

MAHER | LANEN | RAJAN



# Fundamentals of Cost Accounting

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# FUNDAMENTALS OF COST ACCOUNTING

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<p>Exercise 2-1: Using Cost Terms [LO2, LO5, LO7]</p> <p>Following are a number of cost terms introduced in the chapter:</p> <table> <tr> <td>Period cost</td><td>Fixed cost</td></tr> <tr> <td>Variable cost</td><td>Prime cost</td></tr> <tr> <td>Opportunity cost</td><td>Conversion cost</td></tr> <tr> <td>Product cost</td><td>Sunk cost</td></tr> </table> <p>Choose the cost term or terms above that most appropriately describe the costs identified in each of the following situations. A cost term can be used more than once.</p> <ol style="list-style-type: none"> <li>Crestline Books, Inc., prints a small book titled <i>The Pocket Speller</i>. The paper going into the manufacture of the book would be called direct materials and classified as a <b>Product cost</b> (6%). In terms of cost behavior, the paper could also be described as a <b>Product cost</b> (0%) with respect to the number of books printed.</li> <li>Instead of compiling the words in the book, the author hired by the company could have earned considerable fees consulting with business organizations. The consulting fees forgone by the author would be called <b>Opportunity cost</b> (6%).</li> <li>The paper and other materials used in the manufacture of the book, combined with the direct labor cost involved, would be called <b>Prime cost</b> (6%).</li> <li>The salary of Crestline Books' president would be classified as a <b>Product cost</b> (0%), and the salary will appear on the income statement as an expense in the time period in which it is incurred.</li> <li>Depreciation on the equipment used to print the book would be classified by Crestline Books as a <b>Product cost</b> (6%). However, depreciation on any equipment used by the company in selling and administrative activities would be classified as a <b>Period cost</b> (6%). In terms of cost behavior, depreciation would probably be classified as a <b>Fixed cost</b> (6%) with respect to the number of books printed.</li> <li>A <b>Product cost</b> (6%) is also known as an inventoriable cost.</li> </ol>	Period cost	Fixed cost	Variable cost	Prime cost	Opportunity cost	Conversion cost	Product cost	Sunk cost	<p>Exercise 2-1: Using Cost Terms [LO2, LO5, LO7]</p> <p>Following are a number of cost terms introduced in the chapter:</p> <table> <tr> <td>Period cost</td><td>Fixed cost</td></tr> <tr> <td>Variable cost</td><td>Prime cost</td></tr> <tr> <td>Opportunity cost</td><td>Conversion cost</td></tr> <tr> <td>Product cost</td><td>Sunk cost</td></tr> </table> <p>Choose the cost term or terms above that most appropriately describe the costs identified in each of the following situations. A cost term can be used more than once.</p> <ol style="list-style-type: none"> <li>Crestline Books, Inc., prints a small book titled <i>The Pocket Speller</i>. The paper going into the manufacture of the book would be called direct materials and classified as a <b>Product cost</b>. In terms of cost behavior, the paper could also be described as a <b>variable cost</b> with respect to the number of books printed.</li> <li>Instead of compiling the words in the book, the author hired by the company could have earned considerable fees consulting with business organizations. The consulting fees forgone by the author would be called <b>Opportunity cost</b>.</li> <li>The paper and other materials used in the manufacture of the book, combined with the direct labor cost involved, would be called <b>Prime cost</b>.</li> <li>The salary of Crestline Books' president would be classified as a <b>Period cost</b>, and the salary will appear on the income statement as an expense in the time period in which it is incurred.</li> <li>Depreciation on the equipment used to print the book would be classified by Crestline Books as a <b>Product cost</b>. However, depreciation on any equipment used by the company in selling and administrative activities would be classified as a <b>Period cost</b>. In terms of cost behavior, depreciation would probably be classified as a <b>Fixed cost</b> with respect to the number of books printed.</li> <li>A <b>Product cost</b> is also known as an inventoriable cost.</li> </ol>	Period cost	Fixed cost	Variable cost	Prime cost	Opportunity cost	Conversion cost	Product cost	Sunk cost
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Product cost	Sunk cost																

Immediately after finishing an assignment or quiz, students can compare their answers side by side with the detailed solutions. Students can try again with new numbers to see if they have mastered the concept.

## **Dedication**

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I dedicate this book to my children, Krista and Andrea, and to my extended family, friends, and colleagues, who have provided their support and wisdom over the years.

Michael

To my wife, Donna, and my children, Cathy and Tom, for encouragement, support, patience, and general good cheer throughout the years.

Bill

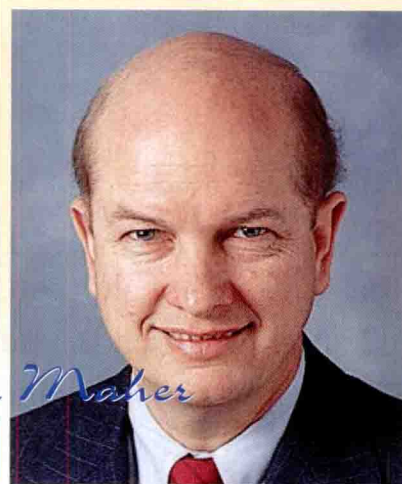
To my mentors, Stan and Srikant, for their inspiration; to my parents, for their encouragement; to my family, for their love.

Madhav



# About the Authors

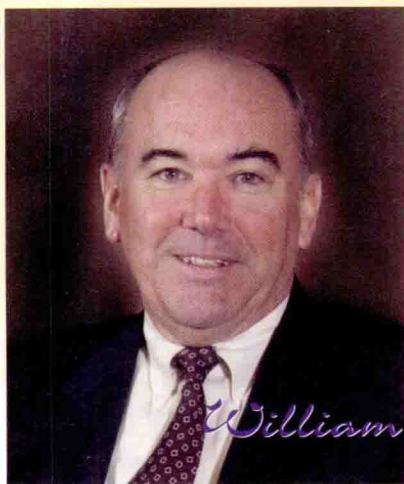
Michael W. Maher



Michael Maher is a Professor of Management at the University of California-Davis. He previously taught at the University of Michigan, the University of Chicago, and the University of Washington. He also worked on the audit staff at Arthur Andersen & Company and was a self-employed financial consultant for small businesses. He received his BBA from Gonzaga University, which named him Distinguished Alumnus in 1989, and his MBA and PhD from the University of Washington, and he earned the CPA from the state of Washington.

Michael is a past president of the Management Accounting Section of the American Accounting Association and has served on the editorial boards of *The Accounting Review*, *Accounting Horizons*, *Journal of Management Accounting Research*, and *Management Accounting*. He is coauthor of two leading textbooks, *Cost Management*, 3/e, and *Managerial Accounting*, 8/e. Maher has coauthored several additional books and monographs, including *Internal Controls in U.S. Corporations* and *Management Incentive Compensation Plans*, and published articles in many journals, including *Management Accounting*, *The Journal of Accountancy*, *The Accounting Review*, *Journal of Accounting Research*, *Financial Executive*, and *The Wall Street Journal*.

For his research on internal controls, Michael was awarded the American Accounting Association's Competitive Manuscript Award and the AICPA Notable Contribution to Literature Award. He also received the award for the Outstanding Tax Manuscript. He received the Annual Outstanding Teacher Award three times from his students at the University of California's Graduate School of Management and twice he has received a special award for outstanding service. Maher's current research includes studies of the efficacy of online education, health care costs, and corporate corruption.



*William N. Lanen*

William Lanen is Professor of Accounting and Michael and Joan Sakkinen Scholar at the Stephen M. Ross School of Business at the University of Michigan Business School. He holds degrees in economics from the University of California, Berkeley and Purdue University and earned a PhD in accounting from the Wharton School of the University of Pennsylvania.

Bill teaches management accounting in both the BBA and MBA programs at the University of Michigan. He also teaches management accounting in Global MBA Programs and Executive Education Programs in Asia, Europe, and Latin America. Before coming to the University of Michigan, Bill was on the faculty at the Wharton School of the University of Pennsylvania where he taught various financial and managerial accounting courses at the undergraduate, MBA, and Executive MBA levels. He has received teaching awards at both the University of Michigan and the Wharton School.

Bill has served on the Editorial Board of *The Accounting Review* and the *Journal of Management Accounting Research*. He has published in *Journal of Accounting Research*, *Journal of Accounting and Economics*, *Accounting, Organizations, and Society*, and *The Accounting Review*. Bill is past-president of the Management Accounting Section of the American Accounting Association.



*Madhav U. Rajan*

Madhav Rajan is Gregor G. Peterson Professor of Accounting at the Graduate School of Business, Stanford University. Madhav joined Stanford GSB in 2001, after 12 years on the faculty of the Wharton School of the University of Pennsylvania. Madhav received his MS, MBA, and PhD in Accounting from Carnegie Mellon University. His dissertation won Carnegie Mellon's Alexander Henderson Award for Excellence in Economic Theory.

Madhav is an editor of *The Accounting Review* and an associate editor for *Management Science*. He also serves on the editorial boards of three other academic journals. Madhav's primary area of research interest is the economics-based analysis of issues in management accounting, using both analytical and empirical methodologies. His work has been published in leading journals in accounting, economics, finance, and operations management. In 2004, he received the American Accounting Association's Notable Contribution to Management Accounting Literature award.

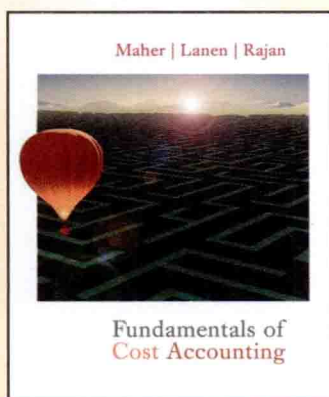
Madhav has taught courses in cost and managerial accounting at the undergraduate, MBA, PhD, and executive MBA levels. He has won numerous undergraduate and MBA teaching awards at Wharton and Stanford GSB, including the David W. Hauck Award, the highest undergraduate teaching honor at Wharton.



# Helping Students through the

The business world presents an array of twists and turns, and getting through them successfully takes informed decision making and a

# Maze



perspective that takes in the whole picture, not just the view immediately ahead. Students entering the business world need to navigate a maze of information systems, ambiguous situations, and value- and nonvalue-added activities. Cost accounting gives them the skills they need to find their way through, and *Fundamentals of Cost Accounting* is the best choice available to help them learn the cost concepts they must know to succeed.

**We based this text on the needs of accounting instructors and students.**

**In a nationwide survey of cost accounting instructors,** conducted in May 2004, we asked what the greatest challenge and most difficult topics are in this course. **The feedback we received from the market shaped this book.** From the comments we received, it was clear that the ideal cost textbook needed to have three qualities: it needed to **develop students' problem solving skills, be realistic, and be concise.** By accomplishing these three goals, *Fundamentals of Cost Accounting* helps students through the maze.

## Problem-Solving Skills

Students learn by doing, so *Fundamentals of Cost Accounting* provides a wide range of challenging and thought-provoking end-of-chapter material for them to practice on. The authors have written the problem material to match precisely the presentation of concepts in each chapter; there are no inconsistent terms or conflicting requirements.

*Fundamentals of Cost Accounting* is available with McGraw-Hill's Homework Manager, the most powerful system for creating, assigning, and grading homework. With this tool, you can use the authors' problem material to its full potential. McGraw-Hill's Homework Manager can generate unlimited variations of the end-of-chapter material in *Fundamentals of Cost Accounting*, allowing you to create unique assignments, tests, or practice problems in minutes.

## Realistic

Students enter the cost accounting course with varying levels of preparedness, and some lack the experience to understand how cost accounting relates to all types of businesses and organizations. For this reason, *Fundamentals of Cost Accounting* presents concepts in context, showing how cost accounting applies to a variety of service and manufacturing companies. Topic Tackler Plus, a multimedia tutorial available at the text Web site or on an optional CD-ROM, gives the students even more real-world flavor with video clips illustrating text concepts at work in actual companies.

## Concise

By focusing on key concepts, we have kept *Fundamentals of Cost Accounting* brief and to the point. With such a concise book, students spend less time trying to memorize details and more time analyzing and applying fundamental principles.

*"I have to say that this is the best cost text I have ever seen by far and I can't stress that enough. . . . The organization of this text in general and the individual chapters is excellent and the clarity of presentation is refreshing."*

John Giles  
North Carolina State University



# Your Guide to Cost Concepts



## Fundamentals of Product and Service Costing

### Chapter Five

#### LEARNING OBJECTIVES

After reading this chapter, you should be able to:

- L.O.1** Explain the fundamental themes underlying the design of cost systems
- L.O.2** Explain how cost allocation is used in a cost management system

### Chapter opener/ opening vignette

Each chapter opens with an engaging, realistic story of how an organization has used cost accounting principles. This sets the stage for the rest of the chapter and encourages students to think of concepts in context.

Working in a group in this executive education class has been really helpful, but maybe not for the reason the instructor thought. About an hour ago, we broke out in groups of three to establish a price for a product. We decided to start by determining the cost of making the product. But the three of us in the group work in very different industries, so when we developed the cost, we all approached it in a different way. We then spent more time talking about the costing systems used in each of our companies than about

coming up with a solution for the case. Now, we have to get back to the classroom. I hope the cost we estimated makes sense.

Selene Theodakis, the production manager at Boats, a manufacturer of custom-built pleasure boats, talking during a break at a local college. The other people in her group were Cathy Baxter, owner of Baxter Sports, and Tom Adams, the marketing manager at Thomson Sports.

**T**his chapter provides an overview of alternative cost systems for product and service costing. Details and extensions to the basic models described here are presented in the following three chapters. The fundamental approach and the problems that arise from using cost data generated by these basic costing systems are illustrated by the example of a boat manufacturer. We follow

### In Action boxes

These examples, drawn from contemporary journals and the authors' own experiences, illustrate how to apply cost accounting methods and tools.

240

Chapter 8 Activity-Based Costing

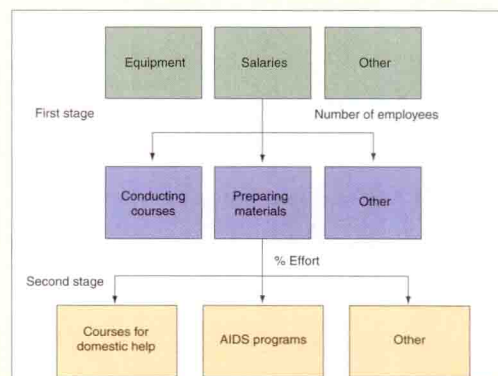
#### In Action Activity-Based Costing in a Not for Profit

Activity-based costing is not just for manufacturing firms or even only for-profit firms. Any organization that wants to better understand the costs of the goods and services it provides can benefit from using it.

The following is a cost flow diagram from a proposed activity-based cost system for a not-for-profit (sometimes referred to as a nongovernment organization, or NGO) operating in the Hong Kong Special Administrative Region of

China. Notice that the first stage separates costs into activities (using number of employees) and then into services using, for one of the activities—preparing materials, percent of effort.

Source: P. Ip, P. Li, and J. Yau, "Application of Activity-Based Costing (ABC): The Case of a Non-Government Organization," *International Journal of Management*, v. 20 (3): 282.





## Review Questions

- 6-1. What are characteristics of companies that are likely to use a job cost system?
- 6-2. Direct labor-hours and direct labor dollars are the most common allocation bases for overhead in the United States (indeed, throughout the world). Why do you suppose they are more common than others?

## Critical Analysis and Discussion Questions

Why do most companies use normal or standard costing? After all, actual costing gives the most accurate picture of the cost of a job, so the firm could just wait until it knows what the cost will be. Is the control of materials important from a managerial planning perspective? Is the control of overhead important from a managerial planning perspective? What about the choice of an overhead allocation base is a waste of time. In the end, overhead is charged to production. Do you agree? Why?

View the manager of a construction company (for example, a company that does house construction, remodeling, landscaping, or street or highway construction) about how they bid on prospective jobs. Does it use cost information from former jobs that are used to bid on prospective ones, for example? Does it have a specialist in cost estimation who estimates the costs of prospective jobs? Write a report to your instructor summarizing the results of your investigation.

## Exercises

### Costs to Jobs

Transactions occurred in April at Darlington Workshops, a custom manufacturer of

10,000 of materials.  
 1,000 of supplies from the materials inventory.  
 600 of materials.  
 Materials purchased in transaction (1).  
 Direct materials to the production department.  
 Direct labor costs of \$10,000, which were credited to Payroll.  
 Cash for utilities, power, equipment maintenance, and depreciation.  
 Depreciation on manufacturing property, plant, and equipment.

## Problems



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(L.O. 3)

### 6-25. Estimate Hours Worked from Overhead Data

Griffin Corporation estimated that direct labor for the year would be 39,000 hours. Overhead (all fixed) is applied on the basis of direct labor-hours. The company estimated overhead costs at \$156,000. During the year, all overhead costs were exactly as planned (\$156,000). Overhead was \$5,200 in overapplied overhead.

#### Required

How many direct labor-hours were worked during the period? Show computations.

(L.O. 2, 3)

### 6-26. Assigning Costs—Missing Data

The following T-accounts represent September activity.

Materials Inventory			Work-In-Process Inventory		
BB (9/1)	8,000		BB (9/1)	22,300	
	(a)	4,300		180,500	
		(b)			
EB (9/30)	9,700				

## Integrative Cases

These involving cases ask students to apply the different techniques they have learned to a realistic situation.

## Integrative Cases

(L.O. 1, 3, 5, 6)



### 8-38. Cost Allocation and Environmental Processes—Ethical Issues

California Circuits Company (3C) manufactures a variety of components. Its Valley plant specializes in two electronic components used in circuit boards. These components serve the same function and perform equally well. The difference in the two products is the raw material. The XL-D chip is the older of the two components and is made with a metal that requires a wash prior to assembly. Originally, the plant released the wastewater directly into a local river. Several years ago, the company was ordered to treat the wastewater before its release, and it installed relatively expensive equipment. While the equipment is fully depreciated, annual operating expenses of \$250,000 are still incurred for wastewater treatment.

Two years ago, company scientists developed an alloy with all of the properties of the raw materials used in XL-D that generates no wastewater. Some prototype components using the new material were produced and tested and found to be indistinguishable from the old components in every way relating to their fitness for use. The only difference is that the new alloy is more expensive than the old raw material. The company has been test-marketing the newer version of the component, referred to as XL-C, and is currently trying to decide its fate.

Manufacturing both components begins in the Production Department and is completed in the Assembly Department. No other products are produced in the plant. The following provides information for the two components:

	XL-D	XL-C
Units produced	100,000	25,000
Raw material costs per unit	\$12	\$14
Direct Labor-Hours per unit—Production	0.1	0.1
Direct Labor-Hours per unit—Assembly	0.4	0.4
Direct Labor Rate per hour—all labor	\$20	\$20
Machine-Hours per unit—production	1.6	1.6
Machine-Hours per unit—assembly	0.4	0.4
Testing Hours per unit (all in production)	3.0	3.0
Shipping weight per unit (pounds)	1.0	1.5
Wastewater generated per unit (gallons)	10.0	0.0

Annual overhead costs for the two departments follow:

	Production Department	Assembly Department
Supervision	\$ 100,000	\$240,000
Material handling	93,000	40,000
Testing	150,000	—0—
Wastewater treatment	250,000	—0—
Depreciation on equipment	400,000	100,000
Shipping	7,000	120,000
Total	\$1,000,000	\$500,000



# Map through the chapters

## Chapter 1 Cost Accounting: Information for Decision Making

The text starts with a detailed overview of cost accounting that describes many of the decisions that require cost accounting information. It also discusses ethical decisions and problems students may face in their careers.

**Unlike most first chapters, it provides a good introduction. This is not a chapter I'd skip!**

—Patricia Derrick, Virginia Tech University

## Chapter 2 Cost Concepts and Behavior

This chapter discusses how cost accounting systems provide information to help managers make better decisions. Because cost accounting systems are tailored to the needs of individual companies, several terms are used in practice to describe the same or similar cost concepts, depending on the use or the audience.

**I see why your book is different. The work to integrate topics in the reading is great. This is a distinct challenge and I can see why it has not been done in this way before.**

—Thomas Zeller, Loyola University—Chicago

## Chapter 3 Fundamentals of Cost Analysis for Decision Making

Unlike typical cost accounting texts, this chapter incorporates the discussion of relevant costs and cost analysis into one chapter. Where most texts cover these related concepts in multiple chapters, *Fundamentals* has grouped the discussion of CVP, decision making, and constraints into one comprehensive chapter at the beginning of the text.

**Incorporating relevant cost decisions into the chapter on cost analysis—this is conceptually sound and not usually done in texts.**

—Margaret O'Reilly-Allen, Rider University

## Chapter 4 Cost Estimation

When managers make decisions, they need to compare the costs (and benefits) among alternative actions by estimating the costs associated with each alternative. This chapter discusses how to estimate the cost data required for decision making and how cost estimates can be an important element in making decisions that add value to the company.

*Fundamentals of Cost Accounting* is a cost accounting text for decision making. Through real-world examples and detailed illustrations, each chapter provides comprehensive coverage of the basic concepts of cost accounting.

## Chapter 5 Fundamentals of Product and Service Costing

This chapter provides an overview of alternative cost systems for product and service costing presented in Chapters 6, 7, and 8. The intuitive approach the chapter takes highlights the basics of product costing systems. The fundamental approach and the problems that arise from using cost data generated by these basic costing systems are illustrated by the examples in the chapter. Two principles are emphasized: the cost system should be oriented to the needs of the decision makers (that is, users of the information) and the cost system should be designed so that its benefits exceed its costs.

**Good explanation of equivalent units. Really like the way the reader is lead to the need for EQU's. In my experience, students "get" the concept if they come to see the need for them by themselves through an example. Good discussion of allocation bases. . . . Nice logical flow. It's not rushed (as is often the case in many texts).**

—Patricia Derrick, Virginia Tech University

## Chapter 6 Job Costing

## Chapter 7 Process Costing

## Chapter 8 Activity-Based Costing

Chapters 6, 7, and 8 use detailed flow charts and examples of the various costing systems. Chapter 6 discusses the product costing system, including accounting for the flows of costs through the inventory accounts. It describes a job costing system used in many service and discrete manufacturing settings. Chapter 7 deepens the discussion by describing the development of a process costing system. Operations costing systems are described at the end of the chapter. Chapter 8 describes innovations to the basic costing systems, including activity-based costing (ABC), which has been implemented or considered by manufacturing firms such as General Motors and Chrysler, financial service firms such as Citibank, and even agencies of the U.S. government.

**This chapter is written very well on a very, very difficult topic for students.**

—Jeannie Harrington, Middle Tennessee University



## Chapter 9 Fundamentals of Cost Management

While Chapter 8 discusses the use of activity-based costing to compute the costs of products and services, Chapter 9 considers the use of these methods to manage and control costs. Activity-based management does not focus on the detailed calculation of product costs using activity-based costing already covered in Chapter 8, but explores management's uses of activity-based costing methods to identify ways to assess customer profitability. The chapter also describes the assignment of capacity costs and measuring the cost of quality.

**I think this chapter is a major contribution compared to most old texts.**

—Kathleen Sevigny, Bridgewater State College

## Chapter 10 Service Department and Joint Cost Allocation

Chapter 10 discusses the allocation of service department costs to production departments. It also considers product costing when multiple products are produced from inputs in fixed proportions. The chapter describes several methods of allocating joint costs and includes multiple examples.

**Having service department allocations and joint cost allocations in one chapter is very efficient, and facilitates understanding of the material.**

—Ola Smith, Western Michigan University

## Chapter 11 Fundamentals of Management Control Systems

Students explicitly recognize how individuals respond to methods used for performance measurement. Thus, the discussion of the design and use of management control systems uses concepts from human and organizational behavior as well as accounting and economics. This chapter develops basic issues and a coherent framework for assessing management control issues.

**Resists temptation to fill with "fluff." Presents the material well, grounds it well, but doesn't add the management control system du jour, which quickly dates the book.**

—Patricia Derrick, Virginia Tech University

## Chapter 12 Planning and Budgeting

This chapter focuses on the planning purposes of the budgeting process. It shows how a master budget is developed and how it fits into the overall plan for achieving organization's goals. Before investigating the details of developing a master budget, this chapter discusses how strategic planning can increase competitiveness and affect global operations.

## Chapter 13 Business Unit Performance Measurement

Chapter 13 develops and analyzes the performance measures for investment centers or business units. As the chapter develops the performance measures, the discussion centers around three questions:

- 1) Is the performance measure consistent with the decision authority of the manager?
- 2) Does the measure reflect the results of the actions that improve the performance of the organization?
- 3) What actions can the manager take that improve reported performance, but are detrimental to organizational performance?

**This is a relatively new and important topic . . . well done in this chapter.**

—Margaret O'Reilly-Allen, Rider University

## Chapter 14 Transfer Pricing

Chapter 14 explains the basic issues involved with transfer pricing by presenting real-world examples to show the costs of dysfunctional decision making that arise when local managers, making decisions based on local interests, make choices that are suboptimal for the organization as a whole.

**The exercises and problems were very interesting as they have a high global and segment reporting content; the examples used were very realistic. They would make the classroom experience very enriching.**

—Kim Tan, California State University-Stanislaus

## Chapter 15 Fundamentals of Variance Analysis

Chapter 15 discusses the control and evaluation activity for profit and cost centers. Comparing actual performance to budgets, students learn how to better understand why targets are not achieved. This helps maintain control by identifying areas for improvement. It also allows firms to assess the performance of managers in different departments.

## Chapter 16 Special Topics in Variance Analysis

This chapter discusses additional variances to illustrate some of the ways the basic variance analysis model can be extended and adapted to specific circumstances. The basic principles are the same as those presented in Chapter 15.

## Chapter 17 Nonfinancial and Multiple Measures of Performance

This chapter discusses how financial performance measures are commonly used to evaluate employee performance. In recent years, however, more and more companies have begun using nonfinancial measures such as customer satisfaction and product quality measures. This chapter shows innovative ways to evaluate performance "beyond the numbers" by presenting a framework used to ensure that the performance measures developed are consistent with the rest of the management control system.



# Technology



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- Video clips
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- Interactive quizzes

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This icon marks any topic given further coverage in Topic Tackler.

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- Links to text references
- Links to professional resources on the Web and job opportunity information
- Learning objectives
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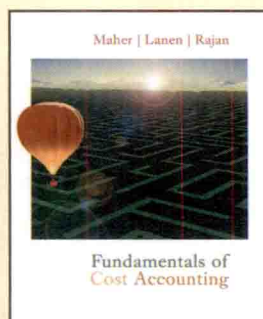
The OLC is full of resources for students, including: Chapter Summaries, Online Quizzing, Key Term Reviews, PowerPoint Presentations, Excel Templates, Links to Net Tutor and Homework Manager, Links to Professional Resources, and Text Updates.

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