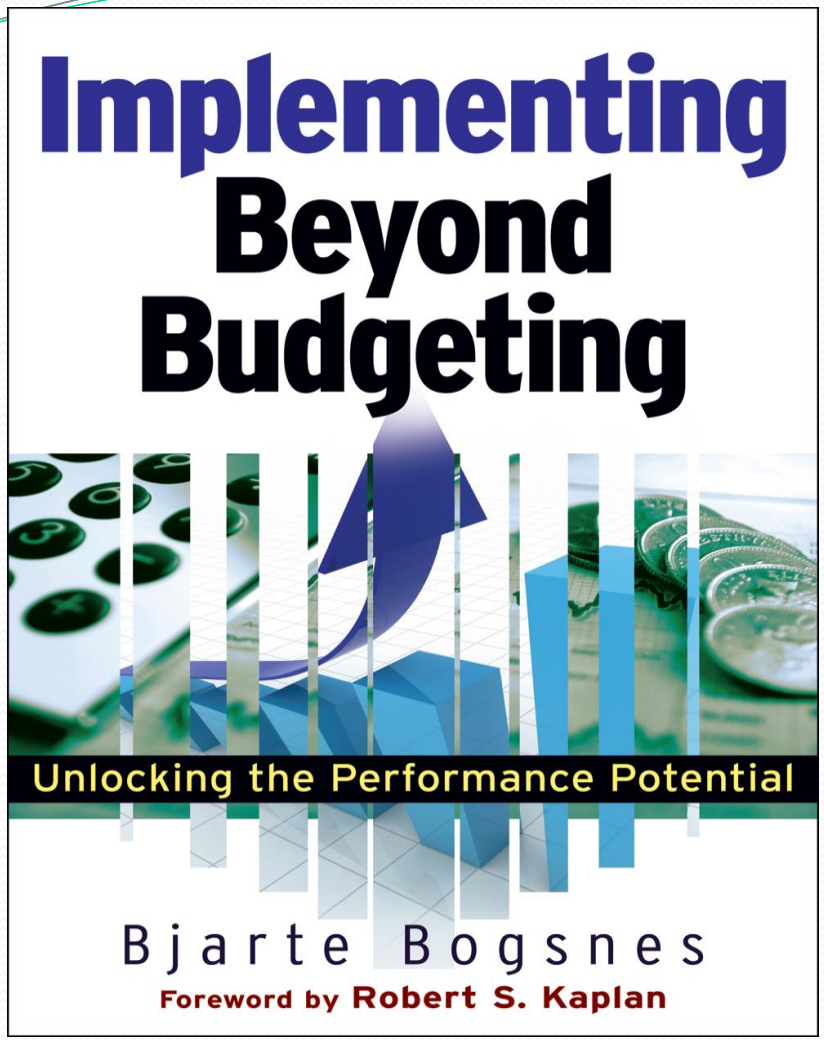
Behaviour

Living the values

- Day-to day-observations
- 360°/ 180°/ 90° surveys
- People survey
- Individual development plan

A systematic change of the whole process

	”Annual command and control”	More dynamic & flexible A new performance language
Target setting	· Equal to plan – ”what we can deliver” · KPI targets · Absolute targets	· Aspiration driven –”what we must deliver”. Targets before plan. · ” Ambition to action” · Relative targets
Planning	· Plan = target, forecast and resource allocation · Gaps vs targets hidden · One outcome only · Very detailed	· Plan = forecast only (actions and expected performance) · Gaps vs. targets visible · Main uncertainty spans · Less detailed
Resource allocation	· Annual pre-allocation through budgets · Budgets ”an entitlement – my money”	· Resources available when needed, but within KPI targets + mandates + decision criteria. Monitoring of development
Business reporting	· Backward looking · Variance vs. YTD budget	· Forward looking · Forecast vs. targets, and actions to close gaps
Evaluation/ rewards	· Only based on budgets and KPIs	· A broader evaluation: ”Ambition to action” + Behaviour


Implementing
Beyond
Budgeting
Unlocking the Performance Potential
Bjarte Bogsnes
Foreword by Robert S. Kaplan

BBRT Check List – in your organisation?

Principle		Beyond Budgeting: Do this!	Not that!
Leadership	1. Customers	Focus everyone on their customers	Hierarchical relationships
	2. Organization	Organize as a lean network of accountable teams	Centralized functions
	3. Autonomy	Give teams the freedom and capability to act	Micro-manage them
	4. Responsibility	Enable everyone to think and act like a leader	Merely follow 'the plan'
	5. Values	Govern through a few clear values, goals and boundaries	Detailed rules and budgets
	6. Transparency	Promote open information for self management	Restrict it hierarchically
Processes	7. Goals	Set relative goals for continuous improvement	Negotiated contracts
	8. Rewards	Reward shared success based on relative performance	Fixed targets
	9. Planning	Make planning a continuous and inclusive process	Top-down, annual event
	10. Controls	Base controls on relative indicators and trends	Variances against plan
	11. Resources	Make resources available as needed	Budget allocations
	12. Coordination	Coordinate cross company interactions dynamically	Annual planning cycles

Beyond Budgeting Tools?

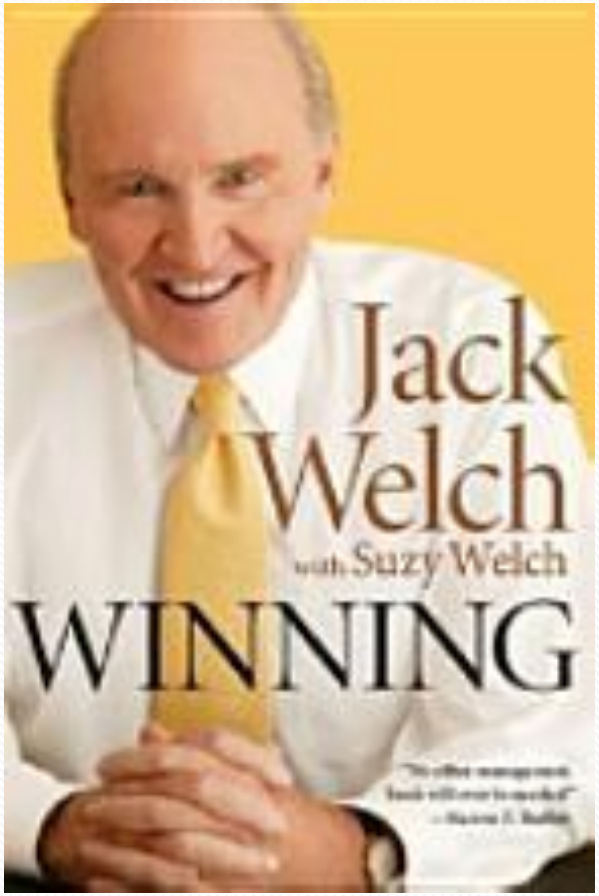


Balanced Scorecards
KPIs
Activity Based Management
Rolling Forecasts
"Real" costs v Standard cost
Relative (and continuous) improvement
External comparison & benchmarking
Delegation of Ownership of OUTCOMES not just INPUTS
Understand how the organisation is going to be successful
Understanding of people and motivation
Theory Y Management – Not Theory X

Theory X believes held about human nature	Theory Y believes held about human nature
Attitude – *People dislike work, find it boring, and willavoid it if they can.*	***Attitude*** – *People need to work and want to take an interest in it. Under the right conditions, they can enjoy it.*
Direction – *People must be forced or bribed to make the right effort.*	***Direction*** – *People will direct themselves towards a target that they accept.*
Responsibility – *People would rather be directed than accept responsibility, which they avoid.*	***Responsibility*** – *People will seek, and accept responsibility, under the right conditions.*
Motivation – *People are motivated mainly by money and fears about their job security.*	***Motivation*** – *Under the right conditions, people are motivated by the desire to realize their own potential*
Creativity – *Most people have little creativity - except when it comes to getting round management rules.*	***Creativity*** – *Creativity and ingenuity are widely distributed and grossly underused*

Source: BBTN

Jack Welch - STRETCH



STRETCH - The fundamental part of Stretch came down to a focus on performance against the competition. Under the old system, if you met your budget you were a hero and got your bonus. Under Welch's new system the important measurement was your performance against that of your competitors

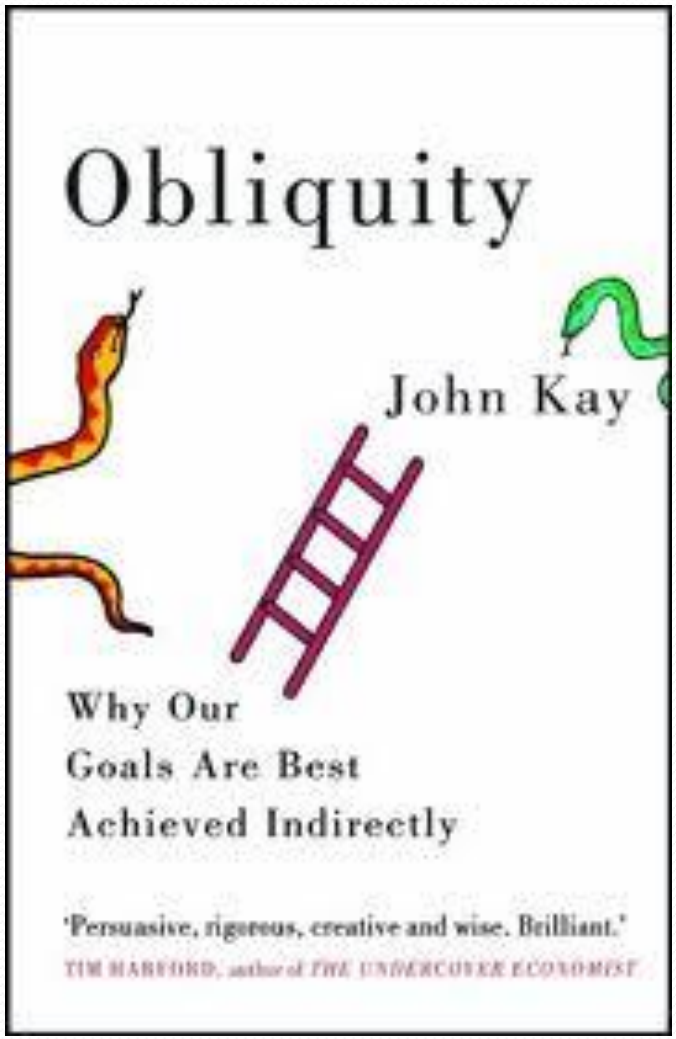
DON'T BEAT THE BUDGET – BEAT THE COMPETITION

USE RELATIVE PERFORMANCE MEASURES

Beyond Budgeting – Stretch Targets Advantages

- **VARIANCE CONTROLS**
  - **Lead to an "excuse" culture**
- **RELATIVE KPI CONTROLS**
  - **Lead to an "improvement" culture**

Obliquity – Indirect Routes Get You There Fastest John Kay





MONTHLY BUDGETARY REPORTING

MONTH		
ACTUAL	BUDGET	VARIANCE

YEAR TO DATE		
ACTUAL	BUDGET	VARIANCE

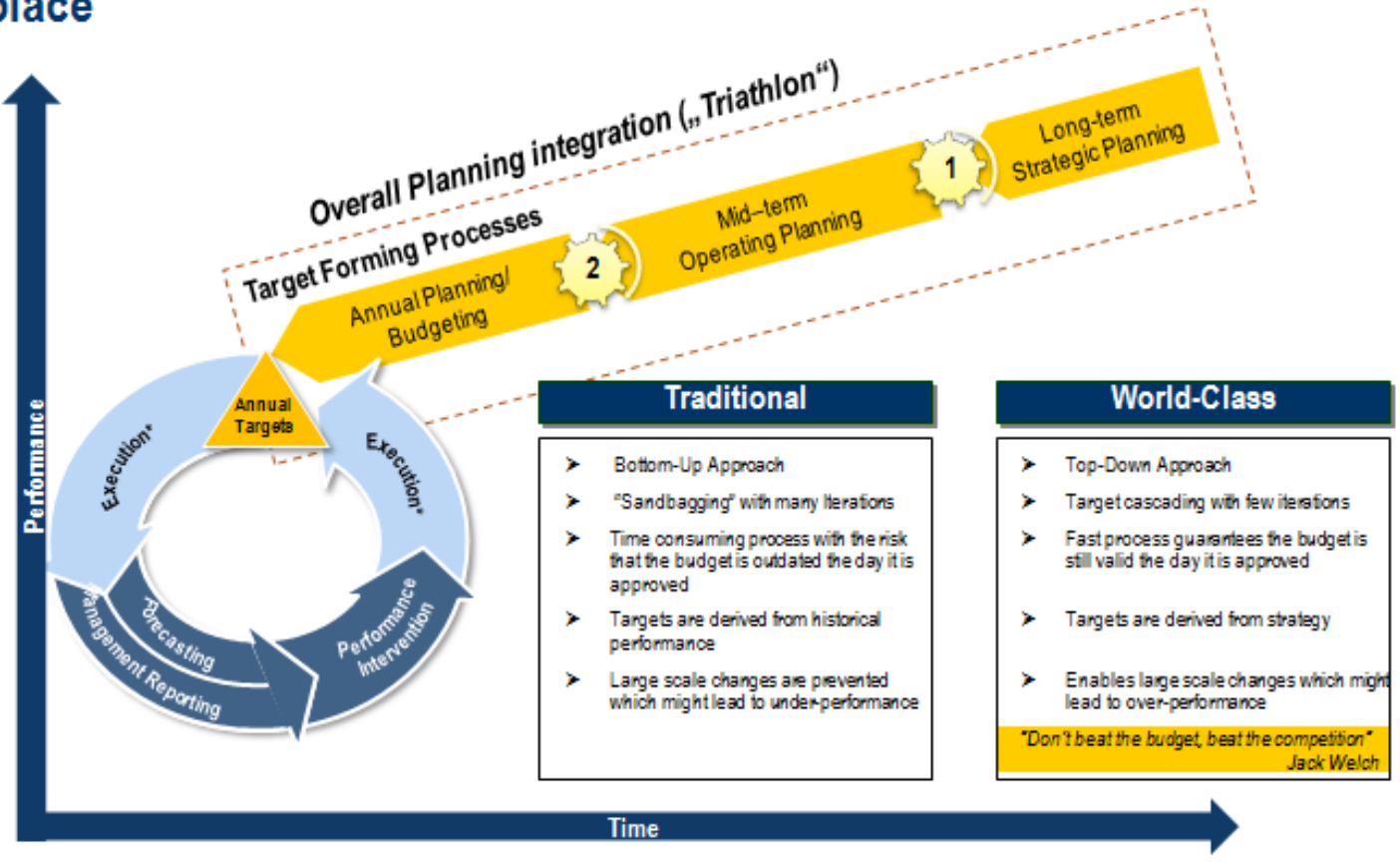
YEAR		
FORECAST	BUDGET	VARIANCE

COMMENTARY
REVIEW
ANALYSIS
ACTION

COMMENTARY
REVIEW
ANALYSIS
ACTION

COMMENTARY
REVIEW
ANALYSIS
ACTION

World-Class companies have highly integrated planning processes in place



Traditional

- Bottom-Up Approach
- "Sandbagging" with many iterations
- Time consuming process with the risk that the budget is outdated the day it is approved
- Targets are derived from historical performance
- Large scale changes are prevented which might lead to under-performance

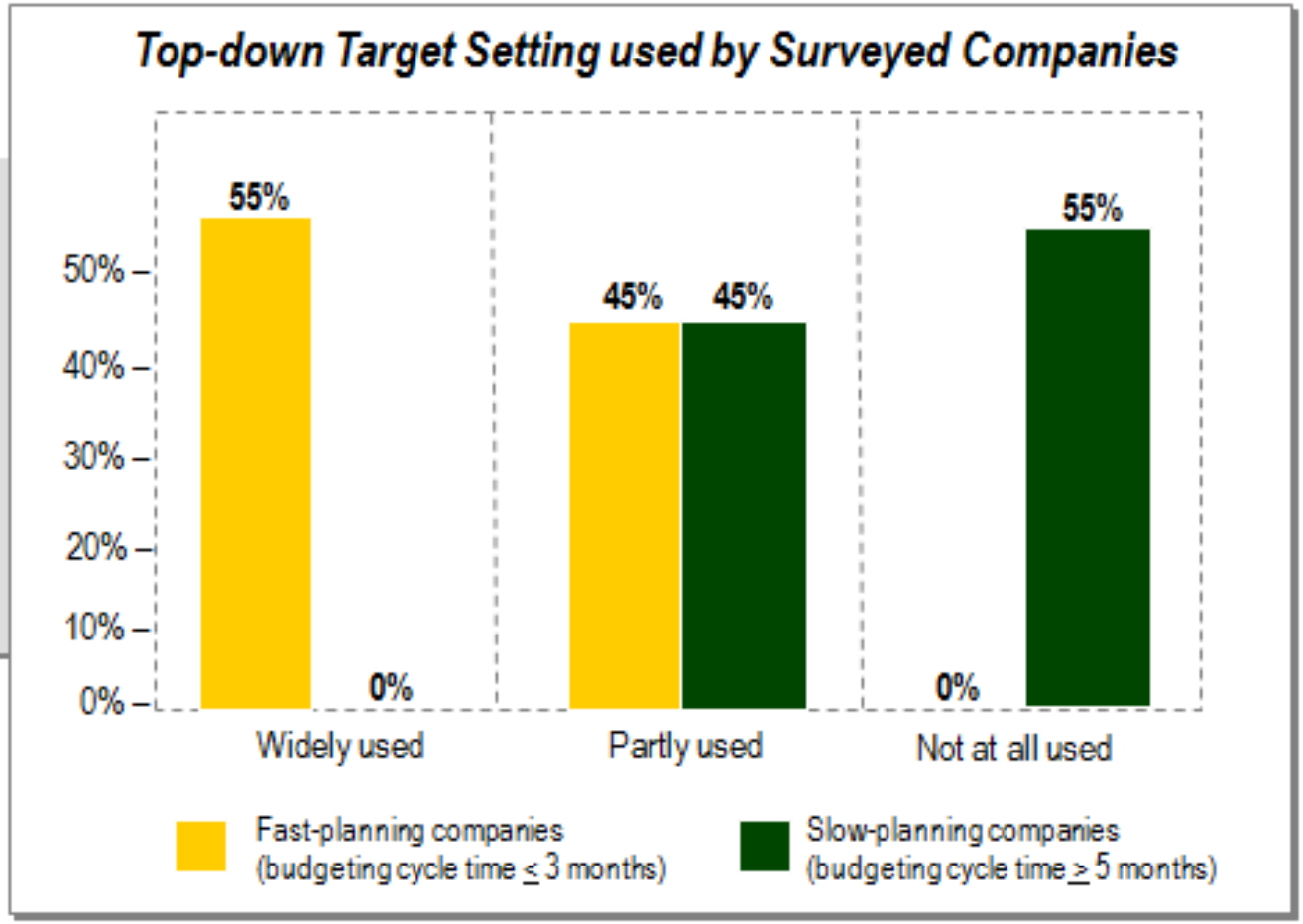
World-Class

- Top-Down Approach
- Target cascading with few iterations
- Fast process guarantees the budget is still valid the day it is approved
- Targets are derived from strategy
- Enables large scale changes which might lead to over-performance

"Don't beat the budget, beat the competition"
Jack Welch

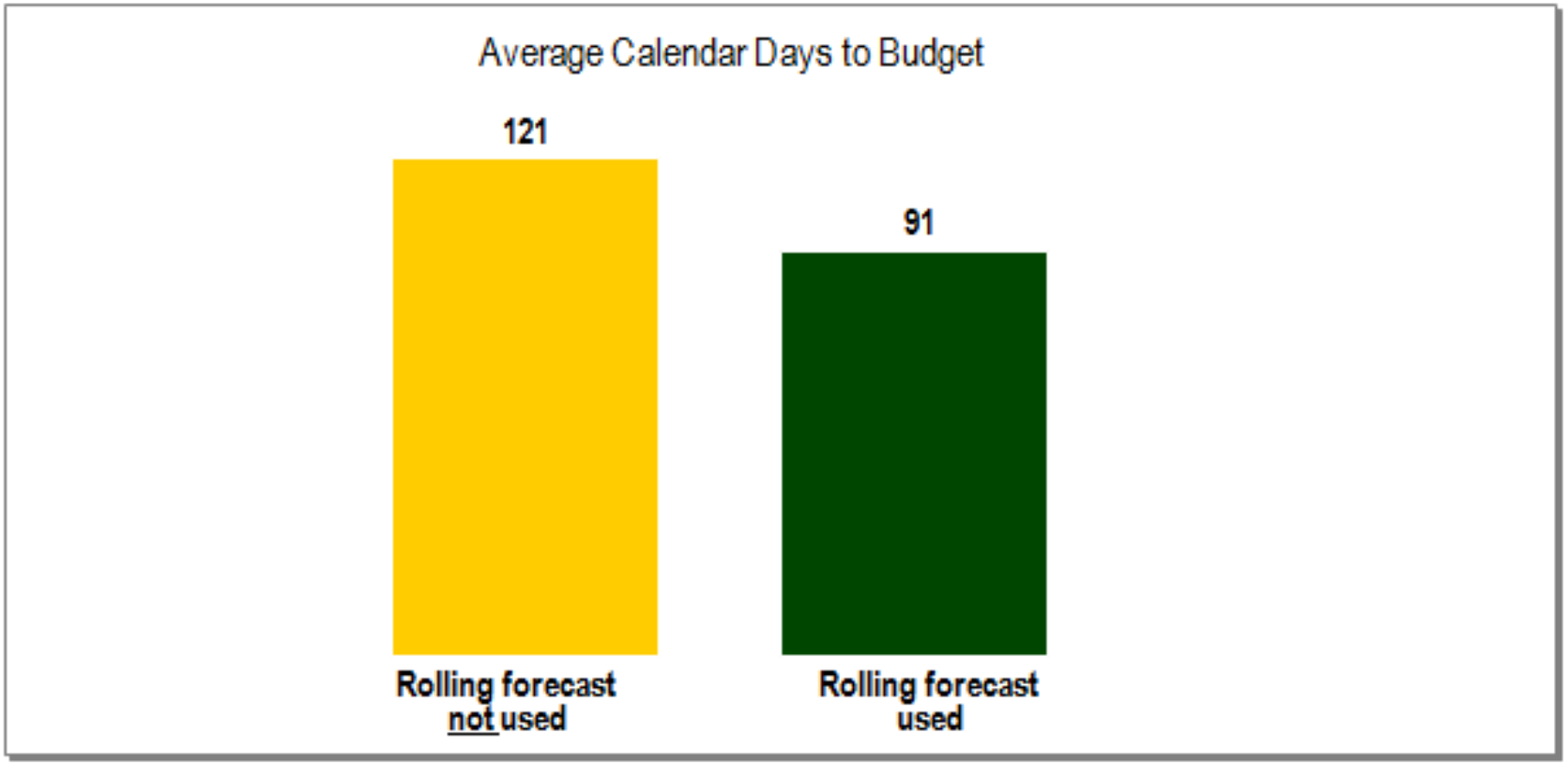
Top-down target setting is the key differentiator

The majority of fast-planning companies use top-down target setting; the remaining fast-planning companies use that best practice at least in part.

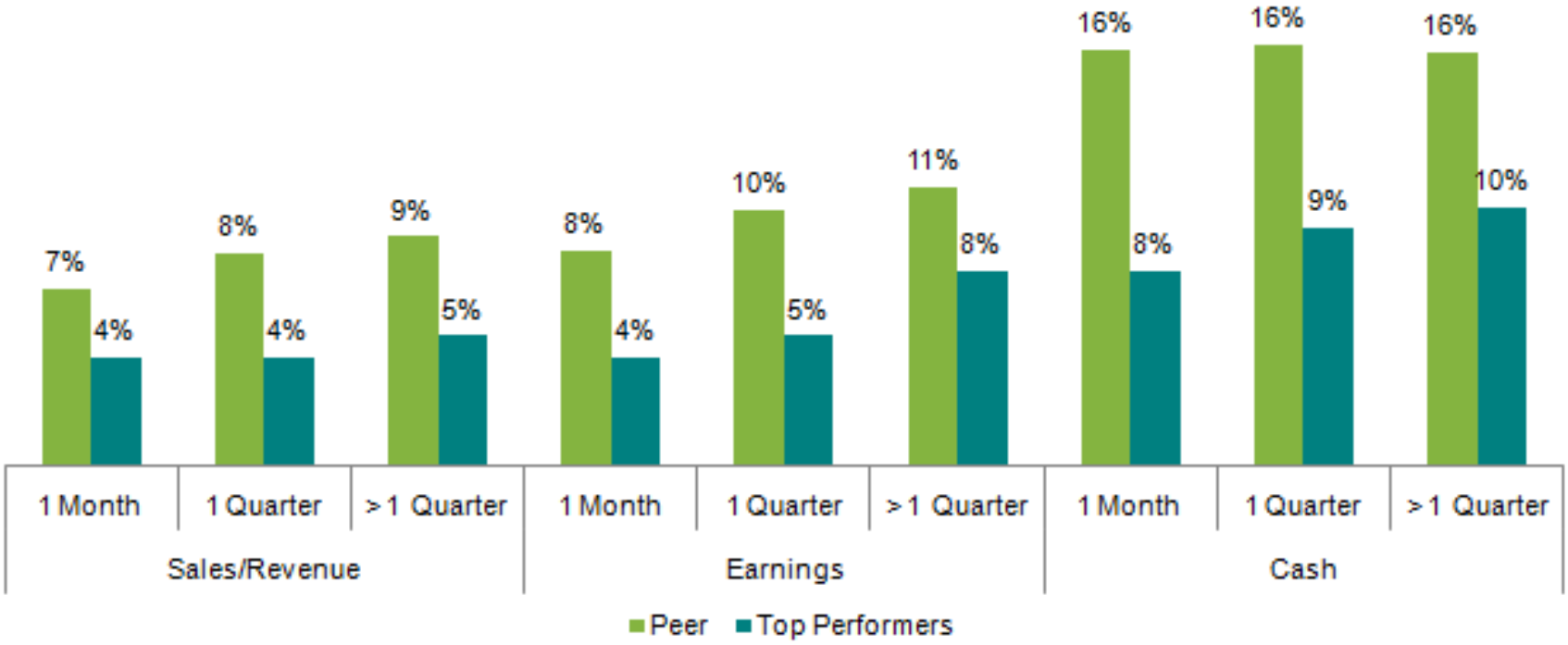


Fast-planning companies utilize a Rolling Forecast to reduce efforts and improve quality in budgeting

Utilization of a Rolling Forecast * and impact on cycle time



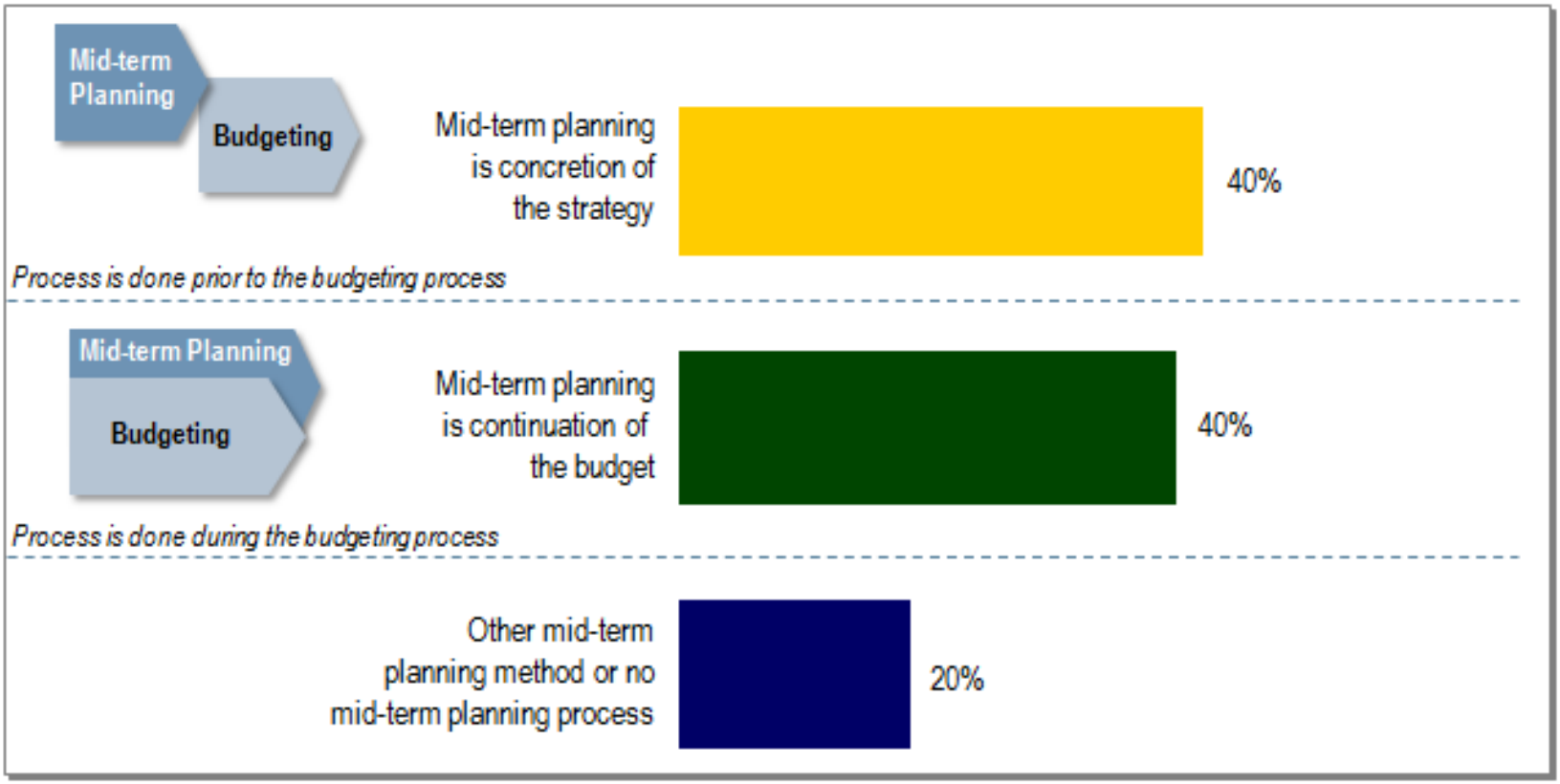
Top Performers have shorter cycle times and are almost twice as accurate that Peers according to Hackett 2011 – Global EPM Study



- Accuracy of forecasts of top performers is about twice higher than of peers
- Cash is by far the least accurately forecasted financial parameter, sales / revenue the most, and earnings in between
- Difference between short term and longer term forecasting accuracy is relatively small, with the exception of earnings

Two different approaches are widely used in mid-term operating planning

Mid-term Operating Planning Approaches used by Surveyed Companies



Finally
Future of Finance Departments?

The changing role of the finance function

- Faculty of Finance & Management, ICAEW
- October 2003 – survey of members
- ‘How will the finance function within business change over the next five years?’
- 567 responses

Qualities and skills sought in finance personnel



Other results from the survey

- A trend towards outsourcing
- A move away from standard finance processes and towards strategy and business development
- Corporate governance came across as a major concern
- The drive to identify value is a continuing trend
- Accountants as Business Partners – support business units to deliver

ENRON

Collapsed 2nd December, 2001, destroying $60bn in market value

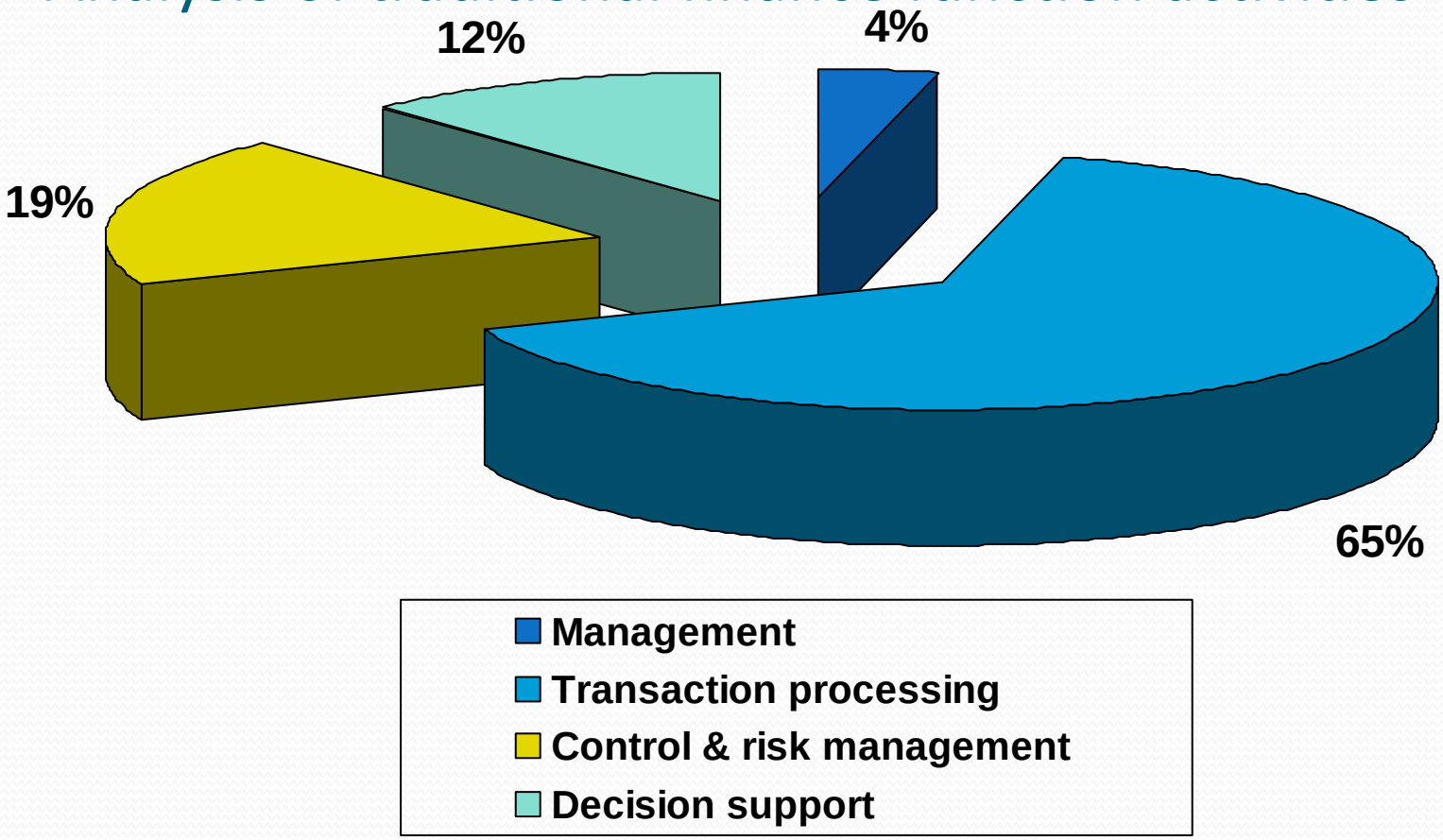
Year 2000 accounts reveal:

96% of reported net income and 105% of reported funds flow were attributed to accounting violations

Debt reported as $10bn v. $22bn actual

Source - Malcolm Salter, Harvard Business School

Analysis of traditional finance function activities

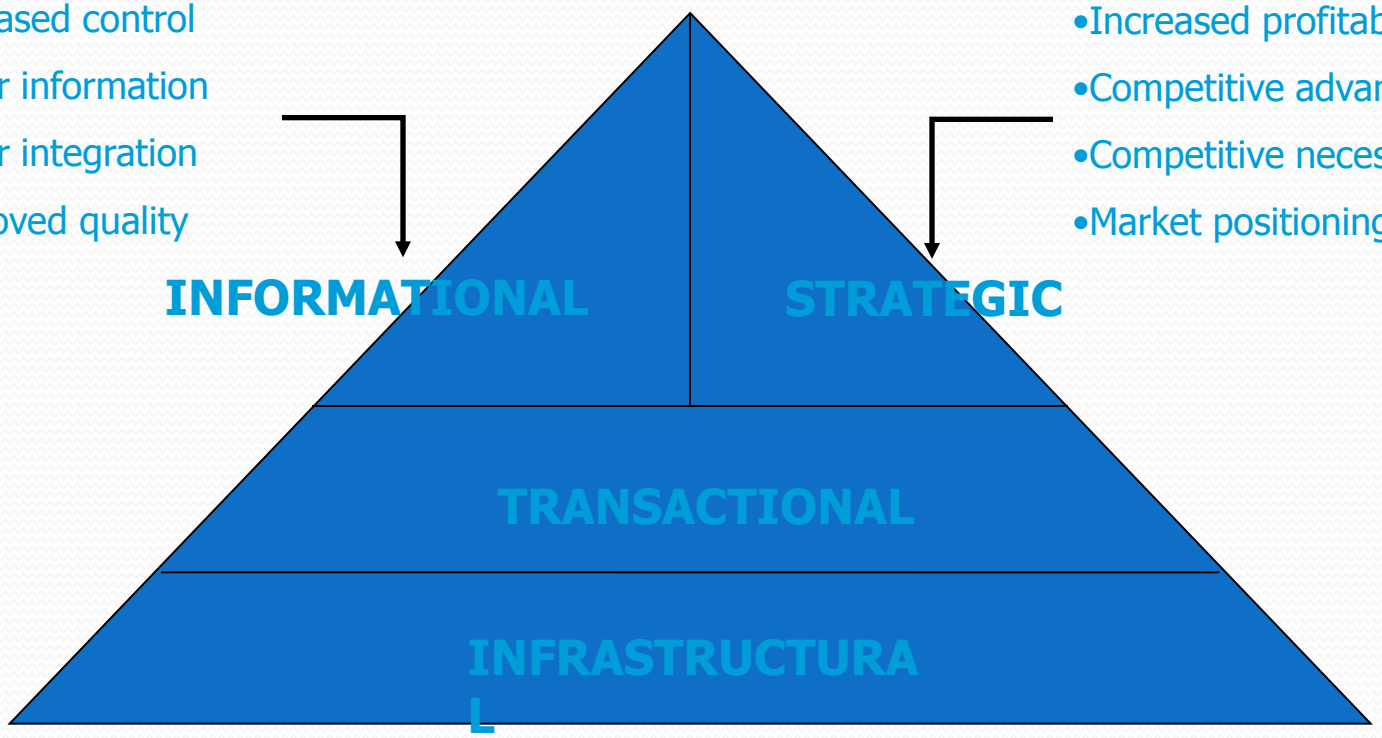


Source: Redesigning the finance function, CMA, 1999

Management objectives for finance function redesign

- Increased control
- Better information
- Better integration
- Improved quality

- Increased profitability
- Competitive advantage
- Competitive necessity
- Market positioning



Source: Redesigning the finance function, CMA, 1999

ICAEW – 2005 business member survey

FINANCE DEVELOPMENT NEEDS	Budgeting
	Financial Modelling & Forecasting
	Finance Function Effectiveness
	Financial Management
	Performance Measurement/Management
	Management Accounting
	Financial Reporting (inc IFRS)
MANAGEMENT DEVELOPMENT NEEDS	Managing People & Teams
	Strategic Planning
	Personal Skills
	Risk Management

- The changing role of finance – the need to ‘add value’
- ***Measuring value performance***
- Adding value with forecasting
- Adding value with ‘Beyond Budgeting’
- Adding value with the Balanced Scorecard

Final Review & Questions



Thank You

