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WARREN | TAYLER 16

MANAGERIAL Accounting

The Basics

Accounting Equation:

Assets = Liabilities + Stockholders' Equity

T Account:

Account Title	
Left side	Right side
debit	credit

Rules of Debit and Credit, Normal Balances:

Balance Sheet Accounts

ASSETS = LIABILITIES + STOCKHOLDERS' EQUITY							
Asset Accounts		**Liability Accounts**		**Common Stock**		**Retained Earnings**	
Debit for increases (+)	Credit for decreases (–)	Debit for decreases (–)	Credit for increases (+)	Debit for decreases (–)	Credit for increases (+)	Debit for decreases (–)	Credit for increases (+)
Balance			Balance		Balance		Balance

Dividends		Income Statement Accounts	
		Revenue Accounts	
Debit for increases (+)	Credit for decreases (–)	Debit for decreases (–)	Credit for increases (+)
Balance			Balance
		Expense Accounts	
		Debit for increases (+)	Credit for decreases (–)
		Balance	

The side of the account for recording increases and the normal balance is shaded.

Analyzing and Journalizing Transactions:

1. Carefully read the description of the transaction to determine whether an asset, liability, common stock, retained earnings, revenue, expense, or dividends account is affected.
2. For each account affected by the transaction, determine whether the account increases or decreases.
3. Determine whether each increase or decrease should be recorded as a debit or a credit, following the rules of debit and credit.
4. Record the transaction using a journal entry.
5. Periodically post journal entries to the accounts in the ledger.
6. Prepare an unadjusted trial balance at the end of the period.

Financial Statements:

- **Income statement:** A summary of the revenue and expenses for a specific period of time, such as a month or a year.
- **Statement of stockholders' equity:** A summary of the changes in stockholders' equity that have occurred during a specific period of time, such as a month or a year.
- **Balance sheet:** A list of the assets, liabilities, and stockholders' equity as of a specific date, usually at the close of the last day of a month or a year.
- **Statement of cash flows:** A summary of the cash receipts and cash payments for a specific period of time, such as a month or a year.

Accounting Cycle:

1. Transactions are analyzed and recorded in the journal.
2. Transactions are posted to the ledger.
3. An unadjusted trial balance is prepared.
4. Adjustment data are assembled and analyzed.
5. An optional end-of-period spreadsheet is prepared.
6. Adjusting entries are journalized and posted to the ledger.
7. An adjusted trial balance is prepared.
8. Financial statements are prepared.
9. Closing entries are journalized and posted to the ledger.
10. A post-closing trial balance is prepared.

Types of Adjusting Entries:

- Accrued revenue (accrued asset)
- Accrued expense (accrued liability)
- Unearned revenue (deferred revenue)
- Prepaid expense (deferred expense)
- Depreciation expense

Each entry will always affect both a balance sheet account and an income statement account.

Closing Entries:

1. Revenue and expense account balances are transferred to the retained earnings account.
2. The balance of the dividends account is transferred to the retained earnings account.

Shipping Terms:

	FOB Shipping Point	FOB Destination
Ownership (title) passes to buyer when merchandise is.....	delivered to freight carrier	delivered to buyer
Freight costs are paid by.....	buyer	seller

Format for Bank Reconciliation:

Cash balance according to bank statement	$ XXX
Add: Deposits in transit	XXX
Deduct: Outstanding checks not paid by bank	(XXX)
Adjusted balance	$ XXX

Cash balance according to company's records	$ XXX
Add: Credit memos that have not been recorded (notes collected by bank)	XXX
Deduct: Debit memos that have not been recorded (NSF checks, service charges)	(XXX)
Adjusted balance	$ XXX

Inventory Costing Methods:

- First-In, First-Out (FIFO)
- Last-In, First-Out (LIFO)
- Weighted Average Cost

Interest Computations:

Interest = Face Amount (or Principal) × Rate × Time

Methods of Determining Depreciation:

Straight-Line: $\frac{\text{Cost} - \text{Estimated Residual Value}}{\text{Estimated Life}}$

Units-of-Activity: $\frac{\text{Cost} - \text{Estimated Residual Value}}{\text{Total Estimated Units of Activity}} \times \text{Units of Activity}$

Double-Declining-Balance: Rate* × Book Value at Beginning of Period

*Rate is commonly twice the straight-line rate (1 ÷ Estimated Life).

Units-of-Activity Method:

Depreciation per Unit = $\frac{\text{Cost} - \text{Residual Value}}{\text{Total Estimated Units of Activity}}$

Depreciation Expense = Depreciation per Unit × Units of Activity for Period

Adjustments to Net Income (Loss) Using the Indirect Method:

Net income (loss)	$ XXX
Adjustments to reconcile net income (loss) to net cash flows from (used for) operating activities:	
Depreciation of fixed assets	XXX
Amortization of intangible assets	XXX
Losses on disposal of assets	XXX
Gains on disposal of assets	(XXX)
Changes in current operating assets and liabilities:	
Increases in noncash current operating assets	(XXX)
Decreases in noncash current operating assets	XXX
Increases in current operating liabilities	XXX
Decreases in current operating liabilities	(XXX)
Net cash flows from (used for) operating activities	$XXX

Subtract

- Increases in accounts receivable
- Increases in inventory
- Increases in prepaid expenses
- Decreases in accounts payable
- Decreases in accrued expenses payable
- Decreases in income taxes payable

Add

- Decreases in accounts receivable
- Decreases in inventory
- Decreases in prepaid expenses
- Increases in accounts payable
- Increases in accrued expenses payable
- Increases in income taxes payable

Contribution Margin Ratio = $\frac{\text{Sales} - \text{Variable Costs}}{\text{Sales}}$

Break-Even Sales (Units) = $\frac{\text{Fixed Costs}}{\text{Unit Contribution Margin}}$

Target Profit Sales (Units) = $\frac{\text{Fixed Costs} + \text{Target Profit}}{\text{Unit Contribution Margin}}$

Margin of Safety = $\frac{\text{Sales} - \text{Sales at Break-Even Point}}{\text{Sales}}$

Operating Leverage = $\frac{\text{Contribution Margin}}{\text{Operating Income}}$

Variances:

$$\text{Direct Materials Price Variance} = \left(\text{Actual Price} - \text{Standard Price}\right) \times \text{Actual Quantity}$$

$$\text{Direct Materials Quantity Variance} = \left(\text{Actual Quantity} - \text{Standard Quantity}\right) \times \text{Standard Price}$$

$$\text{Direct Labor Rate Variance} = \left(\text{Actual Rate per Hour} - \text{Standard Rate per Hour}\right) \times \text{Actual Hours}$$

$$\text{Direct Labor Time Variance} = \left(\text{Actual Direct Labor Hours} - \text{Standard Direct Labor Hours}\right) \times \text{Standard Rate per Hour}$$

$$\text{Variable Factory Overhead Controllable Variance} = \text{Actual Variable Factory Overhead} - \text{Budgeted Variable Factory Overhead}$$

$$\text{Fixed Factory Overhead Volume Variance} = \left(\text{Standard Hours for 100\% of Normal Capacity} - \text{Standard Hours for Actual Units Produced}\right) \times \text{Fixed Factory Overhead Rate}$$

Return on Investment (ROI) = $\frac{\text{Operating Income}}{\text{Invested Assets}}$

Alternative ROI Computation:

$$\text{ROI} = \frac{\text{Operating Income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Invested Assets}}$$

Capital Investment Analysis Methods:

Methods That Ignore Present Values:

- Average Rate of Return Method
- Cash Payback Method

Methods That Use Present Values:

- Net Present Value Method
- Internal Rate of Return Method

Average Rate of Return = $\frac{\text{Estimated Average Annual Income}}{\text{Average Investment}}$

Present Value Index = $\frac{\text{Total Present Value of Net Cash Flow}}{\text{Amount to Be Invested}}$

Present Value Factor for an Annuity of $1 = $\frac{\text{Amount to Be Invested}}{\text{Equal Annual Net Cash Flows}}$

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Managerial Accounting 16e

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Throughout this text, real-world companies are used in the narrative, illustrations, and end-of-chapter assignments. These companies are identified in boldface color type, and any data presented was adapted from or based upon annual reports, Securities and Exchange Commission filings, or other publicly available sources. Any other individuals or companies used in illustrations or homework are fictional, and any resemblance to actual persons, living or dead, businesses, or companies is entirely coincidental.

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Preface

Roadmap for Success

Warren/Tayler *Managerial Accounting, 16e*, provides a sound pedagogy for giving students a solid foundation in managerial accounting. Warren/Tayler covers the fundamentals AND motivates students to learn by showing how accounting is important to businesses.

Inclusivity

A major objective of Warren/Tayler *Managerial Accounting, 16e*, is to create an inclusive learning experience for all students that recognizes the wide diversity in student demographics, abilities, and experiences. This edition has been revised with a learner-centric approach that understands and acknowledges that a student's learning experience may be influenced by a variety of mental, sensory, and physical factors. As a result, this edition and its ancillaries have been designed to create an accessible learning experience for all students.

This edition also recognizes that students have unique backgrounds and perspectives. As a result, chapter content, illustrations, and homework are designed to be respectful and inclusive of differences in student race, ethnicity, sexual orientation, gender, religion, age, and culture. The authors welcome suggestions and comments on how to be even more inclusive in future editions.

Warren/Tayler is successful because it reaches students with a combination of new and tried-and-tested pedagogy.

New Features

This revision includes a range of new and existing features that help Warren/Tayler provide students with the context to see how accounting is valuable to their careers and business. These new features include:

- New! Updated schema at the beginning of each managerial chapter
- New! Using Data Analytics
- New! Take It Further data analytics cases
- New! Journal entries with T accounts
- New! Illustration of why accrual accounting is required by GAAP

Data Analytics

Using Data Analytics examples have been added to each chapter, which describe an application of data analytics related to each chapter's content.

Using Data Analytics

Joint Costs

Joint cost allocations highlight the importance of effective intercompany communication across departments, which data analytics can help improve. Using data analytic tools such as dashboards and automated reports, managers can receive real-time reports and information from other departments. For example, if a product requires work in three different departments, managers can monitor the progress of units as they are processed through each department and adjust their schedules and plans accordingly.

To illustrate, an *application programming interface (API)* is a data analytic interface where an application's methods and its data are available for intercompany use. The most common API can be accessed using the Internet and provides intercompany access in real time even though business units are spread across the world. This provides intercompany departments and teams the ability to coordinate data and work together across different countries and continents.

See TIF 5-4 for a homework assignment using data analytics.

Take It Further Data Analytics Cases

Take It Further data analytics cases have been added to several chapters. These TIF cases use a dataset related to the chapter content that requires a student to analyze and develop reports using Excel and Tableau. The chapters with TIF data analytics cases are as follows:

Chapter 1: Introduction to Managerial Accounting
- TIF 1-7 "Cost analyses" (Excel application)

Chapter 2: Job Order Costing
- TIF 2-6 "Job order costing" (Excel application)

Chapter 5: Support Department and Joint Cost Allocation
- TIF 5-4: "Joint cost allocation" (Tableau application)

Chapter 6: Cost-Volume-Profit Analysis
- TIF 6-7 "Cost behavior" (Excel application)

Chapter 8: Budgeting
- TIF 8-7 "Budgeting" (Excel application)

Chapter 9: Evaluating Variances from Standard Costs
- TIF 9-4 "Cost variances" (Excel application)

Chapter 11: Differential Analysis and Product Pricing
- TIF 11-7: "Make-or-buy decision" (Tableau application)

The following is the data analytics case for Chapter 2.

TIF 2-6 Data Analytics: Job order costing

Panhandle Supply is a provider of industrial supplies located in Northwest Florida. In addition to its business as a distributor of branded supply products, Panhandle Supply also manufactures a relatively small quantity of compressed gas containers (tanks) for both food and beverage use as well as welding supplies. In the past, Panhandle Supply has estimated costs but would like to have a better understanding of the true unit cost of each type of tank. You have been hired as a management accounting consultant and provided with one year's worth of production data. Using the provided dataset, you have been asked to produce the following:

1. A table with cost per unit by job
2. Additional comments and suggestions

Go to CNOWv2 to complete this assignment.

Journal Entries with T Accounts

T accounts with debit and credit postings are included with journal entries throughout *Managerial Accounting, 16e*. The accounting equation and T accounts are shown in a smaller font so that the presentation is still focused on the journal entry. That is, the presentation is designed to subtly reinforce student learning without detracting from a journal entry focus.

Examples of this new presentation follow:

Purchase of $9,250 of inventory on account.

Inventory	9,250	
Accounts Payable—Thomas Corporation		9,250
Purchased inventory on account.		

Assets = Liabilities + Stockholders' Equity

Inventory		Accounts Payable	
9,250			9,250

Discarding of fully depreciated equipment.

Accumulated Depreciation—Equipment	4,800	
Loss on Disposal of Equipment	1,200	
Equipment		6,000
To write off equipment discarded.		

Assets = Liabilities + Stockholders' Equity

Equipment		Accumulated Depreciation		Loss on Disposal of Equipment	
6,000			4,800	1,200	

Issuance of preferred stock and common stock at par value for cash.

Cash	1,500,000	
Preferred Stock		500,000
Common Stock		1,000,000
Issued preferred stock and common stock at par for cash.		

Assets = Liabilities + Stockholders' Equity

Cash		Preferred Stock		Common Stock	
1,500,000			500,000		1,000,000

The preceding presentation has the following pedagogical advantages:

- Students can see the impact of the journal entry on the elements of the accounting equation.
- Students can see the impact of the journal entry on the financial statements.
  - The impact on the balance sheet is shown by the accounting equation.
  - The impact on the income statement is shown by revenue and expense T accounts under Stockholders' Equity.
  - The impact on the statement of stockholders' equity is shown by common stock, retained earnings, and dividend T accounts under Stockholders' Equity.
  - The impact on the statement of cash flows is shown by the cash T account under Assets.
- The presentation reinforces the rules of debits and credits.
- The accounting equation is illustrated as the foundation (framework) for all financial accounting systems.
- The presentation is consistent with today's accounting systems where posting to accounts is often done at the same time journal entries are recorded.

Existing Features

Warren/Tayler also includes a thorough grounding in the fundamentals that any business student will need to be successful. These key features include:

- Stepwise approach to accounting cycle
- Presentation style designed around the way students learn
- A Schema, or roadmap, at the start of each chapter
- Links to the Opening Company
- Pathways Challenges
- Business Insights
- Check Up Corners
- Analysis for Decision Making
- Make a Decision

Schema

At the start of each chapter, **an updated schema, or roadmap, shows students what they are going to learn and how it is connected to the larger picture**. In the early chapters, the schema illustrates how the steps in the accounting cycle are interrelated. In later financial chapters, the schema shows how each chapter's topics are connected to the financial statements. The schema for the managerial chapters illustrates how the chapter content lays the foundation with managerial concepts and principles. Then it moves students through developing the information and ultimately into evaluating and analyzing information in order to make decisions.

Caterpillar Inc.

Have you ever wondered why large retail stores like **Walmart (WMT)**, **Target (TGT)**, and **Kohl's (KSS)** are divided into departments? Organizing into departments allows retailers to provide products and expertise in specialized areas while offering a wide range of products. Departments also allow companies to assign responsibility for financial performance. This information can be used to make product decisions, evaluate operations, and guide company strategy. Strong departmental performance might be attributable to a good department manager, while weak departmental performance may be the result of a product mix that has low customer appeal. By tracking departmental performance, companies can identify and reward excellent performance and take corrective action in departments that are performing poorly.

Like retailers, most businesses organize into operational units, such as divisions and departments. For example, **Caterpillar Inc. (CAT)** manufactures a variety of equipment and machinery and is organized into a number of different segments, including Construction Industries, Resource Industries, Energy & Transportation, and Financial Products. The Construction Industries segment manufactures construction equipment such as tractors, dump trucks, and loaders. The Resource Industries segment makes equipment for the mining industry, such as off-highway and mining trucks. The Energy & Transportation segment manufactures equipment that is used to generate power, such as engines and turbines for power plants and railroads. The Financial Products segment provides financing for Caterpillar products to customers and dealers.

Managers at Caterpillar Inc. are responsible for running their business segment. Each segment is evaluated on segment profit, which excludes certain expense items from the computation of profit that are not within the control of the business segment. The company uses segment profit to determine how to allocate resources between business segments and to plan and control the company's operations.

In this chapter, the role of accounting in assisting managers in planning and controlling organizational units, such as departments, divisions, and stores, is described and illustrated.

Source: www.caterpillar.com.

Link to Caterpillar. . . . . Pages 471, 472, 473, 476, 480, 481, 483, 487

Caterpillar uses a decentralized network of over a thousand dealers to sell its products. *Link to Caterpillar*

Link to Opening Company

Link to the "opening company" of each chapter calls out examples of how the concepts introduced in the chapter are connected to the opening company. **This shows how accounting is used in the real world by real companies.**

When a real-world company is first mentioned, its stock (ticker) symbol is shown in parentheses. Doing so facilitates students' ability to access additional information about the company, including its stock price and website.

Pathways Challenges

Pathways Challenge encourages students' interest in accounting and emphasizes the critical thinking aspect of accounting. A suggested answer to the Pathways Challenge is provided at the end of the chapter.

Pathways Challenge

This is Accounting!

Economic Activity

A modern management theory entitled "organizational architecture" addresses the complexity of measuring and evaluating employee performance. The theory has the following three components:

- Decision rights: How companies delegate decisions (decentralized or centralized decision making).
- Performance measure: How companies measure employee performance.
- Incentives: How companies encourage employees to act in ways benefiting the company.

The preceding three components make up three "legs" of the organizational architecture "stool." As the length of one leg of the stool is adjusted (for example, by decentralizing an organization), the other legs must also be adjusted or the organization will be out of balance.

To illustrate, a plane of a major U.S. airline was grounded in the afternoon and needed repairs, but the closest qualified mechanic was at an airport in another city. The mechanic's repair supervisor refused to send the mechanic to do the repair that afternoon, because the mechanic would probably incur a hotel charge. The charge would have to be paid for out of the supervisor's budget. Instead, the supervisor waited until early the next morning to send the mechanic thus avoiding a hotel charge. As a result, the airline lost tens of thousands of dollars in revenues while the plane sat idle, waiting for repairs.

Critical Thinking/Judgment

Were the three legs of the organizational architecture stool out of balance?
How were the repairs decision rights delegated to repair supervisors (centralized or decentralized)?
Assess the performance measurement and incentives of the repair supervisor.
What could be done to correct this situation?

Sources: M. Hammer and J. Champy, *Reengineering the Corporation*, Harper Business, New York, NY, 1993; J. Brickley, C. Smith, and J. Zimmerman, *Managerial Economics and Organizational Architecture*, McGraw Hill/Irwin, New York, NY, 2007.

Suggested answer at end of chapter.

Pathways Challenge

This is Accounting!

Information/Consequences

Yes, the three legs of the organizational architecture stool were out of balance. As a result, the airline lost tens of thousands of dollars in revenues.

Decision rights regarding repair work were delegated (decentralized) to repair supervisors at airports.

Performance measurement of repair supervisors was based (in part) on their ability to stay within the budget, which could affect their performance reviews, promotions, and pay raises. Thus, the repair supervisor had incentives to do something that was bad for the overall airline.

The airline could change (rebalance) the organizational architecture in several ways. First, the airline could centralize the decision rights regarding mechanic assignments. Second, the airline could keep the decision rights delegated, but give repair supervisors incentives based (in part) on minimizing plane downtime. Third, the airline could allow repair supervisors to "write off" costs of repair work done at other airports, transferring these costs to top management or to the airport where repairs were needed.

Suggested Answer

Business Insights

Located in each chapter, **Business Insight** shows students how accounting is important to businesses with which they are familiar.

Business Insight

Support Department Cost Allocation at Emory University

Service businesses like colleges and universities use support department allocation methods to cost their various departments. Some departments, like individual schools within a university, have profit and loss statements and are expected to at least make enough revenue to cover their own costs (break even) each year. Other departments do not generate revenues from tuition, but incur costs to serve the revenue-generating schools. Thus, the costs from these support departments are allocated to the schools within the university.

At **Emory University**, a private research university in Atlanta, Georgia, costs from university-wide departments, such as Campus Services and the WorkLife Resource Center, are allocated to individual schools within the university, such as the Goizueta Business School. Among other things, Campus Services provides building maintenance, custodial services, and interior design assistance to the university. Because much of these costs are difficult to directly trace to individual schools, the costs are instead allocated using support department cost allocation methods.

Check Up Corners

To aid learning and problem solving, throughout each chapter **Check Up Corners** provide students with step-by-step guidance on how to solve problems. Problem-solving tips help students avoid common errors.

Check Up Corner 5-1 Direct Method of Support Department Cost Allocation

Support Department 1 has $200,000 in costs distributed to it. Costs from Support Department 1 will be allocated to other departments based on labor hours. Support Department 2 uses 50 labor hours from Support Department 1, Production Department 1 uses 75 labor hours from Support Department 1, and Production Department 2 uses 25 labor hours from Support Department 1.

a. Using the direct method for support department cost allocation, how much of Support Department 1's costs will be allocated to Support Department 2?

b. Using the direct method for support department cost allocation, how much of Support Department 1's costs will be allocated to Production Department 1?

c. Using the direct method for support department cost allocation, how much of Support Department 1's costs will be allocated to Production Department 2?

Solution:

a. Because the direct method is used, all support department costs are allocated directly to the production departments. None of Support Department 1's costs are allocated to Support Department 2.

b. Note that, because no costs are allocated from Support Department 1 to Support Department 2, the number of Support Department 1 labor hours used by Support Department 2 is irrelevant.

Production Department 1 uses 75% of Support Department 1's labor hours (only considering the usage among departments to which Support Department 1's costs will be allocated), computed as follows:

$$\frac{75}{75+25} = 75\%$$

Costs are allocated from Support Department 1 to Production Department 1 by multiplying the $200,000 Support Department 1 costs by Production Department 1's proportional usage of Support Department 1 labor hours. Thus, allocated costs are $200,000 × 75% = $150,000.

c. Production Department 2 uses 25% of Support Department 1's labor hours (only considering the usage among departments to which Support Department 1's costs will be allocated), computed as follows:

$$\frac{25}{75+25} = 25\%$$

Costs are allocated from Support Department 1 to Production Department 2 by multiplying the $200,000 Support Department 1 costs by Production Department 2's proportional usage of Support Department 1 labor hours. Thus, allocated costs are $200,000 × 25% = $50,000.

Check Up Corner

Analysis for Decision Making

Analysis for Decision Making highlights how companies use accounting information to make decisions and evaluate their business. This provides students with context of why accounting is important to companies.

Analysis for Decision Making

Objective 4
Describe the use of job order costing information for decision making.

Analyzing Job Costs

Job order costing accumulates and records product costs by jobs. The resulting total and unit product costs can be compared to similar jobs, compared over time, or compared to expected costs. In this way, job order costing can be used by managers for evaluating and controlling costs.

To illustrate, Exhibit 12 shows the direct materials used for Jobs 54 and 63 for **Legend Guitars**. The wood used in manufacturing guitars is measured in board feet. Because Jobs 54 and 63 produced the same type and number of guitars, the direct materials cost per unit should be about the same. However, the materials cost per guitar for Job 54 is $100, while for Job 63 it is $125. Thus, the materials costs are significantly more for Job 63.

The job cost sheets shown in Exhibit 12 can be analyzed for possible reasons for the increased materials cost for Job 63. Because the materials price did not change ($10 per board foot), the increased materials cost must be related to the wood used.

Exhibit 12
Comparing Data from Job Cost Sheets

Job 54
Item: 40 Jazz Series guitars

	Materials Quantity (board feet)	Materials Price	Materials Amount
Direct materials:			
No. 8 Wood—Maple	400	$10.00	$4,000
Direct materials per guitar			$ 100*

*$4,000 ÷ 40

Job 63
Item: 40 Jazz Series guitars

	Materials Quantity (board feet)	Materials Price	Materials Amount
Direct materials:			
No. 8 Wood—Maple	500	$10.00	$5,000
Direct materials per guitar			$ 125*

*$5,000 ÷ 40

Make a Decision

Make a Decision in the end-of-chapter material gives students a chance to analyze real-world business decisions.

MAD 2-2 Analyze Alvarez Manufacturing Inc.'s job costs **Obj. 4**

Alvarez Manufacturing Inc. is a job shop. The management of Alvarez Manufacturing Inc. uses the cost information from the job sheets to assess cost performance. Information on the total cost, product type, and quantity of items produced is as follows:

Date	Job No.	Product	Quantity	Amount
Jan. 2	1	TT	520	$16,120
Jan. 15	22	SS	1,610	20,125
Feb. 3	30	SS	1,420	25,560
Mar. 7	41	TT	670	15,075
Mar. 24	49	SLK	2,210	22,100
May 19	58	SLK	2,550	31,875
June 12	65	TT	620	10,540
Aug. 18	78	SLK	3,110	48,205
Sept. 2	82	SS	1,210	16,940
Nov. 14	92	TT	750	8,250
Dec. 12	98	SLK	2,700	52,650

a. Develop a graph for *each* product (three graphs), with Job Number (in date order) on the horizontal axis and Unit Cost on the vertical axis. Use this information to determine Alvarez Manufacturing Inc.'s cost performance over time for the three products.

b. What additional information would you require in order to investigate Alvarez Manufacturing Inc.'s cost performance more precisely?

Student Learning Aids

This edition includes a variety of student learning aids in addition to the Check Up Corners, including the following:

- At the end of each chapter, **Let's Review** is a new chapter summary and self-assessment feature that is designed to help busy students prepare for an exam. It includes a summary of each learning objective's key points, key terms, multiple-choice questions, exercises, and a sample problem that students may use to practice.
- Sample multiple-choice questions allow students to practice with the type of assessments they are likely to see on an exam.
- Short exercises and a longer problem allow students to apply their knowledge.
- **Answers** provided at the end of the Let's Review section let students check their knowledge immediately.
- **Take It Further** in the end-of-chapter activities allows instructors to assign other special activities related to ethics, communication, and teamwork.
- **Certified Management Accountant (CMA®) Examination Questions** help students prepare for the CMA exam so they can earn CMA certification.

CNOWv2

CNOWv2 is a powerful course management and online homework resource that provides control and customization to optimize the student learning experience. Included are many proven resources, such as algorithmic activities, a test bank, course management tools, reporting and assessment options, and much more.

Excel Online

Cengage and Microsoft have partnered in CNOWv2 to provide students with a uniform, authentic Excel experience. It provides instant feedback, built-in video tips, and easily accessible spreadsheet work. These features allow you to spend more time teaching college accounting applications and less time troubleshooting Excel.

These new algorithmic activities offer pre-populated data directly in Microsoft Excel Online. Students receive their own version of the problem to perform the necessary data calculations in Excel Online. Their work is constantly saved in Cengage cloud storage as a part of homework assignments in CNOWv2. It's easily retrievable so students can review their answers without cumbersome file management and numerous downloads/uploads.

Motivation: Set Expectations and Prepare Students for the Course

CNOWv2 helps motivate students and get them ready to learn by reshaping their misconceptions about the introductory accounting course and providing a powerful tool to engage students.

CNOWv2 Start-Up Center

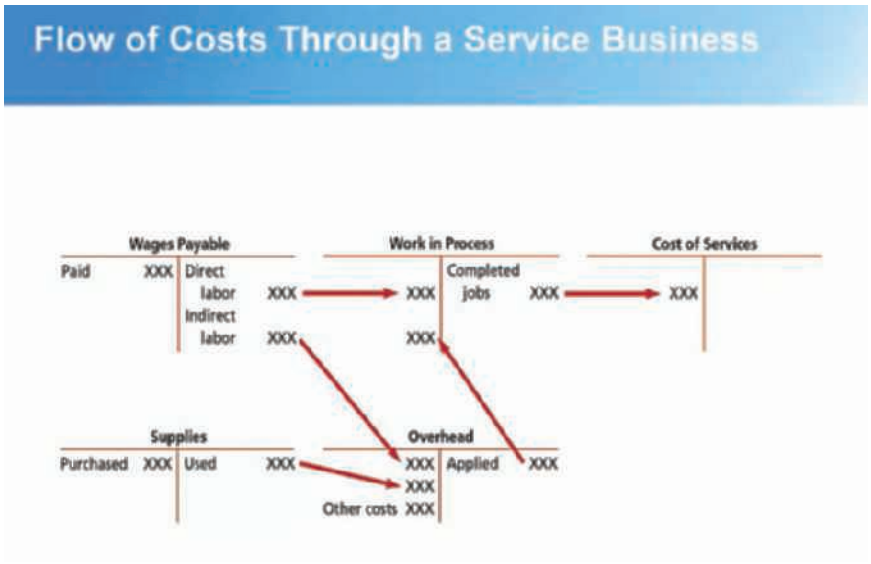
Students are often surprised by the amount of time they need to spend outside of class working through homework assignments in order to succeed. The CNOWv2 Start-Up Center will help students identify what they need to do and where they need to focus in order to be successful with a variety of new resources.

- What Is Accounting? Module ensures students understand course expectations and how to be successful in the introductory accounting course. This module consists of two assignable videos: *Introduction to Accounting* and *Success Strategies*. The Student Advice Videos offer advice from real students about what it takes to do well in the course.
- Math Review Module, designed to help students get up to speed with necessary math skills, includes math review assignments and Show Me How math review videos to ensure that students have an understanding of basic math skills.
- How to Use CNOWv2 Module focuses on learning accounting, not on a particular software system. Quickly familiarize your students with CNOWv2 and direct them to all of its built-in student resources.

Motivation: Prepare Them for Class

With all the outside obligations accounting students have, finding time to read the textbook before class can be a struggle. Point students to the key concepts they need to know before they attend class.

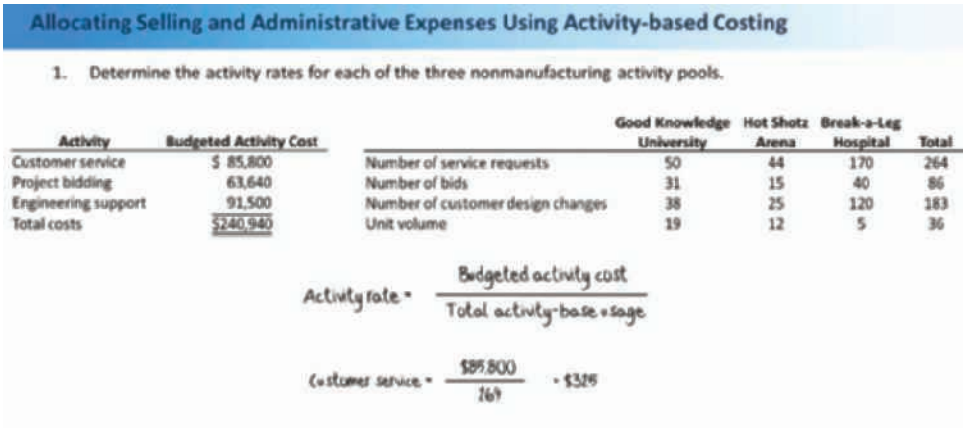
- **Video: Tell Me More.** Short Tell Me More lecture activities explain the core concepts of the chapter through an engaging auditory and visual presentation. Available either on a stand-alone basis or as an assignment, they are ideal for all class formats—flipped model, online, hybrid, or face-to-face.



Provide Help Right When Students Need It

The best way to learn accounting is through practice, but students often get stuck when attempting homework assignments on their own.

- **Video: Show Me How.** Created for the most frequently assigned end-of-chapter items, Show Me How problem demonstration videos provide a step-by-step model of a similar problem. Embedded tips help students avoid common mistakes and pitfalls.



SHOW ME HOW

Help Students Go Beyond Memorization to True Understanding

Students often struggle to understand how concepts relate to one another. For most students, an introductory accounting course is their first exposure to both business transactions and the accounting system. While these concepts are already difficult to master individually, their combination and interdependency in the introductory accounting course often pose a challenge for students.

- **Mastery Problems.** Mastery Problems enable you to assign problems and activities designed to test students' comprehension and mastery of difficult concepts.

MindTap eReader

The MindTap eReader for Warren/Tayler's *Managerial Accounting* is the most robust digital reading experience available. Hallmark features include:

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- Note taking, highlighting, and more.
- Embedded digital media.
- The MindTap eReader also features ReadSpeaker®, an online text-to-speech application that vocalizes, or "speech-enables," online educational content. This feature is ideally suited for both instructors and learners who would like to listen to content instead of (or in addition to) reading it.

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New Appendix

A new end-of-text appendix has been added to this edition.

Appendix B: Nike Annual Report (10-K). This appendix includes excerpts from a recent Nike annual report (10-K). New to this appendix are student assignments for each chapter. An instructor could use all of the chapter assignments as an "annual report" project. The annual report assignments are referenced at the end of each chapter following the Take It Further section.

Chapter Changes and Improvements

The following chapter changes and improvements have been made in this edition:

Chapter 1

- The sections covering the management process and the role of managerial accounting have received a significant rewrite, emphasizing the four basic functions of strategic planning, measurement, evaluation, and control.
- Exhibit 15 on the flow of manufacturing costs has been reworked.
- A new Business Insight box titled "Managerial Accounting and Ordering at Subway" has been added.

Chapter 2

- The chapter has been updated with terminology changes: "job order cost system" to "job order costing" and "process cost system" to "process costing."

Chapter 3

- The chapter has been updated with terminology changes: "job order cost system" to "job order costing" and "process cost system" to "process costing."
- Exhibit 1 has been updated with new examples of job order companies.
- The Business Insight box titled "Fill 'Er Up" has been updated and rewritten.

Chapter 4

- Significant numeric adjustments have been made throughout to add clarity to the running examples.

Chapter 5

- The coverage on the reciprocal services method has been moved to a chapter appendix.

Chapter 6

- The coverage on cost-volume-profit relationships has been revised and simplified.
- The coverage on sales mix considerations has been updated with a terminology change: one overall enterprise product "E" to one overall company product "M."

Chapter 7

- A new Business Insight box titled "Throughput Costing" has been added.
- The coverage on analyzing market segments has been revised and simplified.
- Real-world company examples have been updated.

Chapter 8

- The coverage on the objectives of budgeting has been rewritten to tie into the four basic functions of the management process: strategic planning, measurement, evaluation, and control.
- Clarification on the cash budget has been added.
- New terminology additions include incremental budgeting, participative budgeting, and multiperiod budgeting.
- A new end-of-chapter appendix has been added: Multiperiod Budgeting.

Chapters 10, 11, and 12

- Many significant updates around real-world company examples have been made.

Chapter 13

- The coverage on just-in-time (lean) accounting principles has been updated and clarified, including the effects of the COVID-19 pandemic on lean practices.
- A new Business Insight box entitled "'Not' So Just-in-Time (Lean) Manufacturing" has been added.
- A new problem on supply chain disruptions has been added.
- Pareto chart coverage has been removed.

Chapter 14

- The Business Insight box titled "Sustainable Papermaking" has received significant updates based on International Paper Company's sustainability strategic objectives and associated performance metrics and targets.

Acknowledgements

The many enhancements to this edition of *Managerial Accounting* are the direct result of reviews, surveys, and focus groups with instructors at institutions across the country. We would like to take this opportunity to thank those who have helped us better understand the challenge of the financial accounting course and provided valuable feedback on our content and digital assets.

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Brief Contents

1 Introduction to Managerial Accounting 2
2 Job Order Costing 48
3 Process Costing 96
4 Activity-Based Costing 152
5 Support Department and Joint Cost Allocation 206
6 Cost-Volume-Profit Analysis 252
7 Variable Costing for Management Analysis 306
8 Budgeting 354
9 Evaluating Variances from Standard Costs 418
10 Evaluating Decentralized Operations 468
11 Differential Analysis and Product Pricing 518
12 Capital Investment Analysis 572
13 Lean Manufacturing and Activity Analysis 620
14 The Balanced Scorecard and Corporate Social Responsibility 662
15 Statement of Cash Flows 706
16 Financial Statement Analysis 766
Appendix A Interest Tables A-2
Appendix B Nike Inc., Form 10-K for the Fiscal Year Ended May 31, 2020 Selected Excerpts B-1
Appendix C Computing Present Values (online) C-1
Glossary G-1
Index I-1

Contents

1 Introduction to Managerial Accounting 2

Managerial Accounting 4
- The Management Process 4
- The Role of Managerial Accounting 5
- Differences Between Financial and Managerial Accounting 7
- Managerial Accounting within the Organization 9

Manufacturing Operations 12
- Nature of Manufacturing 12
- Direct and Indirect Costs 12
- Manufacturing Costs 13

Financial Statements for a Manufacturing Business 18
- Balance Sheet 18
- Income Statement 19

Analysis for Decision Making 22
- Utilization Rates 22

Make a Decision 42

Take It Further 44

Certified Management Accountant (CMA®) Examination Questions (Adapted) 47

Pathways Challenge 14, 47

2 Job Order Costing 48

Cost Systems Overview 50
- Job Order Costing 50
- Process Costing 50
- Hybrid Costing 50

Job Order Costing for Manufacturing Businesses 51
- Materials 52
- Factory Labor 54
- Factory Overhead 55
- Work in Process 62
- Finished Goods 63
- Sales and Cost of Goods Sold 63
- Period Costs 64
- Summary of Cost Flows for Legend Guitars 64

Job Order Costing for Service Businesses 66
- Types of Service Businesses 66
- Flow of Costs in a Service Business Using Job Order Costing 67

Analysis for Decision Making 68
- Analyzing Job Costs 68

Make a Decision 88

Take It Further 91

Certified Management Accountant (CMA®) Examination Questions (Adapted) 94

Pathways Challenge 61, 95

3 Process Costing 96

Process Manufacturers 98
- Comparing Job Order Costing and Process Costing 99
- Cost Flows for a Process Manufacturer 100

Cost of Production Report 103
- Step 1: Determine the Units to Be Assigned Costs 104
- Step 2: Compute Equivalent Units of Production 104
- Step 3: Determine the Cost per Equivalent Unit 108
- Step 4: Allocate Costs to Units Transferred Out and Partially Completed Units 109
- Preparing the Cost of Production Report 111

Journal Entries for Process Costing 114

Using the Cost of Production Report 118

Analysis for Decision Making 119
- Analyzing Process Costs 119

Appendix Weighted Average Method 120
- Determining Costs Using the Weighted Average Method 120
- The Cost of Production Report 122

Make a Decision 144

Take It Further 147

Certified Management Accountant (CMA®) Examination Questions (Adapted) 149

Pathways Challenge 114, 151

4 Activity-Based Costing 152

Product Costing Allocation Methods 154

Single Plantwide Factory Overhead Rate Method 155

Multiple Production Department Factory Overhead Rate Method 157
- Department Overhead Rates and Allocation 158
- Distortion of Product Costs 159

Activity-Based Costing Method 162
- Activity Rates 164
- Allocating Costs 165
- Distortion in Product Costs 167
- Dangers of Product Cost Distortion 167

Activity-Based Costing for Selling and Administrative Expenses 169

Activity-Based Costing in Service Businesses 170

Analysis for Decision Making 175
Using ABC Product Cost Information to Reduce Costs 175

Make a Decision 201

Take It Further 203

Certified Management Accountant (CMA®) Examination Questions (Adapted) 204

Pathways Challenge 173, 205

5 Support Department and Joint Cost Allocation 206

Support Departments 208

Support Department Cost Allocation 209
Single Plantwide Rate 210
Multiple Production Department Rates 210
Activity-Based Costing 211

Allocating Support Department Costs to Production Departments 212
Direct Method 213
The Sequential Method 215
Comparison of Support Department Cost Allocation Methods 219

Joint Costs 220

Joint Cost Allocation 220
The Physical Units Method 220
The Weighted Average Method 221
The Market Value at Split-Off Method 221
The Net Realizable Value Method 222
Comparison of Joint Cost Allocation Methods 224
By-Products 225

Analysis for Decision Making 226
Using Support Department and Joint Cost Allocations for Performance Evaluation 226

Appendix Reciprocal Services Method 227

Make a Decision 246

Take It Further 248

Certified Management Accountant (CMA®) Examination Questions (Adapted) 250

Pathways Challenge 219, 251

6 Cost-Volume-Profit Analysis 252

Cost Behavior 254
Variable Costs 255
Fixed Costs 256
Mixed Costs 258
Summary of Cost Behavior Concepts 260

Cost-Volume-Profit Relationships 262
Contribution Margin 262
Contribution Margin Ratio 262
Unit Contribution Margin 263

Mathematical Approach to Cost-Volume-Profit Analysis 264
Break-Even Point 264
Target Profit 269

Graphic Approach to Cost-Volume-Profit Analysis 270
Cost-Volume-Profit (Break-Even) Chart 270
Profit-Volume Chart 272
Use of Spreadsheets in Cost-Volume-Profit Analysis 273
Assumptions of Cost-Volume-Profit Analysis 274

Special Cost-Volume-Profit Relationships 276
Sales Mix Considerations 276
Operating Leverage 278
Margin of Safety 279

Analysis for Decision Making 281
Cost-Volume-Profit Analysis for Service Companies 281

Make a Decision 301

Take It Further 302

Certified Management Accountant (CMA®) Examination Questions (Adapted) 304

Pathways Challenge 260, 305

7 Variable Costing for Management Analysis 306

Operating Income: Absorption and Variable Costing 308
Absorption Costing 308
Variable Costing 309
Effects of Inventory 310

Analyzing Operating Income Using Absorption and Variable Costing 314

Using Absorption and Variable Costing 319
Controlling Costs 319
Pricing Products 319
Planning Production 320
Analyzing Market Segments 320

Analyzing Market Segments 320

Variable Costing for Service Businesses 323
Reporting Income 323
Analyzing Segments 324

Analysis for Decision Making 326
Segment Analysis and EBITDA 326

Make a Decision 348

Take It Further 350

Certified Management Accountant (CMA®) Examination Questions (Adapted) 351

Pathways Challenge 318, 352

8 Budgeting 354

Nature and Objectives of Budgeting 356
- Objectives of Budgeting 356
- Human Behavior and Budgeting 357

Budgeting Systems 358
- Static Budget 359
- Flexible Budget 360

Master Budget 362

Operating Budgets 363
- Sales Budget 363
- Production Budget 364
- Direct Materials Purchases Budget 365
- Direct Labor Cost Budget 366
- Factory Overhead Cost Budget 368
- Cost of Goods Sold Budget 368
- Selling and Administrative Expenses Budget 371
- Budgeted Income Statement 371

Financial Budgets 373
- Cash Budget 373
- Capital Expenditures Budget 378
- Budgeted Balance Sheet 378

Analysis for Decision Making 379
- Nonmanufacturing Staffing Budgets 379

Appendix Multiperiod Budgeting 380
- Sales Budget 380
- Production Budget 380
- Direct Materials Purchases Budget 381
- Direct Labor Cost Budget 382
- Factory Overhead Cost Budget 382
- Cost of Goods Sold Budget 383
- Selling and Administrative Expenses Budget 384
- Budgeted Income Statement 384

Make a Decision 412

Take It Further 413

Certified Management Accountant (CMA®) Examination Questions (Adapted) 416

Pathways Challenge 372, 417

9 Evaluating Variances from Standard Costs 418

Standards 420
- Setting Standards 420
- Types of Standards 421
- Reviewing and Revising Standards 421
- Criticisms of Standard Costs 421

Budgetary Performance Evaluation 422
- Budget Performance Report 423
- Manufacturing Cost Variances 423

Direct Materials and Direct Labor Variances 424
- Direct Materials Variances 425
- Direct Labor Variances 427

Factory Overhead Variances 430
- The Factory Overhead Flexible Budget 431
- Variable Factory Overhead Controllable Variance 432
- Fixed Factory Overhead Volume Variance 432
- Reporting Factory Overhead Variances 434
- Factory Overhead Account 435

Recording and Reporting Variances from Standards 438

Analysis for Decision Making 440
- Service Staffing Variances 440

Appendix Revenue Variances 441

Comprehensive Problem 5 461

Make a Decision 463

Take It Further 464

Certified Management Accountant (CMA®) Examination Questions (Adapted) 466

Pathways Challenge 426, 467

10 Evaluating Decentralized Operations 468

Centralized and Decentralized Operations 470
- Advantages of Decentralization 470
- Disadvantages of Decentralization 471
- Responsibility Accounting 472

Responsibility Accounting for Cost Centers 473

Responsibility Accounting for Profit Centers 476
- Support Department Allocations 476
- Profit Center Reporting 478

Responsibility Accounting for Investment Centers 480
- Return on Investment 480
- Residual Income 484

Transfer Pricing 487
- Market Price Approach 488
- Negotiated Price Approach 488
- Cost Price Approach 491

Analysis for Decision Making 491
- Franchise Operations 491

Make a Decision 512

Take It Further 514

Certified Management Accountant (CMA®) Examination Questions (Adapted) 516

Pathways Challenge 471, 517

11 Differential Analysis and Product Pricing 518

Differential Analysis 520
- Lease or Sell 522
- Discontinue a Segment or Product 523
- Make or Buy 524

Replace Equipment 526
Process or Sell 527
Accept Business at a Special Price 527

Setting Normal Product Selling Prices 530
Cost-Plus Methods 531
Product Cost Method 531
Illustration 533
Target Costing Method 533

Production Bottlenecks 536
Managing Bottlenecks 536
Pricing Bottleneck Products 536

Analysis for Decision Making 537
Yield Pricing in Service Businesses 537

Appendix Total and Variable Cost Methods to Setting Normal Price 538
Total Cost Method 538
Variable Cost Method 541

Make a Decision 565

Take It Further 567

Certified Management Accountant (CMA®) Examination Questions (Adapted) 569

Pathways Challenge 525, 570

12 Capital Investment Analysis 572

Nature of Capital Investment Analysis 574

Methods Not Using Present Values 575
Average Rate of Return Method 575
Cash Payback Method 576

Methods Using Present Values 578
Present Value Concepts 579
Net Present Value Method and Index 581
Internal Rate of Return Method 584

Factors That Complicate Capital Investment Analysis 587
Income Tax 587
Unequal Proposal Lives 587
Lease Versus Capital Investment 589
Uncertainty 589
Changes in Price Levels 590
Qualitative Considerations 591

Capital Rationing 591

Analysis for Decision Making 592
Uncertainty: Sensitivity and Expected Value Analyses 592

Make a Decision 613

Take It Further 615

Certified Management Accountant (CMA®) Examination Questions (Adapted) 617

Pathways Challenge 583, 618

13 Lean Manufacturing and Activity Analysis 620

Lean Principles 622
Reducing Inventory 623
Reducing Lead Times 624
Reducing Setup Time 625
Emphasizing Product-Oriented Layout 628
Emphasizing Employee Involvement 628
Emphasizing Pull Manufacturing 629
Emphasizing Zero Defects 629
Emphasizing Supply Chain Management 630

Lean Accounting 631
Fewer Transactions 632
Combined Accounts 632
Nonfinancial Performance Measures 633
Direct Tracing of Overhead 634

Activity Analysis 634
Costs of Quality 635
Quality Activity Analysis 636
Value-Added Activity Analysis 637
Process Activity Analysis 639

Analysis for Decision Making 640
Lean Performance for Nonmanufacturing 640

Make a Decision 657

Take It Further 658

Certified Management Accountant (CMA®) Examination Questions (Adapted) 660

Pathways Challenge 628, 661

14 The Balanced Scorecard and Corporate Social Responsibility 662

Performance Measurement Systems 664

The Balanced Scorecard 665
Performance Perspectives 665
Strategic Objectives 667
Performance Metrics 667
Strategic Initiatives 668
Performance Targets 669

Using the Balanced Scorecard 669
Strategy Maps 669
Measure Maps 671
Strategic Learning 673
Scorecard Cascading 675
Cognitive Biases 675

Corporate Social Responsibility 678
CSR Reporting 679
Corporate Social Responsibility and the Balanced Scorecard 680
Encouraging Corporate Social Responsibility 682

Analysis for Decision Making 682
Capital Investment in CSR 682
Make a Decision 700
Take It Further 701
Certified Management Accountant (CMA®) Examination Questions (Adapted) 703
Pathways Challenge 677, 704

15 Statement of Cash Flows 706

Reporting Cash Flows 708
Cash Flows: Operating Activities 709
Cash Flows: Investing Activities 711
Cash Flows: Financing Activities 711
Noncash Investing and Financing Activities 712
Format of the Statement of Cash Flows 712
No Cash Flow per Share 713
Cash Flows: Operating Activities 713
Net Income 715
Adjustments to Net Income 715
Cash Flows: Investing Activities 719
Land 719
Building and Accumulated Depreciation—Building 720
Cash Flows: Financing Activities 721
Bonds Payable 721
Common Stock 721
Dividends and Dividends Payable 722
Preparing the Statement of Cash Flows 723
Analysis for Decision Making 725
Free Cash Flow 725
Appendix 1 Spreadsheet (Work Sheet) for Statement of Cash Flows—The Indirect Method 726
Analyzing Accounts 727
Retained Earnings 728
Other Accounts 728
Preparing the Statement of Cash Flows 729
Appendix 2 Preparing the Statement of Cash Flows—The Direct Method 729
Cash Received from Customers 730
Cash Payments for Merchandise 730
Cash Payments for Operating Expenses 731
Gain on Sale of Land 731
Interest Expense 732
Cash Payments for Income Taxes 732
Reporting Cash Flows from (Used for) Operating Activities—Direct Method 732
Make a Decision 760
Take It Further 763
Pathways Challenge 723, 764

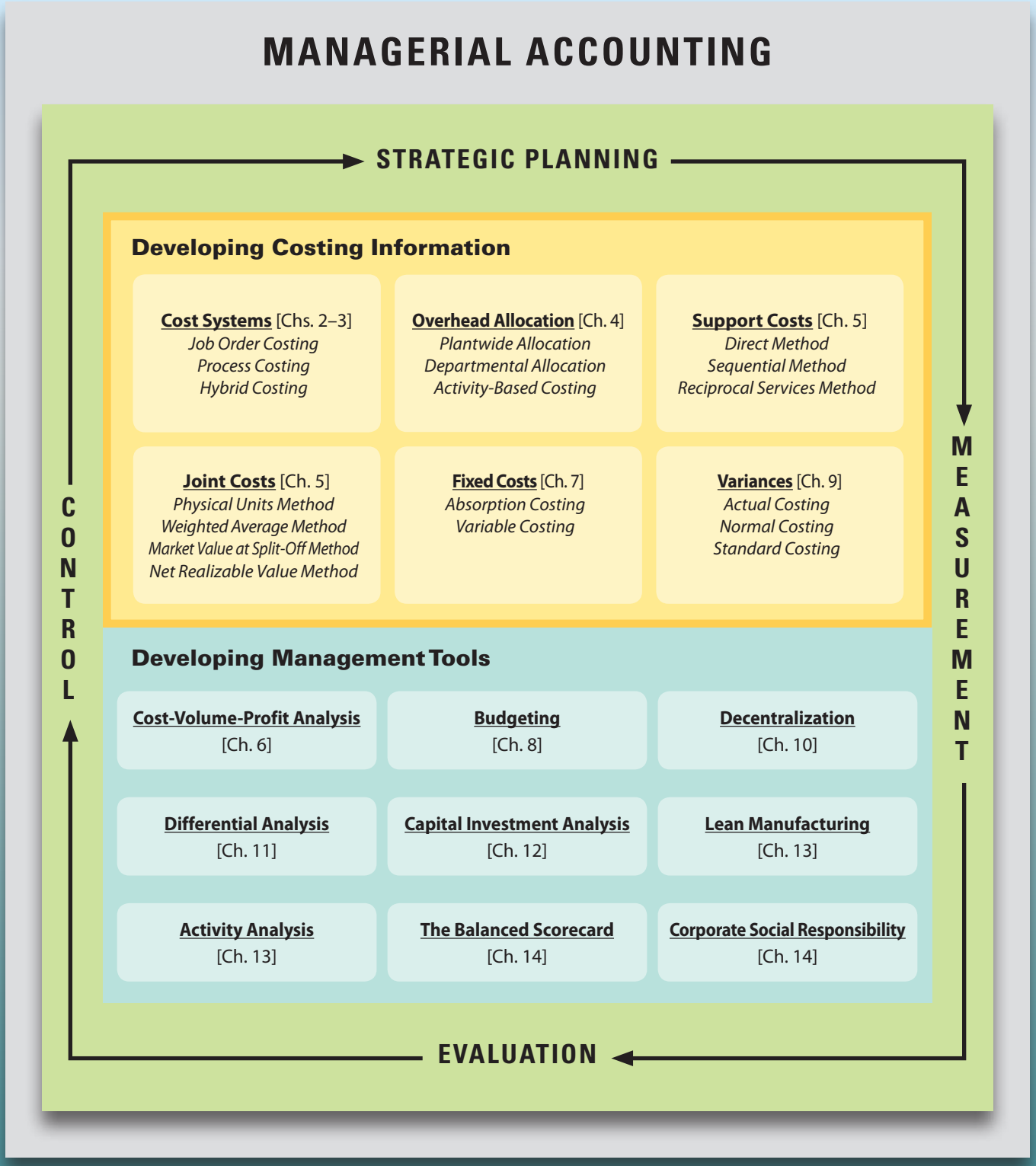
16 Financial Statement Analysis 766

Analyzing and Interpreting Financial Statements 768
The Value of Financial Statement Information 768
Techniques for Analyzing Financial Statements 769
Analytical Methods 769
Horizontal Analysis 769
Vertical Analysis 771
Common-Sized Statements 773
Analyzing Liquidity 775
Current Position Analysis 775
Accounts Receivable Analysis 776
Inventory Analysis 777
Analyzing Solvency 780
Ratio of Fixed Assets to Long-Term Liabilities 780
Ratio of Liabilities to Stockholders' Equity 780
Times Interest Earned 781
Analyzing Profitability 782
Asset Turnover 783
Return on Total Assets 783
Return on Stockholders' Equity 784
Return on Common Stockholders' Equity 785
Earnings per Share on Common Stock 786
Price-Earnings Ratio 787
Dividends per Share 788
Dividend Yield 788
Summary of Analytical Measures 790
Corporate Annual Reports 791
Management Discussion and Analysis 791
Report on Internal Control 792
Report on Fairness of the Financial Statements 792
Make a Decision 819
Take It Further 820
Pathways Challenge 787, 822

Appendix A Interest Tables A-2
Appendix B Nike Inc., Form 10-K for the Fiscal Year Ended May 31, 2020 Selected Excerpts B-1
Appendix C Computing Present Values (online) C-1
Glossary G-1
Index I-1

Chapter 1

Introduction to Managerial Accounting



Gibson Guitars

Gibson guitars have been used by musical legends over the years, including B.B. King, Chuck Berry, Brian Wilson (Beach Boys), Jimmy Page (Led Zeppelin), Sheryl Crow, Lenny Kravitz, Jose Feliciano, Miranda Lambert, Tak Matsumoto, and Wynonna Judd. For example, Sheryl Crow has used her 1964 Gibson Country Western guitar in all of her recordings.

Known for its quality, **Gibson Guitars** celebrated its 125th anniversary in 2019. Staying in business for over 125 years requires a thorough understanding of how to manufacture high-quality guitars. In addition, it requires knowledge of how to account for the costs of making guitars. For example, Gibson needs cost information to answer the following questions:

- What should be the selling price of its guitars?
- How many guitars does it have to sell in a year to cover its costs and earn a profit?
- How many employees should the company have working on each stage of the manufacturing process?
- How would purchasing automated equipment affect the costs of its guitars?

This chapter introduces managerial accounting concepts that are useful in addressing these questions. This chapter begins by describing managerial accounting and its relationship to financial accounting. Following this overview, the management process is described along with the role of managerial accounting. Finally, characteristics of managerial accounting reports, managerial accounting terms, and uses of managerial accounting information are described and illustrated.

Sources: www.gibson.com/Gibson/History.aspx. Chris Kornelis, *The Wall Street Journal*, "How Sheryl Crow Finally Broke Her Starbucks Habit," May 24, 2017.

FABIO PAGANI/SHUTTERSTOCK.COM

Link to Gibson Guitars . . . . . Pages 7, 8, 10, 11, 12, 17

What's Covered

Introduction to Managerial Accounting

Role of Managerial Accounting
- Management Process (Obj. 1)
- Managerial Accounting (Obj. 1)
- Differences with Financial Accounting (Obj. 1)
- Managerial Accounting within the Organization (Obj. 1)

Manufacturing Operations
- Nature of Manufacturing (Obj. 2)
- Direct and Indirect Costs (Obj. 2)
- Manufacturing Costs (Obj. 2)

Manufacturing Financial Statements
- Balance Sheet (Obj. 3)
- Income Statement (Obj. 3)

Learning Objectives

Obj. 1 Describe how managerial accounting supports the management process, its differences with financial accounting, and its place within the organization.

Obj. 2 Describe and illustrate the nature of manufacturing operations, including different types and classifications of costs.

Obj. 3 Describe and illustrate financial statements for a manufacturing business, including the balance sheet, statement of cost of goods manufactured, and income statement.

Analysis for Decision Making

Obj. 4 Describe and illustrate utilization rates in evaluating performance for service companies.

Objective 1
Describe how managerial accounting supports the management process, its differences with financial accounting, and its place within the organization.

Managerial Accounting

Managerial accounting, sometimes called **management accounting**, is the process of developing information and management tools to achieve an organization's objectives. Although we focus primarily on companies whose objective is to earn a profit, much of our discussion also applies to organizations such as churches, government agencies, and other non-profit organizations.

The Management Process

The **management process** is composed of the following four basic functions:

- Strategic planning
- Measurement
- Evaluation
- Control

Strategic Planning The management process begins with **strategic planning** to develop long-term objectives. For example, a company might set an objective of increasing its market share by developing new products or expanding into new markets. Strategic planning normally involves a time horizon of five to ten years.

To achieve its long-term, strategic objectives, management sets a variety of short-term objectives and actions. The process of developing these short-term objectives and actions is often referred to as **operational planning**. For example, to develop new products a company might increase its annual spending on research and development.

Measurement The management process where managers develop and agree upon performance metrics on how well the company is achieving its objectives is **measurement**. A company's performance metrics should tie to its specific short- and long-term objectives. Examples of performance metrics include market share, customer satisfaction, workforce diversity, and earnings per share.

Evaluation The management process by which management monitors operations by comparing actual and expected results is **evaluation**. The comparison of actual and expected results provides feedback for employees and is often used as a basis for performance evaluation, promotions, and compensation.

The philosophy of focusing evaluation on "unexpected" good or bad performance is called **management by exception**. Evaluation is critical for the continuous improvement of employees, business processes, and products.

Control The process by which management takes actions to encourage specific behaviors or outcomes is **control**. The control process includes providing information and guidance for employees and managers to run day-to-day operations. For example, management might provide measurement and evaluation information to help a production supervisor maintain a production schedule for meeting customer needs. Communicating the company's plans, measurements, and evaluations to supervisors and employees to guide their actions is another example of management control.

The Role of Managerial Accounting

The primary role of managerial accounting is to support the management functions of strategic planning, measurement, evaluation, and control. Managerial accounting does this by developing information and tools for use by managers for decision making.

Exhibit 1 is the schema used throughout this text to illustrate managerial accounting's role in supporting the management of a company.

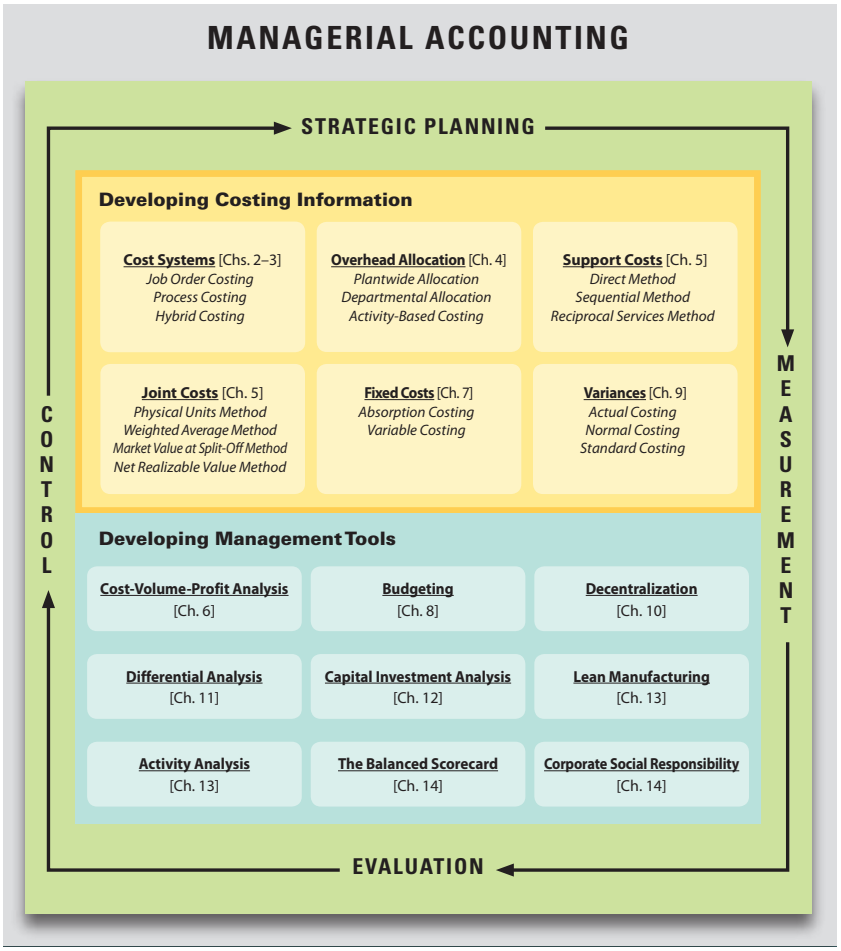


Exhibit 1
Managerial Accounting Schema

The four basic functions of the management process surround the outside of the schema. Managerial accounting supports these four functions by developing cost information and management tools.

Developing Costing Information While managerial accounting provides managers with a variety of information, the development of costing information is a major focus of managerial accounting. For this reason, developing costing information is a primary focus of this text.

Some examples of how cost information could be used by a guitar manufacturer, like Gibson Guitars, include the following:

- The cost of manufacturing each guitar could be used to plan its selling price.
- Comparing the costs of guitars over time can be used to evaluate and control costs.
- The cost of scrap or employee downtime could be measured and evaluated. For example, large costs tied to unusable wood (scrap) after the cutting process should be investigated to determine the underlying cause. Such scrap may be caused by saws that have not been properly maintained.
- The cost of continuing to use a manually operated cutting machine could be measured and evaluated against the potential cost savings of purchasing a computerized saw.

There are many considerations and choices in developing cost information. These choices have a significant impact on the accuracy, complexity, and cost of developing information. Some topics we will consider in developing costing information include the following:

- What cost system to use to record and report the cost of a product (Chapters 2–3).
- How to allocate overhead costs, such as equipment depreciation, to products (Chapter 4).
- How to allocate support department costs, such as factory janitorial costs, to products (Chapter 5).
- How to allocate joint manufacturing costs to products (Chapter 5).
- How to report fixed production costs, such as factory supervisory salaries (Chapter 7).
- How to determine and report variances (differences) between actual and planned costs (Chapter 9).

Developing Management Tools In addition to developing cost information, managerial accounting develops a variety of tools for management to use in analyzing information and making decisions. Some managerial accounting tools we will consider for use by management include the following:

- Cost-volume-profit analysis for determining the sales necessary to break even or earn a target profit (Chapter 6).
- Budgeting for resource planning (Chapter 8).
- Decentralization for assessing operations that are centralized or distributed throughout the company (Chapter 10).
- Differential analysis for comparing the profitability of various options (Chapter 11).

Business Insight

Managerial Accounting and Ordering at Subway

Developing cost information is like building a sandwich at **Subway**. Some cost information choices are mutually exclusive. For example, you can't use both plantwide and activity-based costing for overhead allocation. Likewise, at Subway, you must choose your bread. For example, you may select either wheat bread or Italian bread—but you can't select both. However, some cost choices can be added to other choices to improve and increase the effectiveness of the overall system. For example, a cost system could use the direct method for allocating support department costs *and* use activity-based costing for overhead allocation. Likewise, at Subway you choose a meat, cheese, toppings, and sauce to complete your sandwich.

Developing management tools is like finalizing your order at Subway. For example, while accurate cost information is necessary for making valid decisions, those decisions may be improved by using a variety of management tools. For example, the balanced scorecard enables managers to consider a variety of performance objectives and metrics. Likewise, at Subway, you can order a variety of add-ons, such as chips, a drink, and dessert, to improve your meal.

- Capital investment analysis for use in deciding among long-term assets to purchase (Chapter 12).
- Lean manufacturing for determining how to reduce inventory costs (Chapter 13).
- Activity analysis for use in reducing inefficiencies in the production process (Chapter 13).
- The balanced scorecard for aligning strategic objectives with performance metrics and evaluating performance (Chapter 14).
- Corporate social responsibility for focusing on objectives such as reducing the environmental impact of production or providing diversity and inclusion training to all employees (Chapter 14).

The Managerial Accounting Roadmap The schema shown in Exhibit 1 provides a roadmap for your understanding of managerial accounting. Each chapter and its related topics are highlighted in the schema at the beginning of each chapter. This provides an overall framework of where you are in studying managerial accounting and how the various chapters and topics are interrelated with one another. In addition, decision making occurs in every component of the schema. For this reason, each chapter ends with a decision-making learning objective and related set of assignments.

Orville Gibson started producing guitars in 1894 in Kalamazoo, Michigan. He produced guitars and mandolins based upon the arch-top design of violins.

Link to Gibson Guitars

Differences Between Financial and Managerial Accounting

Accounting information is often classified into two types: financial and managerial. Exhibit 2 shows the relationship between financial accounting and managerial accounting.

Financial accounting information is reported at fixed intervals (monthly, quarterly, yearly) in general-purpose financial statements. These financial statements—the income statement, statement of stockholders' equity, balance sheet, and statement of cash flows—are prepared according

Using Data Analytics

Management Accounting and Data Analytics

Data analytics is the science of analyzing large amounts of raw data, sometimes called "big data," to discover patterns, identify anomalies, or gain other useful insights for decision making. A major role of management accounting is to extract useful insights from data. Given this role, skills in data analytics are essential to managerial accounting.

Data analytics uses tools such as mathematical modeling, statistical computation, and data visualization to enable the computation and visual representation of data for use by management. However, the outputs of data analytics should be interpreted carefully by management. For example, the outputs are only as good as the inputs and the analyses performed. In addition, the information from data analytics is just one input into management's "toolset" that can be used to make informed decisions.

See TIF 1-7 for a homework assignment using data analytics.

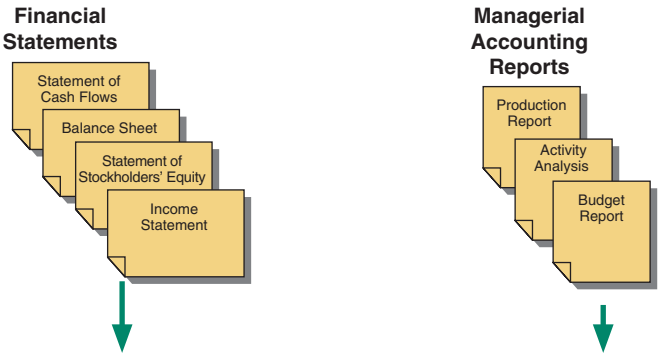
Ethics in Action

Environmental Managerial Accounting

Throughout the last decade, environmental issues have become an increasingly important part of the business environment for most companies. Companies and managers must now consider the environmental impact of their business decisions in the same way that they would consider other operational issues.

To help managers make sound business decisions, the emerging field of environmental managerial accounting focuses on computing the environmental-related costs of business decisions. Environmental managerial accountants evaluate a variety of issues such as the volume and level of emissions, the estimated costs of different levels of emissions, and the impact that environmental costs have on product cost. Managers use these results to consider the environmental effects of their business decisions.

Exhibit 2
Financial Accounting and Managerial Accounting



	Financial Statements	Managerial Accounting Reports
Users of Information	External users and company management	Management
Nature of Information	Objective	Objective and subjective
Guidelines for Preparation	Prepared according to GAAP	Prepared according to management needs
Timeliness of Reporting	Prepared at fixed intervals	Prepared at fixed intervals and on an as-needed basis
Focus of Reporting	Company as a whole	Company as a whole or segment

to generally accepted accounting principles (GAAP). These statements are used by external users such as the following:

- Shareholders
- Creditors
- Government agencies
- The general public

Link to Gibson Guitars

Gibson Mandolin-Guitar Mfg. Co., Ltd. was formed in 1902 in Kalamazoo, Michigan, with the support of five investors.

Managers of a company also use general-purpose financial statements. For example, in planning future operations, managers often begin by evaluating the current income statement and statement of cash flows.

Managerial accounting information is designed to meet the specific needs of a company's management. This information includes the following:

- Historical data, which provide measures of past operations
- Estimated data, which provide estimates about future decisions

Management uses both types of information in directing daily operations, planning future operations, and developing business strategies.

Unlike the financial statements prepared in financial accounting, managerial accounting reports do *not* always have to be:

- Prepared according to generally accepted accounting principles (GAAP). This is because GAAP may not always be relevant to the specific decision-making needs of management.
- Prepared at fixed intervals (monthly, quarterly, yearly). Although some management reports are prepared at fixed intervals, most reports are prepared as management needs the information.
- Prepared for the business as a whole. Most management reports are prepared for products, projects, sales territories, or other segments of the company.

Link to Gibson Guitars

Chicago Musical Instrument Company purchased **Gibson** in 1944.

Managerial Accounting within the Organization

While no two company structures are identical, most large companies are organized in terms of "verticals" and "horizontals." **Verticals** are sometimes referred to as *business units*, because they are often structured as separate businesses within the parent company. These verticals normally develop products that are sold directly to customers. Verticals prepare their own income statements, also referred to as *profit and loss (P&L) statements*, which report their ongoing performance and profitability.

Horizontals are departments within the company that are not responsible for developing products. The role of horizontals is to provide services to the various verticals and other horizontals. As such, horizontals do not report profit and loss (P&L) statements. Marketing, human resources, information technology, legal, facilities, accounting, and finance are normally horizontal departments within a company.

At **McAfee, Inc. (MFE)**, a cyber security provider, the Chief Financial Office functions as a horizontal department that serves McAfee's two main verticals: the Consumer Business Unit and the Enterprise Business Unit. Rather than hire and train separate accounting and finance departments within each vertical, it is more efficient to centralize this function as a horizontal department.

To illustrate, a partial organizational chart of McAfee's Chief Executive Office and Chief Financial Office is shown in Exhibit 3. The **chief financial officer (CFO)** is an executive vice president, who, along with leadership of the other verticals and horizontals, reports directly to the **chief executive officer (CEO)**. Each of the two verticals (Consumer Business Unit and Enterprise Business Unit) has a "VP of Finance" that reports to the CFO. In addition, the Sales & Marketing and Consolidations horizontals have their own "VP of Finance" that reports to the CFO.[1] The "VP of Accounting" is called the **chief accounting officer (CAO)** and oversees technical accounting, accounting policy, credit, collections, tax, treasury, and internal audit at McAfee. The functions reporting to the CFO sometimes are grouped together and are referred to as *corporate finance*.

Finance and accounting professionals often work within verticals and other horizontals managing budgets, tracking key metrics, and generating accounting reports. Doing so requires coordinating and interacting closely with operational employees. As a result, the functions of these professionals are sometimes referred to as *operations finance* or as *financial planning and analysis*. Although finance and accounting professionals often work within verticals and other horizontals, they do not normally report directly to the heads of those units or departments. Instead, they report to an accounting and finance VP, who in turn reports to the CFO. This allows the accounting and finance professionals to maintain their independence.

At some companies, the manager of the accounting function of a vertical (business unit) is referred to as the **controller**. At smaller companies, controller may be used to refer to the chief financial officer. At still other companies, controller may be used to signify rank within the accounting and finance function. For example, the head accountant of a manufacturing facility at **Deere &Company (DE)** is called a controller. In contrast, at **Intel Corporation (INTC)**, accounting and finance employees start as *analysts,* are promoted to *senior analysts*, then to *managers*, and then to *controllers*.

Business Insight

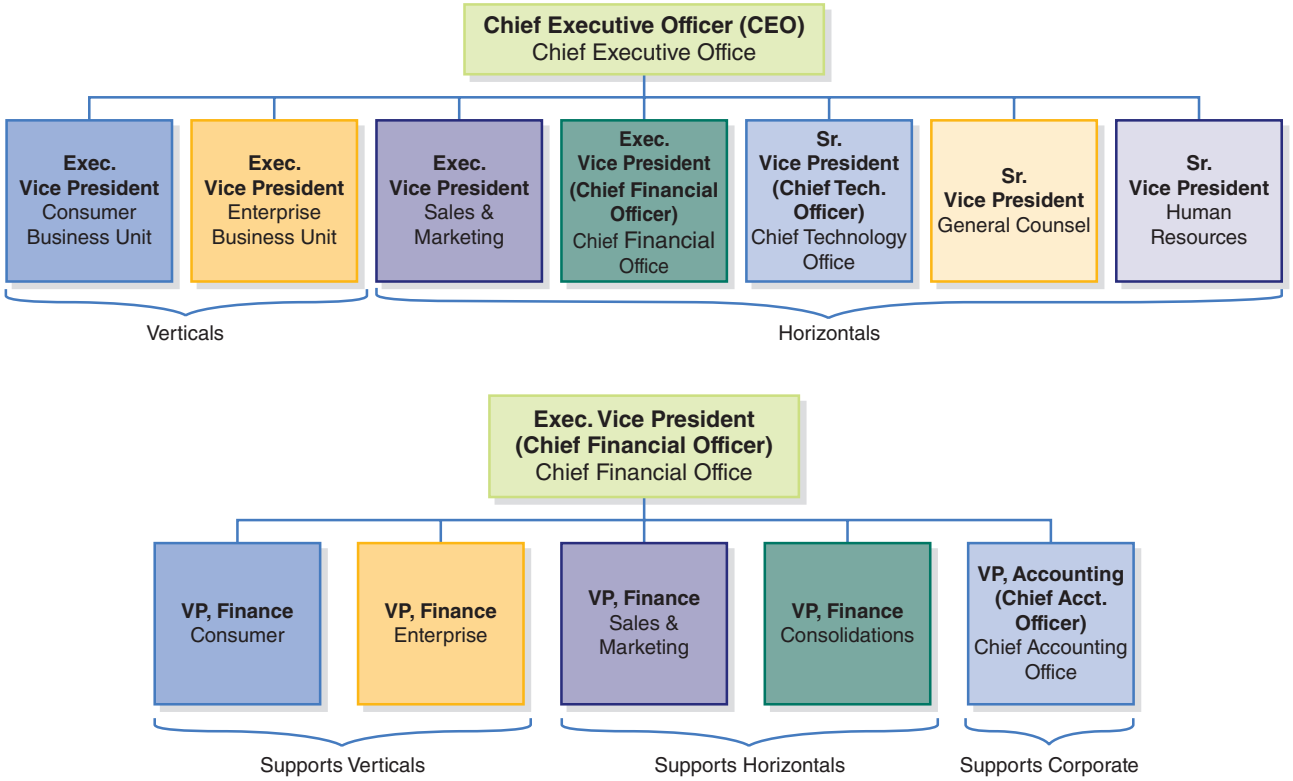
Vertical and Horizontal Functions for Service Companies

Functions that are normally performed by vertical and horizontal units may be applied to service companies. Some examples are as follows:

Service Industry	Vertical Function	Horizontal Function
Airline	Crew, baggage handling, and gate staff	Information systems, accounting, human resources
Hotel	Housekeeping and reception staff	Maintenance, hotel manager, grounds
Hospital	Doctors, nurses, other caregivers	Admissions, records, billing
Banking	Tellers, loan officers, trust officers, and brokers	Branch manager, information systems
Telecommunications	Sales, customer service, and customer installation staff	Information systems, regional management, and network maintenance

[1] Consolidations supports the aggregation of financial statements from other units.

Exhibit 3 Partial Organization Chart for McAfee



The work of accounting and finance professionals requires a thorough knowledge and understanding of managerial accounting, which provides a valuable foundation for advancing to senior management positions. Because managerial accounting crosses a variety of functional areas, the formal title of "managerial accountant" or "management accountant" is normally not used by companies. Instead, professionals who use managerial accounting are typically referred to by their functional area, such as "financial analyst" or "operations analyst."

Link to Gibson Guitars

One of **Gibson**'s most influential managers was Ted McCarty, who was the company president from 1950–1966. During this period, Gibson was known for its innovations. For example, in 1954, McCarty invented the tune-o-matic bridge with adjustable saddles.

Business Insight

Certified Management Accountants

The Institute of Management Accountants (IMA®) is a worldwide association of over 100,000 accounting and finance professionals across more than 140 countries. The IMA works to support the management accounting profession with programs involving continuing education, certification, networking, ethics, research, and scholarships. In the United States, there are over 1.3 million accountants and auditors, most of whose work involves management accounting. The projected growth rate of the accounting profession over the coming decade is 11%, which is 4% higher than the projected average growth rate of all professions.

To meet the growing needs of the accounting profession, the IMA offers the Certified Management Accountant (CMA) certificate. The CMA is not a state or local certificate, but a globally recognized credential. The CMA is earned by passing a two-part examination. Part 1 covers financial reporting, planning and budgeting, performance management, cost management, and internal controls. Part 2 covers financial statement analysis, corporate finance, decision analysis, risk management, investment decisions, and professional ethics. Those passing the examination have proven that they have mastered the skills required to oversee the management accounting and finance functions within a company or other entity. For more information, visit the IMA's website at www.imanet.org.

Source: *U.S. Bureau of Labor Statistics:* www.bls.gov/ooh/business-and-financial/accountants-and-auditors.htm#tab-6.

Gibson struggled financially from 1966–1986. The company was purchased and sold several times and experienced declining sales.

Link to Gibson Guitars

Check Up Corner 1-1 Management Process

1. Indicate whether the following statements are true or false:
   a. Managerial accounting information is designed primarily to meet the needs of external users such as shareholders, creditors, and the general public.
   b. Managerial accounting reports must be prepared for the business as a whole.
   c. Operational planning develops short-term actions for managing the day-to-day operations of the company.
2. The four management processes are strategic planning, measurement, evaluation, and control. Match the following descriptions to the proper management process:

Management Processes	Description
Strategic planning	a. Take actions to encourage specific behaviors or outcomes
Measurement	b. Monitor operations by comparing actual and expected results
Evaluation	c. Develop and agree upon performance metrics on how well the company is achieving its objectives
Control	d. Develop long-term objectives

Solution:

1. a. False. The primary focus and design of managerial accounting information is to meet the specific needs of a company's management.
   b. False. Managerial accounting reports do not have to be prepared for the business as a whole. Most management reports are prepared for products, projects, sales territories, or other segments of the company.
   c. True. Operational planning develops short-term actions for managing the day-to-day operations of the company. In contrast, strategic planning develops long-term actions (strategies) to achieve the company's objectives.
2. Strategic planning: **d.** Develop long-term objectives
   Measurement: **c.** Develop and agree upon performance metrics on how well the company is achieving its objectives
   Evaluation: **b.** Monitor operations by comparing actual and expected results
   Control: **a.** Take actions to encourage specific behaviors or outcomes

Check Up Corner

Business Insight

Not According to Plan

There are times even the best of plans go awry. Sometimes plans are impacted by events outside of management control. For example, the economic consequences of the pandemic caused by COVID-19 surprised management of small and large businesses across the globe. Few management plans would be able to provide for such an extreme contingency. Force majeure (meaning "superior force") clauses in contracts can be used to nullify contracts when such events occur. Such clauses are used when the normal operating plans are disrupted by events beyond management control or expectation. For example, restaurants that temporarily closed due to government regulations against dine-in services may not be required to fulfill a rental agreement, as long as the contract included a force majeure clause. In other cases, a force majeure clause might not be sufficient to protect businesses. For example, restaurants that are able to offer curbside pickup as an alternative to dine-in services could be deemed at least partially responsible for contract fulfillment.

Objective 2
Describe and illustrate the nature of manufacturing operations, including different types and classifications of costs.

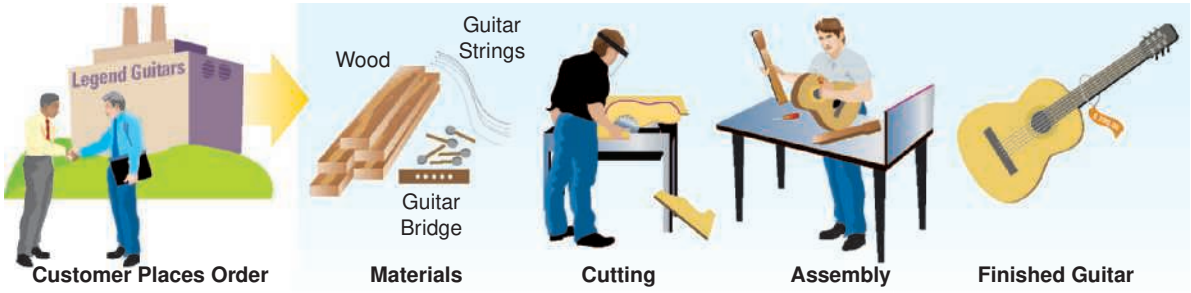
Manufacturing Operations

The operations of a business can be classified as service, retail, or manufacturing. Although the chapters of this text focus primarily on manufacturing and service businesses, most of the managerial accounting concepts discussed also apply to retail businesses.

Nature of Manufacturing

As a basis for illustration of manufacturing operations, a guitar manufacturer, **Legend Guitars**, is used. Exhibit 4 is an overview of Legend's guitar manufacturing operations.

Exhibit 4 Guitar-Making Operations of Legend Guitars



Legend's guitar-making process begins when a customer places an order for a guitar. Once the order is accepted, the manufacturing process begins by obtaining the necessary materials. An employee then cuts the body and neck of the guitar out of raw lumber. Once the wood is cut, the body and neck of the guitar are assembled. When the assembly is complete, the guitar is painted and finished.

Link to Gibson Guitars

Gibson provides tours of its Memphis guitar factory located at 145 Lt. George W. Lee Avenue.

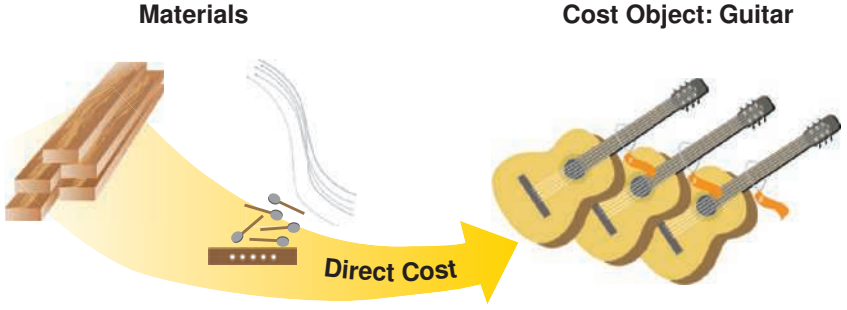
Direct and Indirect Costs

A **cost** is a sacrifice made to obtain some benefit. For example, cash (or credit) used to purchase equipment is the cost of the equipment. If equipment is purchased by exchanging assets other than cash, the current market value of the assets given up is the cost of the equipment purchased.

In managerial accounting, costs are often assigned to a cost object. A **cost object** can be anything to which costs are assigned and will vary depending upon the decision-making needs of management. For example, a cost object may be a product, a sales territory, a department, or an activity, such as research and development. Costs identified with cost objects are either direct costs or indirect costs.

Direct costs are identified with and can be traced to a cost object. For example, as shown in Exhibit 5, the cost of wood (materials) used by **Legend Guitars** in manufacturing a guitar is a direct cost of the guitar.

Exhibit 5
Direct Costs of Legend Guitars



Indirect costs are not identified with or traced to a cost object. For example, as shown in Exhibit 6, the salaries of the **Legend Guitars** production supervisors are indirect costs of producing a guitar. Although the production supervisors contribute to the production of a guitar, their salaries cannot be identified with or traced to any individual guitar.

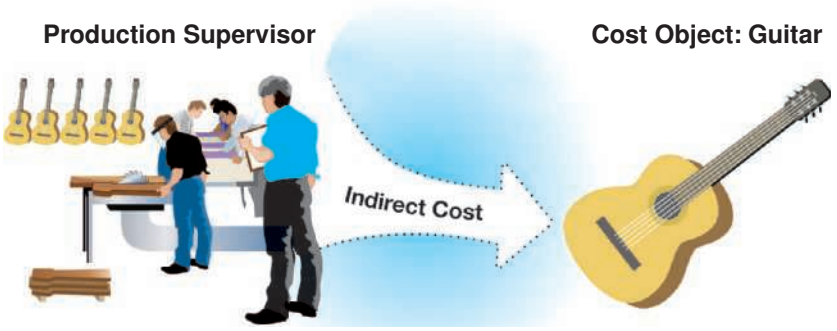


Exhibit 6
Indirect Costs of Legend Guitars

Depending on the cost object, a cost may be either a direct or an indirect cost. For example, the salaries of production supervisors are indirect costs when the cost object is an individual guitar. If, however, the cost object is **Legend Guitars**' overall production process, then the salaries of production supervisors are direct costs.

This process of classifying a cost as direct or indirect is illustrated in Exhibit 7.

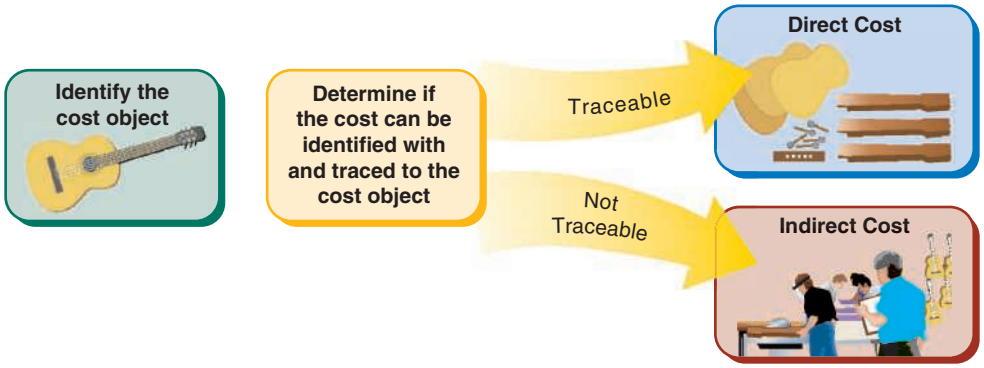


Exhibit 7
Classifying Direct and Indirect Costs

Manufacturing Costs

The cost of a manufactured product includes the cost of materials used in making the product. In addition, the cost of a manufactured product includes the cost of converting the materials into a finished product. For example, **Legend Guitars** uses employees (direct labor) and machines (factory overhead) to convert wood (direct materials) into finished guitars. Thus, as shown in Exhibit 8, the cost of a finished guitar (the cost object) includes the following:

- Direct materials cost
- Direct labor cost
- Factory overhead cost

Exhibit 8
Manufacturing Costs of Legend Guitars

Direct Materials | Direct Labor | Factory Overhead

Direct Materials Cost Manufactured products begin with raw materials that are converted into finished products. The cost of any material that is an integral part of the finished product is classified as a **direct materials cost**. For **Legend Guitars**, direct materials cost includes the cost of the wood used in producing each guitar. Other examples of direct materials costs include the cost of electronic components for a television, silicon wafers for microcomputer chips, and tires for an automobile.

For Legend, the cost of the glue used in the guitar is not a direct materials cost. This is because the cost of glue is an insignificant part of the total cost of each guitar and is difficult to trace accurately to a guitar. Instead, the cost of glue is classified as a factory overhead cost, which is discussed later.

Direct Labor Cost Most manufacturing processes use employees to convert materials into finished products. The cost of employee wages that is an integral part of the finished product is classified as **direct labor cost**. For **Legend Guitars**, direct labor cost includes the wages of the employees who cut each guitar out of raw lumber and assemble it. Other examples of direct labor costs include mechanics' wages for repairing an automobile, machine operators' wages for manufacturing tools, and assemblers' wages for assembling a laptop computer.

For Legend, the wages of the janitors who clean the factory are not a direct labor cost. This is because janitorial costs are not an integral part or a significant cost of each guitar. Instead, janitorial costs are classified as a factory overhead cost, which is discussed next.

Pathways Challenge

This is Accounting!

Economic Activity

Whether a specific expenditure is considered a direct cost or an indirect cost with respect to a cost object depends on a number of factors. While some costs are impossible to trace directly to the cost object, many costs *can* be traced directly, but doing so may not be economically feasible or justifiable given the benefits of direct tracing. In most cases, management subjectively determines whether to treat a cost as direct or indirect. **Larson & Company, PC**, a regional CPA firm based in Utah, bills clients based, in part, on the costs incurred to serve the client. Some costs, such as billable professional hours, are directly traced to clients and billed accordingly. Other costs, such as office supplies, are treated as indirect costs. These costs are not traced directly to clients. Instead, the hourly professional rate is set high enough to provide sufficient revenue to cover both direct and indirect costs.

Critical Thinking/Judgment

What are the effects of considering indirect costs when determining the hourly professional rate to charge clients?
What happens if serving some clients requires more supplies (printed documents, folders, etc.) than other clients? Will Larson & Company's current billing practice capture this difference?
Should Larson & Company consider directly tracing office supplies costs to clients?

Suggested answer at end of chapter.

Factory Overhead Cost Costs other than direct materials and direct labor that are incurred in the manufacturing process are combined and classified as **factory overhead cost**. Factory overhead is sometimes called **factory burden**, **manufacturing overhead**, or simply **overhead**.

All factory overhead costs are indirect costs of the product. Some factory overhead costs include the following:

- Heating and lighting the factory
- Repairing and maintaining factory equipment
- Property taxes on factory buildings and land
- Insurance on factory buildings
- Depreciation on factory plant and equipment

Factory overhead cost also includes **indirect materials** and **indirect labor** costs that are not directly traced to the finished product. Examples include the cost of glue used to assemble guitars and the wages of janitorial and supervisory employees.

For **Legend Guitars**, the costs of glue and janitorial wages are factory overhead costs. Additional factory overhead costs of making guitars are as follows:

- Sandpaper
- Buffing compound
- Oil used to lubricate machines
- Power (electricity) to run the machines
- Depreciation of the machines and building
- Salaries of production supervisors

Prime Costs and Conversion Costs Direct materials, direct labor, and factory overhead costs may be grouped together for analysis and reporting. Two such common groupings are as follows:

- **Prime costs**, which consist of direct materials and direct labor costs
- **Conversion costs**, which consist of direct labor and factory overhead costs

Conversion costs are the costs of converting the materials into a finished product. Direct labor is both a prime cost and a conversion cost, as shown in Exhibit 9.

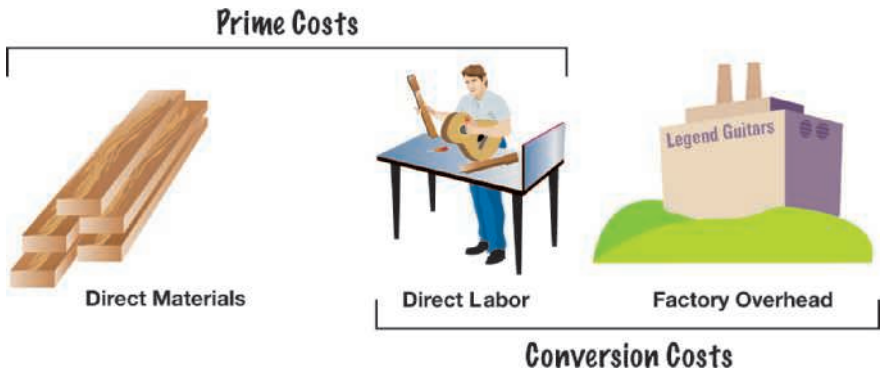


Exhibit 9
Prime Costs and Conversion Costs

Product Costs and Period Costs For financial reporting purposes, costs are classified as product costs or period costs.

Business Insight

Factory Overhead Costs

Defense contractors such as **General Dynamics (GD)**, **Boeing (BA)**, and **Lockheed Martin (LMT)** sell products such as airplanes, ships, and military equipment to the U.S. Department of Defense. Building large products such as these requires a significant investment in facilities and tools, all of which are classified as factory overhead costs. As a result, factory overhead costs are a much larger portion of the cost of goods sold for defense contractors than they are in other industries. For example, a U.S. General Accounting Office study of six defense contractors found that overhead costs were almost one-third of the price of the final product. This is more than three times greater than the factory overhead costs for a laptop computer, which are typically about 10% of the price of the final product.

- **Product costs** consist of manufacturing costs: direct materials, direct labor, and factory overhead. These costs are stored in inventory.
- **Period costs** consist of selling and administrative expenses. *Selling expenses* are incurred in marketing the product and delivering the product to customers. *Administrative expenses* are incurred in managing the company and are not directly related to the manufacturing or selling functions.

Examples of product costs and period costs for **Legend Guitars** are presented in Exhibit 10.

Exhibit 10 Examples of Product Costs and Period Costs—Legend Guitars

Product (Manufacturing) Costs

Direct Materials Cost
- Wood used in neck and body

Direct Labor Cost
- Wages of saw operator
- Wages of employees who assemble the guitar

Factory Overhead
- Wages of janitor
- Power to run the machines
- Depreciation expense—factory building
- Sandpaper and buffing materials
- Oil used to lubricate machines
- Salary of production supervisors

Period (Nonmanufacturing) Costs

Selling Expenses
- Advertising expenses
- Sales salaries expenses
- Commissions expenses

Administrative Expenses
- Office salaries expense
- Office supplies expense
- Depreciation expense—office building and equipment

To facilitate control, selling and administrative expenses may be reported by level of responsibility. For example, selling expenses may be reported by products, salespersons, departments, divisions, or territories. Likewise, administrative expenses may be reported by areas such as human resources, computer services, legal, accounting, or finance.

The impact on the financial statements of product and period costs is summarized in Exhibit 11. As product costs in a manufacturing company are incurred, they are recorded and reported on the balance sheet as *inventory*. When the inventory is sold, the cost of the manufactured product sold is reported as *cost of goods sold* on the income statement. In a service company, product costs typically are not reported as inventory, because the cost of the service typically happens in the same period that the service is sold. Period costs are reported as *expenses* on the income statement in the period in which they are incurred and, thus, never appear on the balance sheet.

Business Insight

Service Companies and Product Costs

Though service companies do not produce a tangible product, they usually still have labor, materials, and overhead costs. These costs are not associated with manufacturing product, but with serving customers. An example is a hospital. Caregivers provide care (similar to direct labor), drugs and health supplies are administered (similar to direct materials), and administrative salaries and utilities are paid (similar to factory overhead).

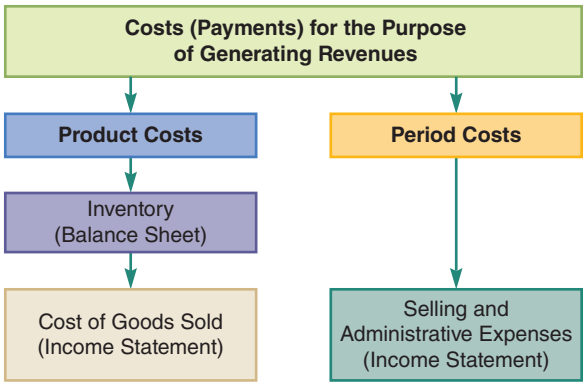


Exhibit 11
Product Costs, Period Costs, and the Financial Statements

In January 1986, guitar enthusiasts Henry Juszkiewicz and David Berryman purchased **Gibson**. Together they restored Gibson's reputation for innovation and quality. Under their leadership, Gibson began generating profits.

Link to Gibson Guitars

Check Up Corner 1-2 Manufacturing Operations

A partial list of the costs for MLB Mitt Company, a baseball glove manufacturer, is as follows:

a. Ink used to print a player's autograph
b. Salesperson's salary and commission
c. Padding material
d. Coolants for machines that sew the baseball gloves
e. Wages of assembly line employees
f. Cost of endorsement from a professional baseball player
g. Salary of manufacturing plant supervisor
h. Leather used to make the gloves
i. Office supplies used at company headquarters
j. Wages of office administrative staff

Using the following headings, classify each cost as a product cost or a period cost. In addition, identify product costs as:

- Direct materials, direct labor, or factory overhead, and
- Prime cost, conversion cost, or both.

	Product Cost					Period Cost
Item	Direct Materials	Direct Labor	Factory Overhead	Prime Cost	Conversion Cost	

Solution:

	Product Cost					Period Cost
Item	Direct Materials	Direct Labor	Factory Overhead	Prime Cost	Conversion Cost	
a.			X		X	
b.						X
c.	X			X		
d.			X		X	
e.		X		X	X	
f.						X
g.			X		X	
h.	X			X		
i.						X
j.						X

Check Up Corner

Objective 3
Describe and illustrate financial statements for a manufacturing business, including the balance sheet, statement of cost of goods manufactured, and income statement.

Financial Statements for a Manufacturing Business

The statement of stockholders' equity and statement of cash flows for a manufacturing business are similar to those for service and retail businesses. However, the balance sheet and income statement for a manufacturing business are more complex. This is because a manufacturer makes the products that it sells and, thus, must record and report product costs. The reporting of product costs primarily affects the balance sheet and the income statement.

Balance Sheet

A manufacturing business reports three types of inventory on its balance sheet as follows:

- **Materials inventory** (sometimes called raw materials inventory). This inventory consists of the costs of the direct and indirect materials that have not entered the manufacturing process.
  Examples for **Legend Guitars**: Wood, guitar strings, glue, sandpaper
- **Work in process inventory.** This inventory consists of the direct materials, direct labor, and factory overhead costs for products that have entered the manufacturing process, but are not yet completed (in process).
  Example for Legend: Unfinished (partially assembled) guitars
- **Finished goods inventory.** This inventory consists of completed (or finished) products that have not been sold.
  Example for Legend: Unsold guitars

Exhibit 12 illustrates the reporting of inventory on the balance sheet for a retail and a manufacturing business. MusicLand Stores, Inc., a retailer of musical instruments, reports only Inventory. In contrast, **Legend Guitars**, a manufacturer of guitars, reports Finished Goods, Work in Process, and Materials inventories. In both balance sheets, inventory is reported in the "Current assets" section.

Exhibit 12
Balance Sheet Presentation of Inventory in Retail and Manufacturing Companies

MusicLand Stores, Inc.
Balance Sheet
December 31, 20Y8

Current assets:	
Cash	$ 25,000
Accounts receivable (net)	85,000
Inventory	142,000
Supplies	10,000
Total current assets	$262,000

Legend Guitars
Balance Sheet
December 31, 20Y8

Current assets:		
Cash		$ 21,000
Accounts receivable (net)		120,000
Inventory:		
Materials	$35,000	
Work in process	24,000	
Finished goods	62,500	
Total inventory		121,500
Supplies		2,000
Total current assets		$264,500

Income Statement

The income statements for retail and manufacturing businesses differ primarily in the reporting of the cost of goods (merchandise) *available for sale* and *sold* during the period. These differences are shown in Exhibit 13.

Exhibit 13
Income Statements for Retail and Manufacturing Businesses

Retail Business

Income Statement

Sales		$ XXX
Beginning inventory	$ XXX	
Net purchases	XXX	
Inventory available for sale	$ XXX	
Ending inventory	(XXX)	
Cost of goods sold		(XXX)
Gross profit		$ XXX

Manufacturing Business

Income Statement

Sales		$ XXX
Beginning finished goods inventory	$ XXX	
Cost of goods manufactured	XXX	
Cost of finished goods available for sale	$ XXX	
Ending finished goods inventory	(XXX)	
Cost of goods sold		(XXX)
Gross profit		$ XXX

As shown in Exhibit 13, a retail business determines its cost of goods sold by first adding its net purchases for the period to its beginning inventory. This determines inventory available for sale during the period. The ending inventory is then subtracted to determine the **cost of goods sold**.[2]

In contrast, a manufacturing business makes the products it sells using direct materials, direct labor, and factory overhead. As a result, a manufacturing business must determine its **cost of goods manufactured** during the period.

The cost of goods manufactured is determined by preparing a **statement of cost of goods manufactured**.[3] This statement summarizes the cost of goods manufactured during the period, as follows:

Statement of Cost of Goods Manufactured

Beginning work in process inventory			$ XXX
Direct materials:			
Beginning materials inventory	$ XXX		
Purchases	XXX		
Cost of materials available for use	$ XXX		
Ending materials inventory	(XXX)		
Cost of direct materials used		$XXX	
Direct labor		XXX	
Factory overhead		XXX	
Total manufacturing costs incurred in period			XXX
Total manufacturing costs			$ XXX
Ending work in process inventory			(XXX)
Cost of goods manufactured			$ XXX

[2] To simplify, we use the computation of cost of goods sold for periodic inventory systems.

[3] Chapters 2 and 3 describe and illustrate the use of job order costing and process costing. As will be illustrated, these systems do not require a statement of cost of goods manufactured.

To illustrate, the following data for **Legend Guitars** are used:

	Jan. 1, 20Y8	Dec. 31, 20Y8
Inventories:		
Materials	$ 65,000	$ 35,000
Work in process	30,000	24,000
Finished goods	60,000	62,500
Total inventories	$155,000	$121,500
Manufacturing costs incurred during 20Y8:		
Materials purchased		$100,000
Direct labor		110,000
Factory overhead:		
Indirect labor	$ 24,000	
Depreciation on factory equipment	10,000	
Factory supplies and utility costs	10,000	
Total factory overhead		44,000
Total		$254,000
Sales		$366,000
Selling expenses		20,000
Administrative expenses		15,000

The statement of cost of goods manufactured is prepared using the following three steps:

- Step 1. Determine the *cost of direct materials used* during the period.
- Step 2. Determine the *total manufacturing costs incurred* during the period.
- Step 3. Determine the *cost of goods manufactured* during the period.

Using the data for **Legend Guitars**, the cost of direct materials used, total manufacturing costs incurred, and cost of goods manufactured are computed as follows:

Step 1. The *cost of direct materials used* in production is determined as follows:

Materials inventory, January 1, 20Y8	$ 65,000
Purchases	100,000
Cost of materials available for use	$165,000
Materials inventory, December 31, 20Y8	(35,000)
Cost of direct materials used	$130,000

The January 1, 20Y8 (beginning), materials inventory of $65,000 is added to the cost of materials purchased of $100,000 to yield the $165,000 total cost of materials that are available for use during 20Y8. Deducting the December 31, 20Y8 (ending), materials inventory of $35,000 yields the $130,000 cost of direct materials used in production.

Step 2. The *total manufacturing costs incurred in 20Y8* are determined as follows:

Direct materials used in production (Step 1)	$130,000
Direct labor	110,000
Factory overhead	44,000
Total manufacturing costs incurred in 20Y8	$284,000

The total manufacturing costs incurred in 20Y8 of $284,000 are determined by adding the cost of direct materials used in production (Step 1), the direct labor cost, and the factory overhead costs.

Step 3. The *cost of goods manufactured* is determined as follows:

Work in process inventory, January 1, 20Y8	$ 30,000
Total manufacturing costs incurred (Step 2)	284,000
Total manufacturing costs incurred	$314,000
Work in process inventory, December 31, 20Y8	(24,000)
Cost of goods manufactured in 20Y8	$290,000

The cost of goods manufactured of $290,000 is determined by adding the total manufacturing costs incurred (Step 2) to the January 1, 20Y8 (beginning), work in process inventory of $30,000. This yields total manufacturing costs incurred of $314,000. The December 31, 20Y8 (ending), work in process inventory of $24,000 is then deducted to determine the cost of goods manufactured of $290,000.

The income statement and statement of cost of goods manufactured for **Legend Guitars** are shown in Exhibit 14.

Legend Guitars
Income Statement
For the Year Ended December 31, 20Y8

Sales		$ 366,000
Cost of goods sold:		
Finished goods inventory, January 1, 20Y8	$ 60,000	
Cost of goods manufactured	290,000	
Cost of finished goods available for sale	$350,000	
Finished goods inventory, December 31, 20Y8	(62,500)	
Cost of goods sold		(287,500)
Gross profit		$ 78,500
Operating expenses:		
Selling expenses	$ 20,000	
Administrative expenses	15,000	
Total operating expenses		(35,000)
Net income		$ 43,500

Legend Guitars
Statement of Cost of Goods Manufactured
For the Year Ended December 31, 20Y8

Work in process inventory, January 1, 20Y8			$ 30,000
Direct materials:			
Materials inventory, January 1, 20Y8	$ 65,000		
Purchases	100,000		
Cost of materials available for use	$165,000		
Materials inventory, December 31, 20Y8	(35,000)		
Cost of direct materials used		$130,000	
Direct labor		110,000	
Factory overhead:			
Indirect labor	$ 24,000		
Depreciation on factory equipment	10,000		
Factory supplies and utility costs	10,000		
Total factory overhead		44,000	
Total manufacturing costs incurred in 20Y8			284,000
Total manufacturing costs			$314,000
Work in process inventory, December 31, 20Y8			(24,000)
Cost of goods manufactured			$290,000

Exhibit 14
Manufacturing Company—Income Statement with Statement of Cost of Goods Manufactured

Exhibit 15 summarizes how manufacturing costs flow to the income statement and balance sheet of a manufacturing business.

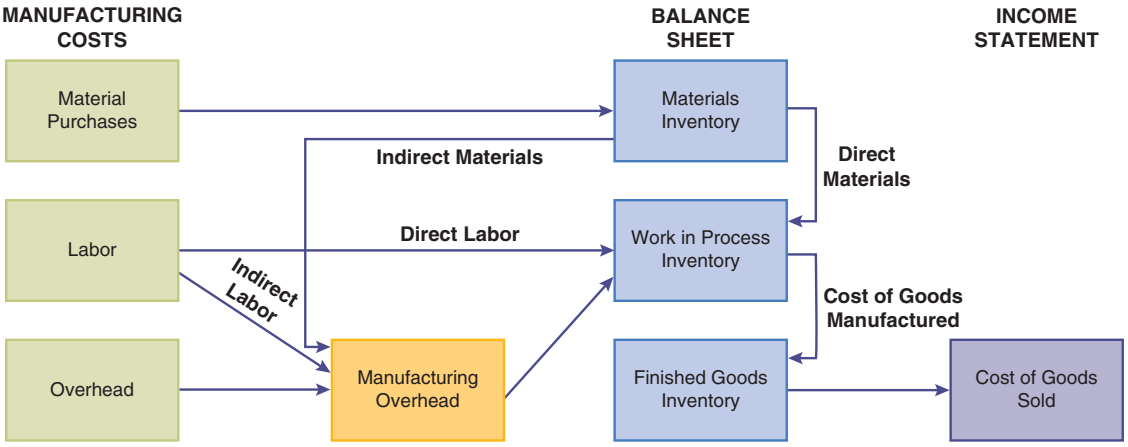


Exhibit 15
Flow of Manufacturing Costs

Check Up Corner 1-3 Manufacturing Financial Statements

The following information is available for January for MLB Mitt Company, a baseball glove manufacturer:

Cost of direct materials used in production	$25,000
Direct labor	35,000
Factory overhead	20,000
Work in process inventory, January 1	30,000
Work in process inventory, January 31	25,000
Finished goods inventory, January 1	15,000
Finished goods inventory, January 31	12,000

For January, determine (a) the cost of goods manufactured and (b) the cost of goods sold.

Solution:

The cost of goods manufactured is determined by adding the total manufacturing costs incurred to the beginning work in process inventory.

a.	Work in process inventory, January 1		$ 30,000
	Cost of direct materials used	$ 25,000	
	Direct labor	35,000	
	Factory overhead	20,000	
	Total manufacturing costs incurred in January		80,000
	Total manufacturing costs		$110,000
	Work in process inventory, January 31		(25,000)
	Cost of goods manufactured		$ 85,000
b.	Finished goods inventory, January 1	$ 15,000	
	Cost of goods manufactured	85,000	
	Cost of finished goods available for sale	$ 100,000	
	Finished goods inventory, January 31	(12,000)	
	Cost of goods sold	$ 88,000	

The cost of goods manufactured is added to the beginning finished goods inventory to determine the finished goods available for sale.

Check Up Corner

Analysis for Decision Making

Objective 4
Describe and illustrate utilization rates in evaluating performance for service companies.

Utilization Rates

Nearly 80% of U.S. economic activity (gross domestic product) is represented by services. Services are activities that do not result in the transfer, possession, or ownership of goods. Services benefit a customer or an item under a customer's control. An example of the latter is an automobile that the owner brings in for maintenance by the dealer. Services cannot be stored and are often used instantly. For example, a hotel provides a room to a guest for a night. The guest does not own the room, but only receives the service for one night. Upon receiving the room, the service is used or completed by the next morning. Other examples of services are provided in Exhibit 16.

Many of the principles discussed in this chapter for manufacturing companies can be applied to service companies. However, the unique characteristics of service companies also create some differences, as shown in Exhibit 17.

Service Industry	Service Example	Company Example
Utilities	Electric power generation	**Consolidated Edison (ED)**
Transportation	Overnight delivery	**FedEx (FDX)**
Information	Social media	**Facebook (FB)**
Financial Services	Banking	**Bank of America (BAC)**
Education	Higher education	**University of Phoenix**
Leisure and Hospitality	Entertainment	**The Walt Disney Company (DIS)**
Health	General healthcare	**Hospital Corporation of America (HCA)**
Personal Services	Fitness club	**Life Time Fitness**

Exhibit 16
Examples of Service Industries, Services, and Companies

Most of the differences in Exhibit 17 are caused by the nature of services. Service companies have no inventory or product costs. Managerial accounting in service companies is concerned with the economic use of people and fixed assets in serving customers.

Manufacturing	Services
Uses materials, work in process, and finished goods inventory.	Inventory is often limited to supplies.
Uses both product and period costs.	Uses only period costs.
Uses cost of goods sold on the income statement.	May use cost of services on the income statement.
Manufacturing requires a physical production site.	Many services require a network that connects the service to the customer. Examples include telecommunications, banking, power distribution, distributed entertainment, and transportation.
Manufacturing overhead is an indirect cost in manufacturing products.	Overhead is an indirect cost incurred in serving customers.
Labor is a direct cost to products.	Labor is not a direct cost to products, but may be a direct cost to customers. Examples are accountants in an accounting firm or doctors in a medical practice.
Materials are a direct cost to products.	Materials are often an indirect cost, but may be significant, such as fuel for transportation or utilities. In other cases, materials are not significant, such as financial, leisure, information, or education services.

Exhibit 17
Managerial Accounting Differences Between Manufacturing and Service Companies

The nature of services influences the performance metrics used by management accountants. For example, the productive use of fixed assets is an important contributor to financial success for many service companies. This is because many service companies must build large networks or other fixed assets in order to deliver a service. For example, the cellular network of **Verizon Communications (VZ)** is extremely costly and, thus, the use of the network is key to Verizon's financial success. Cruise lines (ships), utilities (power plants), railroads (track), hotels (buildings), hospitals (buildings), and educational services (buildings) also require costly fixed assets.

An important measure used in many service companies is utilization rate. A **utilization rate** measures the use of a fixed asset in serving customers relative to the asset's capacity. A higher utilization rate is considered favorable, while a lower utilization rate is considered unfavorable. Different service industries will have different names and computations used for measuring utilization rates. Some service industries, such as power generation, freight transportation, and

telecommunications, measure utilization using complex formulas. However, other service industries use simpler methods to measure utilization. In the hotel industry, for example, utilization is measured by the *occupancy rate*, which is computed as:

$$\text{Occupancy Rate} = \frac{\text{Guest Nights}}{\text{Available Room Nights}}$$

where,

Guest nights = number of guests × number of nights per visit (per time period)
Available room nights = number of available rooms × number of nights per time period

The number of guests is determined under single room occupancy, so that the number of guests is equal to the number of occupied rooms.

To illustrate, assume the EasyRest Hotel is a single hotel with 150 rooms. During the month of June, the hotel had 3,600 guests, each staying for a single night. The occupancy rate would be determined as follows:

$$\text{Occupancy Rate} = \frac{\text{Guest Nights}}{\text{Available Room Nights}}$$

$$= \frac{\text{3,600 guest nights}}{\text{150 rooms} \times \text{30 days}} = 80\%$$

The hotel was occupied to 80% of capacity, which would be considered favorable.

Make a Decision Utilization Rates

Analyze and compare Comfort Plus and Connors Hotel (MAD 1-1)

Analyze and compare Hilton Hotels and Marriott International (MAD 1-2)

Compare Sunrise Suites and Nationwide Inns (MAD 1-3)

Analyze Valley Hospital (MAD 1-4)

Analyze Eastern Skies Airlines (MAD 1-5)

Make a Decision

Let's Review

Chapter Summary

1. Managerial accounting is the process of developing information and management tools to achieve an organization's objectives. This differs from financial accounting, which provides information to users outside of the organization. Managerial accounting reports are designed to meet the specific needs of management and aid management in planning long-term strategies and running the day-to-day operations. Managerial accounting provides a variety of information for decision making for use in operating a business.

2. Manufacturing companies use machinery and labor to convert materials into a finished product. A direct cost can be directly traced to a finished product, while an

indirect cost cannot. The cost of a finished product is made up of three components: direct materials, direct labor, and factory overhead. These three manufacturing costs can be categorized into prime costs (direct materials and direct labor) or conversion costs (direct labor and factory overhead). Product costs consist of the elements of manufacturing cost—direct materials, direct labor, and factory overhead—while period costs consist of selling and administrative expenses.

3. The financial statements of manufacturing companies differ from those of retail companies. Manufacturing company balance sheets report three types of inventory: materials, work in process, and finished goods. The income statement of manufacturing companies reports the cost of goods sold, which is the total manufacturing cost of the goods sold. The income statement is supported by the statement of cost of goods manufactured, which provides the details of the cost of goods manufactured during the period.
4. A utilization rate measures the use of a fixed asset in serving customers relative to the asset's capacity. Higher utilization rates are considered favorable, while lower utilization rates are considered unfavorable. Different service industries will have different names and computations used for measuring utilization. For example, a common utilization rate in the hotel industry is the *occupancy rate*, which is computed by dividing guest nights by available room nights.

Key Terms

chief accounting officer (CAO) (9)
chief executive officer (CEO) (9)
chief financial officer (CFO) (9)
control (5)
controller (9)
conversion costs (15)
cost (12)
cost object (12)
cost of goods manufactured (19)
cost of goods sold (19)
data analytics (7)
direct costs (12)
direct labor cost (14)
direct materials cost (14)
evaluation (5)
factory burden (15)
factory overhead cost (15)
financial accounting (7)
finished goods inventory (18)
horizontals (9)
indirect costs (13)
indirect labor (15)
indirect materials (15)
management accounting (4)
management by exception (5)
management process (4)
managerial accounting (4)
manufacturing overhead (15)
materials inventory (18)
measurement (4)
operational planning (4)
overhead (15)
period costs (16)
prime costs (15)
product costs (16)
statement of cost of goods manufactured (19)
strategic planning (4)
utilization rate (23)
verticals (9)
work in process inventory (18)

Practice

Multiple-Choice Questions

1. Which of the following best describes the difference between financial and managerial accounting?
   a. Managerial accounting provides information to support decisions, while financial accounting does not.
   b. Managerial accounting is not restricted to generally accepted accounting principles, while financial accounting is restricted to GAAP.
   c. Managerial accounting does not result in financial reports, while financial accounting does result in financial reports.
   d. Managerial accounting is concerned solely with the future and does not record events from the past, while financial accounting records only events from past transactions.
2. Which of the following is *not* one of the four basic functions of the management process?
   a. Strategic planning
   b. Evaluation
   c. Control
   d. Operating
3. Which of the following is *not* considered a cost of manufacturing a product?
   a. Direct materials cost
   b. Factory overhead cost
   c. Sales salaries
   d. Direct labor cost

4. Which of the following costs would be included as part of the factory overhead costs of a microcomputer manufacturer?
   a. The cost of memory chips
   b. Depreciation of testing equipment
   c. Wages of microcomputer assemblers
   d. The cost of disk drives
5. For the month of May, Latter Company has beginning finished goods inventory of $50,000, ending finished goods inventory of $35,000, and cost of goods manufactured of $125,000. What is the cost of goods sold for May?
   a. $90,000
   b. $110,000
   c. $140,000
   d. $170,000

Answers provided after Problem. Need more practice? Find additional multiple-choice questions, exercises, and problems in CengageNOWv2.

Exercises

1. Management process — Obj. 1

Three functions of the management process are control, strategic planning, and evaluation. Match the following descriptions to the proper phase:

Phase of Management Process	Description
Control	a. Develop long-term objectives
Strategic planning	b. Monitor operations by comparing actual and expected results
Evaluation	c. Take actions to encourage specific behaviors or outcomes

2. Direct materials, direct labor, and factory overhead — Obj. 2

Identify the following costs as direct materials (DM), direct labor (DL), or factory overhead (FO) for an automobile manufacturer:

a. Wages of employees that operate painting equipment
b. Wages of the plant manager
c. Steel
d. Oil used for assembly line machinery

3. Prime and conversion costs — Obj. 2

Identify the following costs as a prime cost (P), conversion cost (C), or both (B) for an automobile manufacturer:

a. Wages of employees that operate painting equipment
b. Wages of the plant manager
c. Steel
d. Oil used for assembly line machinery

4. Product and period costs — Obj. 2

Identify the following costs as a product cost or a period cost for an automobile manufacturer:

a. Steel
b. Wages of employees that operate painting equipment
c. Rent on office building
d. Sales staff salaries

5. Cost of goods sold, cost of goods manufactured — Obj. 3

Timbuk 3 Company has the following information for March:

Cost of direct materials used in production	$21,000
Direct labor	54,250
Factory overhead	35,000
Work in process inventory, March 1	87,500
Work in process inventory, March 31	92,750
Finished goods inventory, March 1	36,750
Finished goods inventory, March 31	42,000

For March, determine (a) the cost of goods manufactured and (b) the cost of goods sold.

6. Occupancy rate **Obj. 4**

Stay-4-Ever is a small motel chain with locations in the northeastern United States. The chain has a total of 200 rooms. The following operating data are available for July:

Number of Guests	Nights per Visit	Guest Nights
1,600	1	1,600
750	2	1,500
275	3	825
80	4	320
19	5	95

a. Determine the guest nights for July.
b. Determine the available room nights for July.
c. Determine the occupancy rate for July.
d. Assume that the occupancy rate for July of the prior year was 75%. Has the utilization rate for Stay-4-Ever improved or declined?

Answers provided after Problem. Need more practice? Find additional multiple-choice questions, exercises, and problems in CengageNOWv2.

Problem

The following is a list of costs that were incurred in producing this textbook:

a. Insurance on the factory building and equipment
b. Salary of the vice president of finance
c. Hourly wages of printing press operators during production
d. Straight-line depreciation on the printing presses used to manufacture the text
e. Electricity used to run the presses during the printing of the text
f. Sales commissions paid to textbook representatives for each text sold
g. Paper on which the text is printed
h. Book covers used to bind the pages
i. Straight-line depreciation on an office building
j. Salaries of staff used to develop artwork for the text
k. Glue used to bind pages to cover

Instructions

With respect to the manufacture and sale of this text, classify each cost as either a product cost or a period cost. Indicate whether each product cost is a direct materials cost, a direct labor cost, or a factory overhead cost. Indicate whether each period cost is a selling expense or an administrative expense.

Need more practice? Find additional multiple-choice questions, exercises, and problems in CengageNOWv2.

Answers

Multiple-Choice Questions

1. **b** Managerial accounting is not restricted to generally accepted accounting principles, as is financial accounting (answer b). Both financial and managerial accounting support decision making (answer a). Financial accounting is mostly concerned with the decision making of external users, while managerial accounting supports decision making of management. Both

(Continued)

financial and managerial accounting can result in financial reports (answer c). Managerial accounting reports are developed for internal use by managers at various levels in the organization. Both managerial and financial accounting record events from the past (answer d); however, managerial accounting can also include information about the future in the form of budgets and cash flow projections.

2. **d** The four basic functions of the management process are strategic planning (answer a), measurement (not listed), evaluation (answer b), and control (answer c). Operating (answer d) is not one of the four basic functions, but operations are the object of managers' attention.

3. **c** Sales salaries (answer c) is a selling expense and is not considered a cost of manufacturing a product. Direct materials cost (answer a), factory overhead cost (answer b), and direct labor cost (answer d) are costs of manufacturing a product.

4. **b** Depreciation of testing equipment (answer b) is included as part of the factory overhead costs of the microcomputer manufacturer. The cost of memory chips (answer a) and the cost of disk drives (answer d) are both considered a part of direct materials cost. The wages of microcomputer assemblers (answer c) are part of direct labor costs.

5. **c** Cost of goods sold is computed as follows:

Beginning finished goods inventory	$ 50,000
Cost of goods manufactured	125,000
Ending finished goods inventory	(35,000)
Cost of goods sold	$140,000

Exercises

1. Control (c)
   Strategic planning (a)
   Evaluation (b)
2. a. DL
   b. FO
   c. DM
   d. FO
3. a. B
   b. C
   c. P
   d. C
4. a. Product cost
   b. Product cost
   c. Period cost
   d. Period cost
5. a.

Work in process inventory, March 1		$ 87,500
Cost of direct materials used in production	$21,000	
Direct labor	54,250	
Factory overhead	35,000	
Total manufacturing costs incurred in March		110,250
Total manufacturing costs		$197,750
Work in process inventory, March 31		(92,750)
Cost of goods manufactured		$105,000

   b.

Finished goods inventory, March 1	$ 36,750
Cost of goods manufactured	105,000
Cost of finished goods available for sale	$141,750
Finished goods inventory, March 31	(42,000)
Cost of goods sold	$ 99,750

6. a.

Number of Guests		Nights per Visit		Guest Nights
1,600	×	1	=	1,600
750	×	2	=	1,500
275	×	3	=	825
80	×	4	=	320
19	×	5	=	95
Total guest nights				4,340

b. 6,200 available room nights (200 rooms × 31 nights in July)

c. $$\text{Occupancy Rate} = \frac{\text{Guest Nights}}{\text{Available Room Nights}} = \frac{4,340}{6,200} = 70\%$$

d. The utilization (occupancy) rate has declined from 75% in the prior year to 70% in the current year.

Problem

	Product Cost			Period Cost	
Cost	Direct Materials Cost	Direct Labor Cost	Factory Overhead Cost	Selling Expense	Administrative Expense
a.			X		
b.					X
c.		X			
d.			X		
e.			X		
f.				X	
g.	X				
h.	X				
i.					X
j.			X		
k.			X		

Discussion Questions

1. Define managerial accounting and describe the four functions of the management process.
2. What are the major differences between managerial accounting and financial accounting?
3. a. Differentiate between a vertical and horizontal unit within a company.
   b. Are the accounting and legal departments normally considered vertical or horizontal units within a company?
   c. Would a consumer products division that sells products directly to consumers normally be considered a horizontal or vertical unit within a company?
4. What manufacturing cost term is used to describe the cost of materials that are an integral part of the manufactured end product?
5. Distinguish between prime costs and conversion costs.
6. What is the difference between a product cost and a period cost?
7. Name the three inventory accounts for a manufacturing business, and describe what each balance represents at the end of an accounting period.
8. What are the three categories of manufacturing costs included in the cost of finished goods and the cost of work in process?
9. How do the manufacturing costs incurred during a period differ from the cost of goods manufactured for a period?
10. How does the "Cost of goods sold" section of the income statement differ between retail and manufacturing companies?

Basic Exercises

BE 1-1 Management process — Obj. 1

Three functions of the management process are strategic planning, evaluation, and control. Match the following descriptions to the proper function:

Function of Management Process	Description
Strategic planning	a. Developing long-term objectives
Evaluation	b. The process by which management takes actions to encourage specific behaviors or outcomes
Control	c. Process by which managers monitor operations by comparing actual and expected results

BE 1-2 Direct materials, direct labor, and factory overhead — Obj. 2

Identify the following costs as direct materials (DM), direct labor (DL), or factory overhead (FO) for a magazine publisher:

a. Paper used in the magazines
b. Wages of printing machine employees
c. Maintenance on printing machines
d. Glue used to bind the magazines

BE 1-3 Prime and conversion costs — Obj. 2

Identify the following costs as a prime cost (P), conversion cost (C), or both (B) for a magazine publisher:

a. Paper used in the magazines
b. Wages of printing machine employees
c. Maintenance on printing machines
d. Glue used to bind the magazines

BE 1-4 Product and period costs — Obj. 2

Identify the following costs as a product cost or a period cost for a magazine publisher:

a. Sales salaries
b. Paper used in the magazines
c. Depreciation expense—corporate headquarters
d. Maintenance on printing machines

BE 1-5 Cost of goods sold, cost of goods manufactured — Obj. 3

Woodfall Company has the following information for June:

Cost of direct materials used in production	$260,000
Direct labor	340,000
Factory overhead	182,300
Work in process inventory, June 1	70,200
Work in process inventory, June 30	74,000
Finished goods inventory, June 1	33,300
Finished goods inventory, June 30	44,100

For June, determine (a) the cost of goods manufactured and (b) the cost of goods sold.

BE 1-6 Occupancy rate

Obj. 4

Jake's Cabins is a small motel chain with locations near the national parks of Utah, Wyoming, and Montana. The chain has a total of 500 guest rooms. The following operating data are available for June:

Number of Guests	Nights per Visit	Guest Nights
4,400	1	4,400
1,800	2	3,600
750	3	2,250
600	4	2,400
20	5	100

a. Determine the guest nights for June.
b. Determine the available room nights for June.
c. Determine the occupancy rate for June.
d. Assume that the occupancy rate for June of the prior year was 82%. Has the utilization rate for Jake's Cabins improved or declined?

Exercises

EX 1-1 Classifying costs as materials, labor, or factory overhead

Obj. 2

Indicate whether each of the following costs of a motorcycle manufacturer would be classified as direct materials cost, direct labor cost, or factory overhead cost:

a. Motorcycle engine
b. Depreciation of robotic assembly line equipment
c. Brake pads
d. Glass for windshield
e. Tires
f. Salary of quality control inspector
g. Motorcycle seat
h. Safety helmets and masks for assembly line workers
i. Wages of assembly line workers

EX 1-2 Classifying costs as materials, labor, or factory overhead

Obj. 2

Indicate whether the following costs of **Procter & Gamble (PG)**, a maker of consumer products, would be classified as direct materials cost, direct labor cost, or factory overhead cost:

a. Depreciation on assembly line equipment in the Mehoopany, Pennsylvania, paper products plant
b. Packaging materials
c. Maintenance supplies
d. Licensing payments for use of Disney characters on children's products
e. Paper used in bath tissue
f. Salary for process engineers
g. Chemicals for body wash products
h. Plant manager salary for the Iowa City, Iowa, plant
i. Scents and fragrances used in making soaps and detergents
j. Wages of production line employees at the Pineville, Louisiana, soap and detergent plant

EX 1-3 Classifying costs as factory overhead

Obj. 2

Which of the following items are properly classified as part of factory overhead for **Ford Motor Company (F)**, a maker of heavy automobiles and trucks?

a. Air conditioner units for installation in vehicles
b. Consultant fees for a study of production line efficiency

(Continued)