Fundamentals of Cost Accounting

Sixth Edition

William Lanen
Shannon Anderson
Michael Maher

Mc Graw Hill Education

Fundamentals of Cost Accounting

6e

William N. Lanen
University of Michigan

Shannon W. Anderson
University of California at Davis

Michael W. Maher
University of California at Davis

Mc Graw Hill Education

FUNDAMENTALS OF COST ACCOUNTING, SIXTH EDITION

This book is printed on acid-free paper.

1 2 3 4 5 6 7 8 9 LWI 21 20 19 18

ISBN 978-1-259-96947-8 (bound edition)
MHID 1-259-96947-9 (bound edition)
ISBN 978-1-260-70875-2 (loose-leaf edition)
MHID 1-260-70875-6 (loose-leaf edition)

Portfolio Manager: *Elizabeth Eisenhart*
Product Developers: *Michele Janicek/Marilyn Isaacks*
Marketing Manager: *Katherine Wheeler*
Content Project Managers: *Fran Simon/Brian Nacik*
Buyer: *Susan K. Culbertson*
Designer: *Matt Diamond*
Content Licensing Specialists: *Melissa Homer*
Cover Image: ©*structuresxx/Shutterstock*
Compositor: *Aptara®, Inc.*

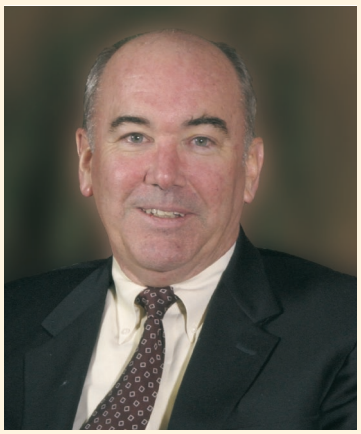
All credits appearing on page or at the end of the book are considered to be an extension of the copyright page.

Library of Congress Cataloging-in-Publication Data

Names: Lanen, William N., author. | Anderson, Shannon W., author. | Maher, Michael, 1946- author.
Title: Fundamentals of cost accounting / William N. Lanen, University of Michigan, Shannon W. Anderson, University of California at Davis, Michael W. Maher, University of California at Davis.
Description: Sixth edition. | New York, NY : McGraw-Hill/Irwin, a business unit of The McGraw-Hill Companies, Inc., [2020]
Identifiers: LCCN 2018048520 | ISBN 9781259969478 (alk. paper) | ISBN 1259969479 (alk. paper)
Subjects: LCSH: Cost accounting.
Classification: LCC HF5686.C8 M224 2020 | DDC 657/.42–dc23 LC record available at https://lccn.loc.gov/2018048520

mheducation.com/highered

About the Authors



William N. Lanen

William Lanen is the KPMG Professor of Accounting Emeritus at the **University of Michigan**. He previously taught at the **Wharton School** at the **University of Pennsylvania**. He received his AB from the **University of California-Berkeley**, MS from **Purdue University**, and his PhD from the **Wharton School**. He has taught cost accounting to undergraduates, MBA students, and executives, including in global programs in Europe, South America, Australia, and Asia. He has also served as the director of the Office of Action-Based Learning at the Ross School of the University of Michigan. His research focuses primarily on performance evaluation and reward systems.

Shannon W. Anderson

Shannon Anderson is the Michael and Joelle Hurlston Presidential Chair and professor of management at the **University of California-Davis**. Previously she taught at **Rice University**, the **University of Melbourne**, and the **University of Michigan**. She received her PhD from **Harvard University** and a BSE from **Princeton University**. Shannon has taught undergraduate, masters, and doctoral students a variety of courses on cost accounting, cost management, and management control. Her research focuses on the design and implementation of performance measurement and cost control systems.

Michael W. Maher

Michael Maher is a professor of management at the **University of California-Davis**. He previously taught at the **University of Michigan** and was a visiting professor at the **University of Chicago**. He received his MBA and PhD from the **University of Washington** and his BBA from **Gonzaga University** and was awarded a CPA by the State of Washington. He has published more than a dozen books, including several textbooks that have appeared in numerous editions. He has taught at all levels from undergraduate to MBA to PhD and executives. His research focuses on cost analysis in service organizations, corporate governance, and white-collar crime. In 2015, he received a Lifetime Achievement Award for his research and teaching in managerial accounting from the AICPA and the AAA.

Dedication

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

Bill

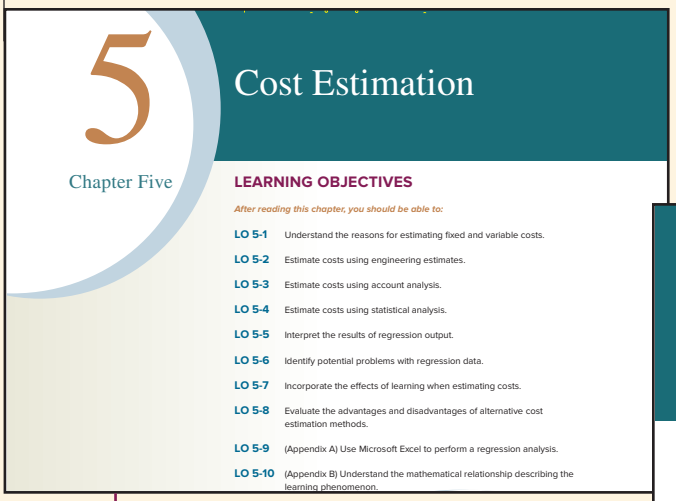
I dedicate this book to the extraordinary public school teachers and counselors who shaped my early development and modeled excellence in teaching, especially Don Bryant, Michael Varner, Carolyn Crouse, and Lee Martin; and to the teachers who had the first and most enduring influence on me, my parents, Max and Nina Weems.

Shannon

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

Michael

Step into the Real World


5

Chapter Five

Cost Estimation

LEARNING OBJECTIVES

After reading this chapter, you should be able to:

LO 5-1 Understand the reasons for estimating fixed and variable costs.

LO 5-2 Estimate costs using engineering estimates.

LO 5-3 Estimate costs using account analysis.

LO 5-4 Estimate costs using statistical analysis.

LO 5-5 Interpret the results of regression output.

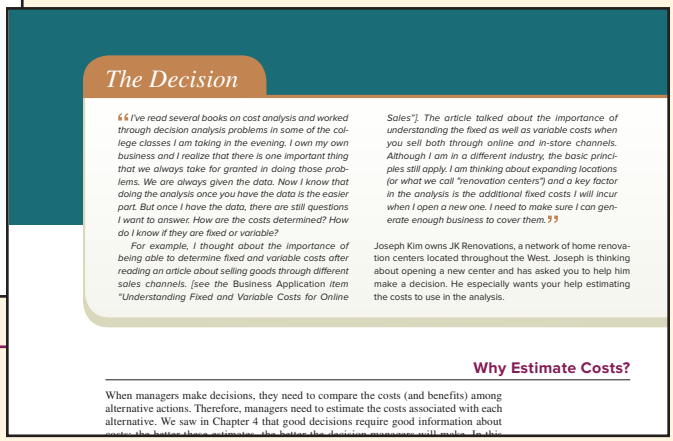
LO 5-6 Identify potential problems with regression data.

LO 5-7 Incorporate the effects of learning when estimating costs.

LO 5-8 Evaluate the advantages and disadvantages of alternative cost estimation methods.

LO 5-9 (Appendix A) Use Microsoft Excel to perform a regression analysis.

LO 5-10 (Appendix B) Understand the mathematical relationship describing the learning phenomenon.


The Decision

"I've read several books on cost analysis and worked through decision analysis problems in some of the college classes I am taking in the evening. I own my own business and I realize that there is one important thing that we always take for granted in doing those problems. We are always given the data. Now I know that doing the analysis once you have the data is the easier part. But once I have the data, there are still questions I want to answer. How are the costs determined? How do I know if they are fixed or variable?

For example, I thought about the importance of being able to determine fixed and variable costs after reading an article about selling goods through different sales channels. [see the Business Application *item "Understanding Fixed and Variable Costs for Online Sales"]. The article talked about the importance of understanding the fixed as well as variable costs when you sell both through online and in-store channels. Although I am in a different industry, the basic principles still apply. I am thinking about expanding locations (or what we call "renovation centers") and a key factor in the analysis is the additional fixed costs I will incur when I open a new one. I need to make sure I can generate enough business to cover them."*

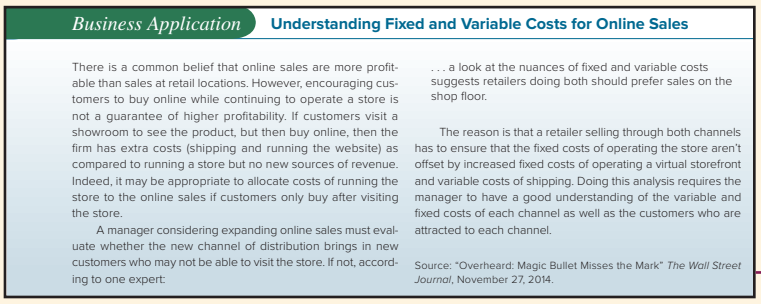
Joseph Kim owns JK Renovations, a network of home renovation centers located throughout the West. Joseph is thinking about opening a new center and has asked you to help him make a decision. He especially wants your help estimating the costs to use in the analysis.

Why Estimate Costs?

When managers make decisions, they need to compare the costs (and benefits) among alternative actions. Therefore, managers need to estimate the costs associated with each alternative. We saw in Chapter 4 that good decisions require good information about

Chapter Opening Vignettes

Do your students sometimes wonder how the course connects with their future? Each chapter opens with *The Decision,* a vignette in which a decision maker needs cost accounting information to make a better decision. This sets the stage for the rest of the chapter and encourages students to think of concepts in a business context.


Business Application **Understanding Fixed and Variable Costs for Online Sales**

There is a common belief that online sales are more profitable than sales at retail locations. However, encouraging customers to buy online while continuing to operate a store is not a guarantee of higher profitability. If customers visit a showroom to see the product, but then buy online, then the firm has extra costs (shipping and running the website) as compared to running a store but no new sources of revenue. Indeed, it may be appropriate to allocate costs of running the store to the online sales if customers only buy after visiting the store.

A manager considering expanding online sales must evaluate whether the new channel of distribution brings in new customers who may not be able to visit the store. If not, according to one expert:

. . . a look at the nuances of fixed and variable costs suggests retailers doing both should prefer sales on the shop floor.

The reason is that a retailer selling through both channels has to ensure that the fixed costs of operating the store aren't offset by increased fixed costs of operating a virtual storefront and variable costs of shipping. Doing this analysis requires the manager to have a good understanding of the variable and fixed costs of each channel as well as the customers who are attracted to each channel.

Source: "Overheard: Magic Bullet Misses the Mark" *The Wall Street Journal*, November 27, 2014.

Business Application

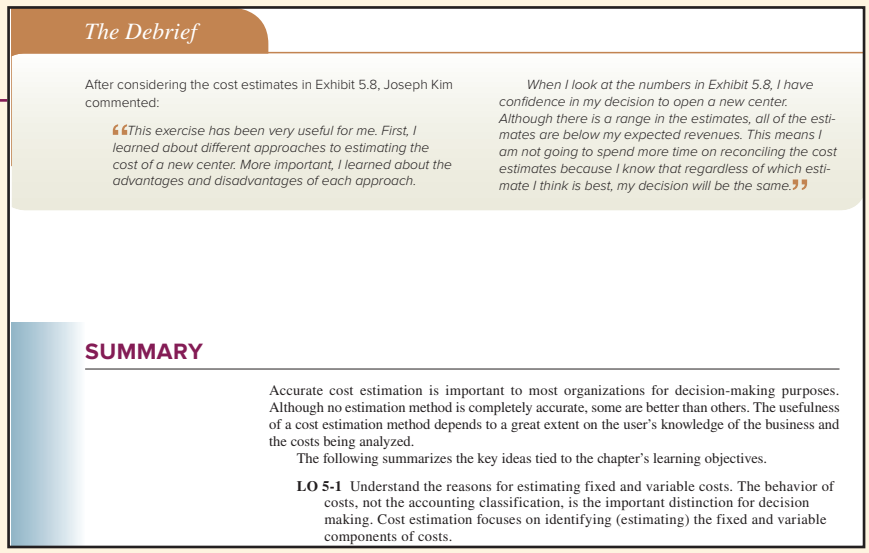
Do your students need help connecting theory to application? The *Business Application* examples tie in to *The Decision* chapter-opening vignettes and are drawn from contemporary journals and the authors' own experiences. They illustrate how to apply cost accounting methods and tools.

"[The Business Application features are] a very helpful piece to help students see how the course material becomes relevant in the professional world."

—N. Ahadiat
University of California Pomona

Debrief

Do your students understand how to apply the concepts in each chapter to become better decision makers? All chapters end with a Debrief feature that links the topics in the chapter to the decision problem faced by the manager in the opening vignette.



The Debrief

After considering the cost estimates in Exhibit 5.8, Joseph Kim commented:

"This exercise has been very useful for me. First, I learned about different approaches to estimating the cost of a new center. More important, I learned about the advantages and disadvantages of each approach. When I look at the numbers in Exhibit 5.8, I have confidence in my decision to open a new center. Although there is a range in the estimates, all of the estimates are below my expected revenues. This means I am not going to spend more time on reconciling the cost estimates because I know that regardless of which estimate I think is best, my decision will be the same."

SUMMARY

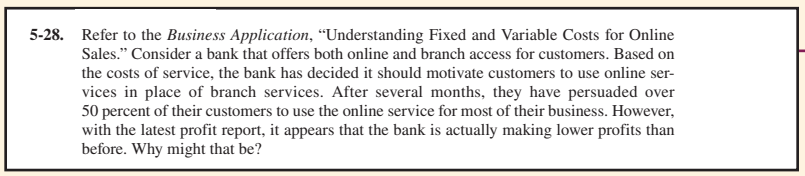
Accurate cost estimation is important to most organizations for decision-making purposes. Although no estimation method is completely accurate, some are better than others. The usefulness of a cost estimation method depends to a great extent on the user's knowledge of the business and the costs being analyzed.

The following summarizes the key ideas tied to the chapter's learning objectives.

LO 5-1 Understand the reasons for estimating fixed and variable costs. The behavior of costs, not the accounting classification, is the important distinction for decision making. Cost estimation focuses on identifying (estimating) the fixed and variable components of costs.

"Good illustrations and real-world examples. It has broad and comprehensive topic coverage."

—Robert Lin
California State University East Bay



5-28. Refer to the *Business Application*, "Understanding Fixed and Variable Costs for Online Sales." Consider a bank that offers both online and branch access for customers. Based on the costs of service, the bank has decided it should motivate customers to use online services in place of branch services. After several months, they have persuaded over 50 percent of their customers to use the online service for most of their business. However, with the latest profit report, it appears that the bank is actually making lower profits than before. Why might that be?

End-of-Chapter Material

Being able to assign end-of-chapter material with confidence is important. The authors have tested the end-of-chapter material over time to ensure quality and consistency with the chapter content. In the sixth edition the authors have updated several exercises and added several new questions.

"This is an excellent cost accounting book with quality end of chapter materials."

—Judy Daulton
Piedmont Technical College

"Well written; good end-of-chapter material."

—R. E. Bryson
University of Alabama in Huntsville

Using Excel in the Classroom

Excel® is essential in today's business environment, and Lanen, 6e integrates Excel where appropriate in the text. Several exercises and problems in each chapter can be solved using Excel spreadsheets templates. An Excel logo appears in the text next to these problems. Additionally, commencing with the sixth edition many of these exercises are now algorithmically generated and assignable in *Connect*, with scoring of select inputs for gradebook inclusion.

NEW! Excel Simulations are auto-graded in *Connect* and allow students to practice their Excel skills, such as basic formulas and formatting, within the context of accounting in a simulated Excel environment. When enabled by the instructor, these questions feature animated, narrated Help and Show Me tutorials.

(LO 5-4, 5)

5-61. Interpretation of Regression Results: Simple Regression

Your company is preparing an estimate of its production costs for the coming period. The controller estimates that direct materials costs are $45 per unit and that direct labor costs are $21 per hour. Estimating overhead, which is applied on the basis of direct labor costs, is difficult.

The controller's office estimated overhead costs at $3,600 for fixed costs and $18 per unit for variable costs. Your colleague, Lance, who graduated from a rival school, has already done the analysis and reports the "correct" cost equation as follows:

Overhead = $10,600 + $16.05 per unit

Lance also reports that the correlation coefficient for the regression is .82 and says, "With 82 percent of the variation in overhead explained by the equation, it certainly should be adopted as the best basis for estimating costs."

When asked for the data used to generate the regression, Lance produces the following:

Month	Overhead	Unit Production
1	$57,144	3,048
2	60,756	3,248
3	77,040	4,176
4	56,412	3,000
5	81,396	3,408
6	72,252	3,928
7	63,852	3,336
8	73,596	4,016
9	77,772	4,120
10	60,048	3,192
11	61,632	3,368
12	73,920	4,080
13	73,248	3,888

The company controller is somewhat surprised that the cost estimates are so different. You have therefore been assigned to check Lance's equation. You accept the assignment with glee.

Required

Analyze Lance's results and state your reasons for supporting or rejecting his cost equation.

"Strong end of chapter and test bank materials. Strong inclusion of Excel in the chapters"

—Michael Flores,
Wichita State University

INTEGRATIVE CASE

(LO 5-4, 5, 9)

5-72. Cost Estimation, CVP Analysis, and Decision Making

Luke Corporation produces a variety of products, each within their own division. Last year, the managers at Luke developed and began marketing a new chewing gum, Bubbs, to sell in vending machines. The product, which sells for $5.25 per case, has not had the market success that managers expected, and the company is considering dropping Bubbs.

The product-line income statement for the past 12 months follows.

Revenue		$14,682,150
Costs		
Manufacturing costs	$14,440,395	
Allocated corporate costs (@5%)	734,108	15,174,503
Product-line margin		$ (492,353)
Allowance for tax (@20%)		98,470
Product-line profit (loss)		$ (393,883)

All products at Luke receive an allocation of corporate overhead costs, which is computed as 5 percent of product revenue. The 5 percent rate is computed based on the most recent year's corporate cost as a percentage of revenue. Data on corporate costs and revenues for the past two years follow.

	Corporate Revenue	Corporate Overhead Costs
Most recent year	$ 106,750,000	$ 5,337,500
Previous year	$ 76,200,000	4,221,000

Roy O. Andre, the product manager for Bubbs, is concerned about whether the product will be dropped by the company and has employed you as a financial consultant to help with some analysis. In addition to the information given, Mr. Andre provides you with the following data on product costs for Bubbs.

Month	Cases	Production Costs
1	207,000	$1,139,828
2	217,200	1,161,328
3	214,800	1,169,981
4	228,000	1,185,523
5	224,400	1,187,827
6	237,000	1,208,673
7	220,200	1,183,699
8	247,200	1,226,774
9	238,800	1,225,226
10	252,600	1,237,325
11	250,200	1,241,760
12	259,200	1,272,451

Integrative Cases

Cases can generate classroom discussion or be the basis for good team projects. These integrative cases, which rely on cost accounting principles from previous chapters as well as the current chapter, ask students to apply the different techniques they have learned to a realistic situation.

What's New in the Sixth Edition?

Our primary goal in the sixth edition remains the same as in the previous five editions—to offer a cost accounting text that lets the student see the development of cost accounting tools and techniques as a natural response to decision making. We emphasize the intuition behind concepts and work to minimize the need to "memorize." We believe that students who develop this intuition will, first, develop an appreciation of what cost accounting is about and, second, will have an easier time understanding new developments that arise during their careers. Each chapter clearly establishes learning objectives, highlights numerous real-world examples, and identifies where ethical issues arise and how to think about these issues. Each chapter includes at least one integrative case that illustrates the links among the topics.

We present the material from the perspective of both the preparer of information as well as those who will use the information. We do this so that both accounting majors and those students planning other careers will appreciate the issues in preparing and using the information. The opening vignettes tie to one of the *Business Application* features in the chapter to highlight the relevance of cost accounting to today's business problems. All chapters end with a *Debrief* that links the topics in the chapter to the decision problem faced by the manager in the opening vignette.

The end-of-chapter material has increased by 9 to 16 percent, depending on the chapter, and 12 percent overall. Throughout the revision process, we have retained the clear writing style that is frequently cited as a strength of the text.

1 Cost Accounting: Information for Decision Making

- New opening vignette.
- Four new *Business Applications.*
- Updated link for IMA Ethics.
- Updated discussion and examples on Trends in Cost Accounting.
- Two new exercises.
- Four new problems.

2 Cost Concepts and Behavior

- New opening vignette.
- Two new *Business Applications.*
- Four new exercises.
- Four new problems.

3 Fundamentals of Cost-Volume-Profit Analysis

- New opening vignette.
- One new *Business Application*.
- One new critical discussion question.
- Four new exercises.
- Three new problems.

4 Fundamentals of Cost Analysis for Decision Making

- New opening vignette.
- Two new *Business Applications*.
- One new critical discussion question.
- Ten new problems.

5 Cost Estimation

- New opening vignette.
- One new *Business Application*.
- Added Learning Objective for learning curves (using existing material).
- One new critical discussion question.
- Three new exercises.
- Four new problems.

6 Fundamentals of Product and Service Costing

- New opening vignette.
- One new *Business Application*.
- Six new exercises.
- Two new problems.

7 Job Costing
- New opening vignette.
- One new *Business Application*.
- Two new exercises.
- Four new problems.

8 Process Costing
- New opening vignette.
- Five new exercises.
- Three new problems.

9 Activity-Based Costing
- New opening vignette.
- One new *Business Application*.
- Two new critical discussion questions.
- Four new exercises.
- Two new problems.

10 Fundamentals of Cost Management
- New opening vignette.
- One new *Business Application*.
- One new critical discussion question.
- Three new exercises.
- Two new problems.

11 Service Department and Joint Cost Allocation
- New opening vignette.
- One new critical discussion question.
- Five new exercises.
- Two new problems.

12 Fundamentals of Management Control Systems
- New opening vignette.
- Two new *Business Applications.*
- Three new exercises.
- Two new problems.

13 Planning and Budgeting
- New opening vignette.
- Four new exercises.
- Two new problems.
- One new integrative case.

14 Business Unit Performance Measurement
- New opening vignette.
- One new *Business Application*.
- Three new exercises.
- Three new problems.

15 Transfer Pricing
- New opening vignette.
- One new *Business Application*.
- Four new exercises.
- Two new problems.

16 Fundamentals of Variance Analysis
- New opening vignette.
- Five new exercises.
- Three new problems.

17 Additional Topics in Variance Analysis
- New opening vignette.
- Four new exercises.
- Four new problems.

18 Performance Measurement to Support Business Strategy
- New opening vignette.
- Three new *Business Applications*.
- Four new exercises.
- Two new problems.

Appendix Capital Investment Decisions: An Overview
- One new exercise.
- One new problem.

Mc Graw Hill Education connect®

Students—study more efficiently, retain more and achieve better outcomes. Instructors—focus on what you love—teaching.

SUCCESSFUL SEMESTERS INCLUDE CONNECT

FOR INSTRUCTORS

You're in the driver's seat.

Want to build your own course? No problem. Prefer to use our turnkey, prebuilt course? Easy. Want to make changes throughout the semester? Sure. And you'll save time with Connect's auto-grading too.

65%

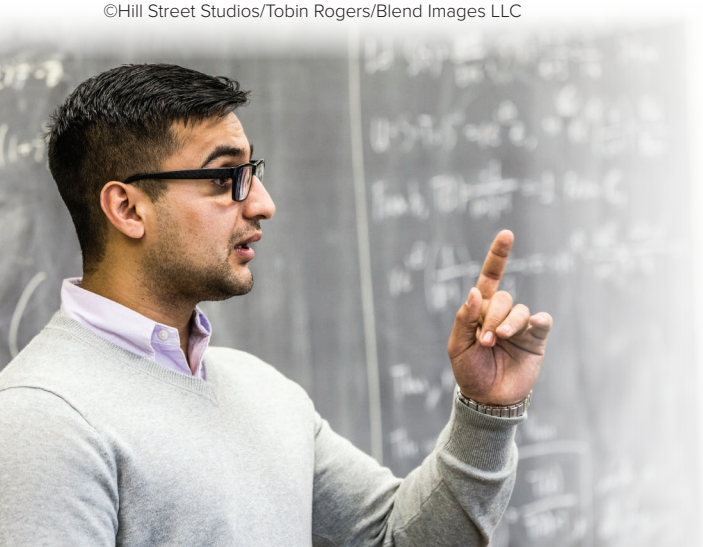
Less Time Grading

They'll thank you for it.

Adaptive study resources like SmartBook® help your students be better prepared in less time. You can transform your class time from dull definitions to dynamic debates. Hear from your peers about the benefits of Connect at **www.mheducation.com/highered/connect**

Make it simple, make it affordable.

Connect makes it easy with seamless integration using any of the major Learning Management Systems—Blackboard®, Canvas, and D2L, among others—to let you organize your course in one convenient location. Give your students access to digital materials at a discount with our inclusive access program. Ask your McGraw-Hill representative for more information.



Solutions for your challenges.

A product isn't a solution. Real solutions are affordable, reliable, and come with training and ongoing support when you need it and how you want it. Our Customer Experience Group can also help you troubleshoot tech problems—although Connect's 99% uptime means you might not need to call them. See for yourself at **status.mheducation.com**

For Students

©Shutterstock/wavebreakmedia

Effective, efficient studying.

Connect helps you be more productive with your study time and get better grades using tools like SmartBook, which highlights key concepts and creates a personalized study plan. Connect sets you up for success, so you walk into class with confidence and walk out with better grades.

"I really liked this app—it made it easy to study when you don't have your textbook in front of you."

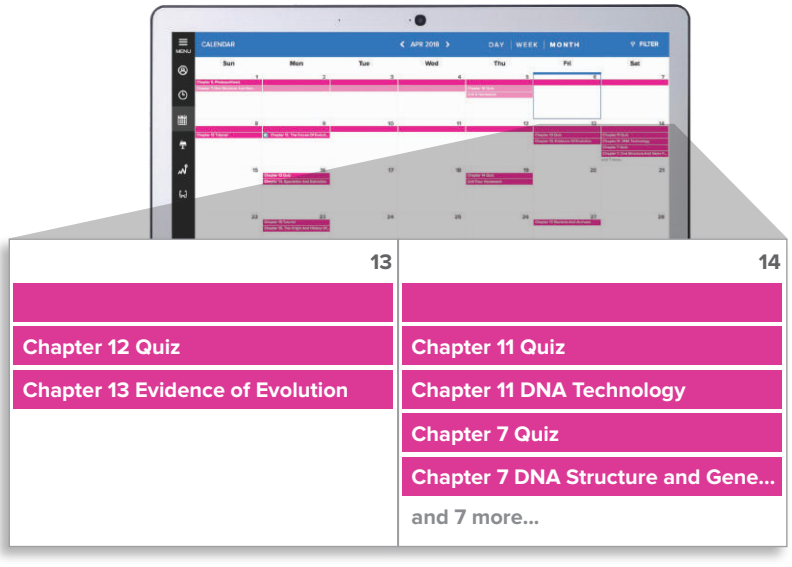
- Jordan Cunningham,
Eastern Washington University

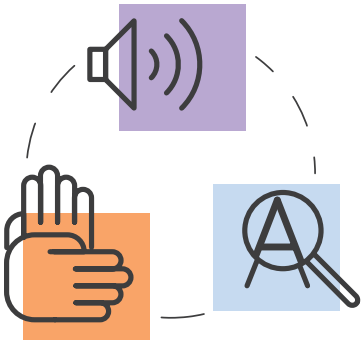
Study anytime, anywhere.

Download the free ReadAnywhere app and access your online eBook when it's convenient, even if you're offline. And since the app automatically syncs with your eBook in Connect, all of your notes are available every time you open it. Find out more at **www.mheducation.com/readanywhere**

No surprises.

The Connect Calendar and Reports tools keep you on track with the work you need to get done and your assignment scores. Life gets busy; Connect tools help you keep learning through it all.





Learning for everyone.

McGraw-Hill works directly with Accessibility Services Departments and faculty to meet the learning needs of all students. Please contact your Accessibility Services office and ask them to email accessibility@mheducation.com, or visit **www.mheducation.com/accessibility** for more information.

Acknowledgments

A special thank you

To the following individuals who helped develop and critique the ancillary package: Patti Lopez for accuracy checking the manuscript and solutions manual; William Lyle for preparing the instructor's manual and PowerPoint slides; Helen Roybark for accuracy checking the instructor's manual and PowerPoint; Stacie Hughes for updating the test bank; and Janice Fergusson for accuracy checking the test bank.

We are grateful for the outstanding support of McGraw-Hill. In particular, we would like to thank Tim Vertovec, Managing Director, Accounting and Business Law; Elizabeth Eisenhart, Portfolio Manager; Rose Koos, Director, Product Development; Michele Janicek, Lead Product Developer; Marilyn Isaacks and Julie Hankins, Product Developers; Kevin Moran, Associate Director of Digital Content; Xin Lin, Digital Product Analyst; Sarah Sacco, Editorial Coordinator; Katherine Wheeler, Marketing Manager; Natalie King, Director of Marketing; Fran Simon and Brian Nacik, Content Project Managers; Karen Jozefowicz, TS Content Project Manager; Susan Culbertson, Buyer; Melissa Homer, Content Licensing Specialist; and Matt Diamond, Designer.

We also want to recognize the valuable input of all those dedicated instructors who helped guide our editorial and pedagogical decisions:

Editorial Board, Sixth Edition

Michael Alles, *Rutgers University*

Linda Bressler, *University of Houston*

Robert Cabral, *Oxnard College*

Don Campbell, *Brigham Young University–Idaho*

Joseph Cunningham, *Albright College*

Alan Czyzewski, *Indiana State University*

Sebahattin Demirkan, *University of Maryland*

Karen Congo Farmer, *Texas A&M*

Marina Grau, *Houston Community College*

Stacie Hughes, *Athens State University*

Cynthia Khanlarian, *North Carolina Agricultural and Technical State University*

Jason Lee, *State University of New York–Plattsburgh*

Ashley Minnich, *William Jewell College*

Patrick Nguyen, *San Jacinto College–Central Campus*

Michael Nickla, *Ivy Tech Community College*

Baseemah Nance, *Central Piedmont Community College*

Rama Ramamurthy, *Georgetown University*

Emily Vera, *University of Colorado–Denver*

Editorial Board, Fifth Edition

Kreag Danvers, *Clarion University*

Melanie Hicks, *Liberty University*

Bob Holtfreter, *Central Washington University*

Larry N. Killough, *Virginia Polytechnic Institute*

Harrison Liu, *The University of Texas at San Antonio*

Pam Meyer, *University of Louisiana at Lafayette*

Clayton Sager, *University of Wisconsin–Whitewater*

Diane Tanner, *University of North Florida*

Emily Vera, *University of Colorado–Denver*

Editorial Board, Fourth Edition

N. Ahadiat, *University of California Pomona*

Rowland Atiase, *McCombs School of Business University of Texas*

R. E. Bryson, *University of Alabama in Huntsville*

David Bukovinsky, *Wright State University*

Maureen Butler, *University of Tampa*

Donald Campbell, *Brigham Young University–Idaho*

Chak-Tong Chau, *University of Houston Downtown*

Judy Daulton, *Piedmont Technical College*

Jennifer Dosch, *Metropolitan State University*

Robert Elmore, *Tennessee Technological University*

Karen Congo Farmer, *Texas A&M University*

Budd Fennema, *Florida State University*

Michael Flores, *Wichita State University*

Ronald Guymon, *Georgia State University*

Michael Hammond, *Missouri State University*
Betty Harper, *Middle Tennessee State University*
Jay Holmen, *University of Wisconsin–Eau Claire*
Raymond Johnson, *Guilford College*
George Joseph, *University of Massachusetts Lowell*
Leslie Kren, *University of Wisconsin–Milwaukee*
Robert Lin, *California State University, East Bay*
Yoshie Saito Lord, *Eastern Illinois University*
Lorraine Magrath, *Troy University*
Malllory McWilliams, *San Jose State University*
Jimmy Mistry, *Suffolk University*
Edward Monsour, *CSULA*
Muroki Mwaura, *William Patterson University*
Linda Schain, *Hofstra University*
Lynne Shoaf, *Belmont Abbey College*
Kenneth Sinclair, *Lehigh University*
Lynn Suberly, *University of South Alabama*
Stephen West, *Arizona State University*
Wallace Wood, *University of Cincinnati*
Nan Zhou, *State University of New York at Binghamton*

Editorial Board, Third Edition
Vidya Awasthi, *Seattle University*
Molly Brown, *James Madison University*
Gia Chevis, *Baylor University*
Michele Chwastiak, *University of New Mexico*
Darlene Coarts, *University of Northern Iowa*
Janice Cobb, *Texas Christian University*
Cheryl Corke, *Genesee Community College*
Steven Daulton, *Piedmont Technical College*
Joe Dowd, *Eastern Washington University*
Rafik Elias, *California State University, Los Angeles*
Sheri Erickson, *Minnesota State University Moorhead*
Michael Flores, *Wichita State University*
Patrick Flynn, *Baldwin-Wallace College*
Bob Hartman, *University of Iowa*
Daniel Hinchliffe, *University of North Carolina–Asheville*
Jay Holmen, *University of Wisconsin–Eau Claire*
Bob Holtfreter, *Central Washington University*
Curtis Howell, *Georgia Southwestern State University*
Norma Hunting, *Chabot College*
Fred Jacobs, *Michigan State University*
Douglas Johnson, *Southeast Community College*
Larry Killough, *Virginia Polytechnic Institute*
Leslie Kren, *University of Wisconsin–Milwaukee*
Edward Lance Monsour, *California State University, Los Angeles*
Cheryl Mckay, *Monroe County Community College*
Pam Meyer, *University of Louisiana at Lafayette*
Lorie Milam, *University of Northern Colorado*
Daniel O'Brien, *North Central Technical College*
Michael Petersen, *Arizona State University*
Mina Pizzini, *Southern Methodist University*
Shirley Polejewski, *University of Saint Thomas*
Paul Sheldon Foote, *California State University, Fullerton*
Lynn Suberly, *University of South Alabama*
Kim Tan, *California State University, Stanislaus*
Benson Wier, *Virginia Commonwealth University*
David Wiest, *Merrimack College*
Christine Wilkinson, *Iowa State University*
Wallace Wood, *University of Cincinnati*
Nan Zhou, *State University of New York*

Editorial Board, Second Edition
Gary Adna Ames, *Brigham Young University–Idaho*
Nas Ahadiat, *California State Polytechnic University, Pomona*
Sepeedeh Ahadiat, *California State Polytechnic University, Pomona*
Michael Alles, *Rutgers University*
Felix Amenkhienan, *Radford University*
Kashi Balachandran, *New York University*
Daniel Bayak, *Northampton Community College*
Joseph Berry, *Campbell University*
Charles Betts, *Delaware Technical and Community College*
Michael Blackett, *National American University*
Marvin Bouillon, *Iowa State University*
Michelle Cannon, *Ivy Tech Community College*
Roberta Cable, *Pace University*
Chiaho Chang, *Montclair State University*
Bea Chiang, *The College of New Jersey*
D. Douglas Clinton, *Northern Illinois University*
Carlos Colon, *Valencia Community College*
Joan Cook, *Milwaukee Area Tech College*
Sue Cullers, *Tarleton State University*
Alan Czyzewski, *Indiana State University*
Lee Daugherty, *Lorain County Community College*
Fara Elikai, *University of North Carolina–Wilmington*
Terry Elliott, *Morehead State University*
Robert Elmore, *Tennessee Tech University*
Timothy Farmer, *University of Missouri–St. Louis*
Michael Fedoryshyn, *St. John Fisher College*

Jerry Ferry, *University of North Alabama*
Benjamin Foster, *University of Louisville*
Kenneth Fowler, *Santa Clara University*
John Garlick, *Fayetteville State University*
Lisa Gillespie, *Loyola University, Chicago*
Lorraine Glasscock, *University of North Alabama*
Sylwia Gornik-Tomaszewski, *St. John's University*
Marina Grau, *Houston Community College*
Mary Green, *University of Virginia*
Ralph Greenberg, *Temple University*
Robert Gruber, *University of Wisconsin–Whitewater*
Aundrea Kay Guess, *St. Edward's University*
Sanjay Gupta, *Valdosta State University*
Michael R. Hammond, *Missouri State University*
Betty Harper, *Middle Tennessee State University*
Jeannie Harrington, *Middle Tennessee State University*
Geoffrey Heriot, *Greenville Technical College*
Aleecia Hibbets, *University of Louisiana–Monroe*
Jonathan Hidalgo, *Montclair University*
Jay Holmen, *University of Wisconsin–Eau Claire*
Bob Holtfreter, *Central Washington University*
Bikki Jaggi, *Rutgers University*
Agatha Jeffers, *Montclair State University*
Thomas Kam, *Hawaii Pacific University*
Larry Killough, *Virginia Polytechnic University*
Mehmet Kocakulah, *University of Southern Indiana*
Thomas Krissek, *Northeastern Illinois University*
Daniel Law, *Gonzaga University*
Minwoo Lee, *Western Kentucky University*
Joan Luft, *Michigan State University*
Janet Mabon, *University of Oregon*
Suneel Maheshwari, *Marshall University*
Linda Mallory, *Central Virginia Community College*
Mark Martinelli, *De Anza College*
Maureen Mascha, *Marquette University*
Raj Mashruwala, *Washington University, St. Louis*
Michele Matherly, *University of North Carolina at Charlotte*
Barbara Mcelroy, *Susquehanna University*
Gloria McVay, *Winona State University*
Pam Meyer, *University of Louisiana–Lafayette*
David Morris, *North Georgia College*
Ann Murphy, *Metropolitan State College of Denver*
Rosemary Nurre, *College of San Mateo*
Carolyn Ogden, *University of Massachusetts, Boston*
Tamara Phelan, *Northern Illinois University*
Cynthia Phipps, *Lake Land College*
Jo Ann Pinto, *Montclair State University*
Paul Polinski, *Case Western Reserve University*
Judy Ramage, *Christian Brothers University*
Roy Regel, *University of Montana–Missoula*
David Remmele, *University of Wisconsin–Whitewater*
Gerald Rosson, *Lynchburg College*
David Satava, *University of Houston*
Kathy Sauer, *Aakers Business College*
Richard Sauoma, *University of California, Los Angeles*
Margaret Shackell-Dowell, *University of Notre Dame*
Karen Shastri, *University of Pittsburgh*
Donald Simmons, *Frostburg State University*
Kenneth Sinclair, *Lehigh University*
James Smith, *Saint Cloud State University*
Toni Smith, *University of New Hampshire*
Carol Springer, *Georgia State University*
Scott Steinkamp, *College of Lake County*
Dennis Stovall, *Grand Valley University*
Ronald Stunda, *Birmingham-Southern College*
Norman Sunderman, *Angelo State University*
Kim Tan, *California State University–Stanislaus*
James Thompson, *Oklahoma City University*
Robin Turner, *Rowan-Cabarrus Community College*
Michael Tyler, *Barry University*
Karen Varnell, *Tarleton State University*
Stephen Wehner, *Columbia College*
Randi Whitney, *University of Oregon*
Michael Wilson, *Metropolitan State University*
Priscilla Wisner, *Montana State University*
Raymond Zingsheim, *Moraine Park Technical University*

Editorial Board, First Edition
Rowland Atiase, *University of Texas at Austin*
Timothy B. Biggart, *University of North Carolina*
Rodger Brannan, *University of Minnesota at Duluth*
Wayne Bremser, *Villanova University*
Chiaho Chang, *Montclair State University*
Kerry Colton, *Aims Community College*
William Cready, *Louisiana State University*
Patricia Derrick, *George Washington University*
Robert Elmore, *Tennessee Tech University*
John Giles, *North Carolina State University*
Penelope Sue Greenberg, *Widener University*
Jeannie Harrington, *Middle Tennessee State University*

Michael Haselkorn, *Bentley College*
Daniel A. Hinchliffe, *Florida Atlantic University*
M. Zafar Iqbal, *Cal State Poly University–Pomona*
Richard Kelsey, *NOVA Southeastern University*
Larry N. Killough, *Virginia Tech*
Larissa Kyj, *Rowan University*
Randall E. LaSalle, *West Chester University of Pennsylvania*
P. Michael McLain, *Hampton University*
Kathleen Metcalf, *Muscatine Community College*
Karen Nunez, *North Carolina State University*
Marge O'Reilly-Allen, *Rider University*
Tamara Phelan, *Northern Illinois University*
Jeanette Ramos-Alexander, *New Jersey City University*
Anwar Salimi, *Cal State Poly University–Pomona*
Kathleen Sevigny, *Bridgewater State College*
Kenneth Sinclair, *Lehigh University*
Ola Smith, *Western Michigan University*
Cynthia Sneed, *Jacksonville State University*
Swaminathan Sridaran, *Northwestern University*
Verlindsey Stewart, *J.F. Drake State Technical College*
Kim Tan, *California State University–Stanislaus*
Debra Warren, *Chadron State College*
Thomas Zeller, *Loyola University at Chicago*

Brief Contents

INTRODUCTION AND OVERVIEW

One Cost Accounting: Information for Decision Making 2
Two Cost Concepts and Behavior 42

COST ANALYSIS AND ESTIMATION

Three Fundamentals of Cost-Volume-Profit Analysis 92
Four Fundamentals of Cost Analysis for Decision Making 126
Five Cost Estimation 176

COST MANAGEMENT SYSTEMS

Six Fundamentals of Product and Service Costing 226
Seven Job Costing 258
Eight Process Costing 306
Nine Activity-Based Costing 352
Ten Fundamentals of Cost Management 406
Eleven Service Department and Joint Cost Allocation 448

MANAGEMENT CONTROL SYSTEMS

Twelve Fundamentals of Management Control Systems 498
Thirteen Planning and Budgeting 536
Fourteen Business Unit Performance Measurement 582
Fifteen Transfer Pricing 620
Sixteen Fundamentals of Variance Analysis 660
Seventeen Additional Topics in Variance Analysis 710
Eighteen Performance Measurement to Support Business Strategy 746
Appendix Capital Investment Decisions: An Overview A-1

Glossary G-1
Index IND-1

Contents

Step into the Real World v

1

Cost Accounting: Information for Decision Making 2

Business Application: *Understanding Costs in a Small Business* 3

Value Creation in Organizations 3

Why Start with Value Creation? 3

Value Chain 4

Supply Chain and Distribution Chain 5

Business Application: *Choosing Where to Produce in the Supply Chain* 5

Using Cost Information to Increase Value 5

Accounting and the Value Chain 6

Accounting Systems 6

Financial Accounting 6

Cost Accounting 6

Cost Accounting, GAAP, and IFRS 7

Customers of Cost Accounting 7

Our Framework for Assessing Cost Accounting Systems 8

The Manager's Job Is to Make Decisions 8

Decision Making Requires Information 8

Finding and Eliminating Activities That Don't Add Value 9

Identifying Strategic Opportunities Using Cost Analysis 9

Owners Use Cost Information to Evaluate Managers 9

Cost Data for Managerial Decisions 10

Costs for Decision Making 10

Business Application: *Reducing Costs by Making Small Changes* 11

Costs for Control and Evaluation 11

Different Data for Different Decisions 14

Trends in Cost Accounting throughout the Value Chain 14

Cost Accounting in Research and Development (R&D) 14

Cost Accounting in Design 15

Cost Accounting in Purchasing 15

Cost Accounting in Production 15

Cost Accounting in Marketing 16

Cost Accounting in Distribution 16

Cost Accounting in Customer Service 16

Enterprise Resource Planning 17

Creating Value in the Organization 17

Key Financial Players in the Organization 17

Choices: Ethical Issues for Accountants 18

What Makes Ethics So Important? 19

Ethics 20

The Sarbanes-Oxley Act of 2002 and Ethics 20

Business Application: *Accounting Decisions at Tesco: Choices and Consequences* 21

Cost Accounting and Other Business Disciplines 21

The Debrief 22

Summary 22

Key Terms 22

Appendix: Institute of Management Accountants Code of Ethics 23

Review Questions 25

Critical Analysis and Discussion Questions 25

Exercises 26

Problems 30

Integrative Cases 38
Solutions to Self-Study Questions 40

2 Cost Concepts and Behavior 42

Business Application: *Calculating the Costs of E-Books versus Paper Books* 43

What Is a Cost? 44
Cost versus Expenses 44

Presentation of Costs in Financial Statements 45
Service Organizations 46
Retail and Wholesale Companies 46
Manufacturing Companies 48
Direct and Indirect Manufacturing (Product) Costs 48
Prime Costs and Conversion Costs 49
Nonmanufacturing (Period) Costs 49

Cost Allocation 50
Direct versus Indirect Costs 51
Business Application: *Indirect Costs and Allocating Costs to Contracts* 52

Details of Manufacturing Cost Flows 52

How Costs Flow through the Statements 53
Income Statements 53
Cost of Goods Manufactured and Sold 54
Direct Materials 54
Work in Process 54
Finished Goods Inventory 55
Cost of Goods Manufactured and Sold Statement 55
Business Application: *Manufacturing or Service: Not Always Clear* 57

Cost Behavior 57
Fixed versus Variable Costs 57

Components of Product Costs 59
Unit Fixed Costs Can Be Misleading for Decision Making 60

How to Make Cost Information More Useful for Managers 63
Gross Margin versus Contribution Margin Income Statements 64
Developing Financial Statements for Decision Making 64
The Debrief 66
Summary 66
Key Terms 67
Review Questions 68
Critical Analysis and Discussion Questions 68
Exercises 69
Problems 80
Integrative Cases 89
Solutions to Self-Study Questions 89

3 Fundamentals of Cost-Volume-Profit Analysis 92

Cost-Volume-Profit Analysis 93
Business Application: *Cost-Volume-Profit Analysis and On-Demand Services* 93
Profit Equation 94
CVP Example 95
Graphic Presentation 98
Profit-Volume Model 99
Use of CVP to Analyze the Effect of Different Cost Structures 100
Business Application: *Break-Even Analysis Used by "Big Oil"* 101
Margin of Safety 101

CVP Analysis with Spreadsheets 102

Extensions of the CVP Model 103
Income Taxes 103
Multiproduct CVP Analysis 103
Alternative Cost Structures 105
Assumptions and Limitations of CVP Analysis 105
The Debrief 106
Summary 106
Key Terms 107
Review Questions 107
Critical Analysis and Discussion Questions 108
Exercises 108
Problems 114
Integrative Case 122
Solutions to Self-Study Questions 124

4
Fundamentals of Cost Analysis for Decision Making 126

Business Application: *Cost Analysis and the Choice of Sales Channels* 127

Differential Analysis 128
Differential Costs versus Total Costs 128
Differential Analysis and Pricing Decisions 129
Short-Run versus Long-Run Pricing Decisions 129
Short-Run Pricing Decisions: Special Orders 130
Long-Run Pricing Decisions 132
Long-Run versus Short-Run Pricing: Is There a Difference? 132
Cost Analysis for Pricing 133
Business Application: *Take-Back Laws and Product Design* 134

Legal Issues Relating to Costs and Sales Prices 134
Predatory Pricing 134
Dumping 135
Price Discrimination 135
Peak-Load Pricing 136
Price Fixing 136

Use of Differential Analysis for Production Decisions 136
Make-It or Buy-It Decisions 137
Make-or-Buy Decisions Involving Differential Fixed Costs 137
Opportunity Costs of Making 140
Decision to Add or Drop a Product Line or Close a Business Unit 142
Product Choice Decisions 144

The Theory of Constraints 147
The Debrief 149
Summary 149
Key Terms 150
Review Questions 150
Critical Analysis and Discussion Questions 151
Exercises 152
Problems 157
Integrative Cases 171
Solutions to Self-Study Questions 173

5
Cost Estimation 176

Why Estimate Costs? 177

Basic Cost Behavior Patterns 177
Business Application: *Understanding Fixed and Variable Costs for Online Sales* 178

What Methods Are Used to Estimate Cost Behavior? 178
Engineering Method 178
Account Analysis Method 179
Statistical Cost Estimation 181
Business Application: *Using Statistical Analysis to Improve Profitability* 186
Multiple Regression 187
Practical Implementation Problems 188

Learning Phenomenon 190
Business Application: *Learning Curves* 190
Applications 192

How Is an Estimation Method Chosen? 193
Data Problems 193
Effect of Different Methods on Cost Estimates 194
The Debrief 196
Summary 196
Key Terms 197
Appendix A: Regression Analysis Using Microsoft Excel 197
Appendix B: Learning Curves 202
Review Questions 203
Critical Analysis and Discussion Questions 204
Exercises 205
Problems 213
Integrative Case 224
Solutions to Self-Study Questions 225

6
Fundamentals of Product and Service Costing 226

Cost Management Systems 227
Reasons to Calculate Product or Service Costs 228
Business Application: *Understanding How Resources and Their Costs Relate to Revenues and Profits* 228

Cost Allocation and Product Costing 228
Cost Flow Diagram 229

Fundamental Themes Underlying the Design of Cost Systems for Managerial Purposes 229

Costing in a Single Product, Continuous Process Industry 230
Basic Cost Flow Model 230
Costing with No Work-in-Process Inventories 230
Costing with Ending Work-in-Process Inventories 231

Costing in a Multiple Product, Discrete Process Industry 232
Predetermined Overhead Rates 234
Product Costing of Multiple Products 234
Choice of the Allocation Base for Predetermined Overhead Rate 235
Choosing among Possible Allocation Bases 236

Multiple Allocation Bases and Two-Stage Systems 237
Choice of Allocation Bases 238

Different Companies, Different Production and Costing Systems 239
Operations Costing: An Illustration 241
The Debrief 242
Summary 242
Key Terms 243
Review Questions 243
Critical Analysis and Discussion Questions 243
Exercises 244
Problems 250
Integrative Cases 254
Solutions to Self-Study Questions 256

7
Job Costing 258

Defining a Job 259

Using Accounting Records in a Job Shop 260

Computing the Cost of a Job 260
Production Process at Gupta Designs 260
Records of Costs at Gupta Designs 260
How Manufacturing Overhead Costs Are Recorded at Gupta Designs 264
The Job Cost Sheet 266
Over- and Underapplied Overhead 267
An Alternative Method of Recording and Applying Manufacturing Overhead 268
Multiple Allocation Bases: The Two-Stage Approach 271
Summary of Steps in a Job Costing System 271

Using Job Costing in Service Organizations 271

Ethical Issues and Job Costing 273
Misstating the Stage of Completion 274
Charging Costs to the Wrong Jobs 274
Business Application: *Cost Allocation and Government Contracts* 274
Misrepresenting the Cost of Jobs 274

Managing Projects 276
Business Application: *Assessing Product Profitability for Products with Large Development Expenses and Long Product Lives* 276
The Debrief 277
Summary 278
Key Terms 278
Review Questions 278
Critical Analysis and Discussion Questions 279
Exercises 279
Problems 288
Integrative Cases 301
Solutions to Self-Study Questions 304

8
Process Costing 306

Determining Equivalent Units 307

Using Product Costing in a Process Industry 309
Step 1: Measure the Physical Flow of Resources 309
Step 2: Compute the Equivalent Units of Production 309
Business Application: *Overstating Equivalent Units to Commit Fraud* 310
Step 3: Identify the Product Costs for Which to Account 311
Time Out! We Need to Make an Assumption about Costs and the Work-in-Process Inventory 311

Step 4: Compute the Costs per Equivalent Unit: Weighted Average 312
Step 5: Assign Product Cost to Batches of Work: Weighted-Average Process Costing 312

Reporting This Information to Managers: The Production Cost Report 313
Sections 1 and 2: Managing the Physical Flow of Units 314
Sections 3, 4, and 5: Managing Costs 315

Assigning Costs Using First-In, First-Out (FIFO) Process Costing 315
Step 1: Measure the Physical Flow of Resources 316
Step 2: Compute the Equivalent Units of Production 316
Step 3: Identify the Product Costs for Which to Account 318
Step 4: Compute the Costs per Equivalent Unit: FIFO 318
Step 5: Assign Product Cost to Batches of Work: FIFO 319
How This Looks in T-Accounts 319

Determining Which Is Better: FIFO or Weighted Average? 320

Computing Product Costs: Summary of the Steps 320

Using Costs Transferred in from Prior Departments 321
Who Is Responsible for Costs Transferred in from Prior Departments? 322

Choosing between Job and Process Costing 324

Operation Costing 324
Product Costing in Operations 325
Operation Costing Illustration 325

Comparing Job, Process, and Operation Costing 327
The Debrief 328

Summary 328
Key Terms 329
Review Questions 329
Critical Analysis and Discussion Questions 330
Exercises 330
Problems 338
Integrative Cases 347
Solutions to Self-Study Questions 349

9
Activity-Based Costing 352

Reported Product Costs and Decision Making 353
Dropping a Product 353
The Death Spiral 355

Two-Stage Cost Allocation 356
Two-Stage Cost Allocation and the Choice of Cost Drivers 357
Plantwide versus Department-Specific Rates 360
Choice of Cost Allocation Methods: A Cost-Benefit Decision 360

Activity-Based Costing 361
Business Application: *Activity-Based Costing in a Not-for-Profit* 362
Developing Activity-Based Costs 362

Cost Hierarchies 364
Business Application: *The ABC Cost Hierarchy—Maintenance Costs for an Airline* 365

Activity-Based Costing Illustrated 365
Step 1: Identify the Activities 366
Step 2: Identify the Cost Drivers 366
Step 3: Compute the Cost Driver Rates 366
Step 4: Assign Costs Using Activity-Based Costing 366
Unit Costs Compared 367

Cost Flows through Accounts 369

Choice of Activity Bases in Modern Production Settings 370
Business Application: *Evidence on the Benefits of Activity-Based Costing* 371

Activity-Based Costing in Administration 371

Who Uses ABC? 372

Time-Driven Activity-Based Costing 373
Developing Time-Driven Activity-Based Costs 373
Business Application: *What Are a Hospital's Costs?* 375
Extensions of TDABC 375
The Debrief 376

Summary 376
Key Terms 377
Review Questions 377

Critical Analysis and Discussion Questions 377
Exercises 378
Problems 389
Integrative Cases 399
Solutions to Self-Study Questions 404

10
Fundamentals of Cost Management 406

Using Activity-Based Cost Management to Add Value 407
Using Activity-Based Cost Information to Improve Processes 408
Using Activity-Based Cost Management in a Service Setting 409
Lean Manufacturing and Activity-Based Cost Management 409
Using Cost Hierarchies 410

Managing the Cost of Customers and Suppliers 411
Business Application: *Customer Profitability—Revenue and Cost Effects* 411
Using Activity-Based Costing to Determine the Cost of Customers and Suppliers 412
Determining Why the Cost of Customers Matters 414
Using Cost of Customer Information to Manage Costs 414
Business Application: *The Importance of Good Data in Analyzing Customer Profitability: The Case of DHL* 415

Determining the Cost of Suppliers 415
Capturing the Cost Savings 416

Managing the Cost of Capacity 417
Using and Supplying Resources 417
Computing the Cost of Unused Capacity 419
Assigning the Cost of Unused Capacity 421
Business Application: *Filling Excess Capacity "Below Cost"* 421
Seasonal Demand and the Cost of Unused Capacity 422

Managing the Cost of Quality 424
How Can We Limit Conflict between Traditional Managerial Accounting Systems and Total Quality Management? 424
What Is Quality? 424
What Is the Cost of Quality? 425
Trade-Offs, Quality Control, and Failure Costs 426
Business Application: *Cost Elements Included in Reported Quality Costs* 428
The Debrief 429
Summary 429
Key Terms 430
Review Questions 430
Critical Analysis and Discussion Questions 430
Exercises 431
Problems 440
Integrative Cases 445
Solutions to Self-Study Questions 446

11
Service Department and Joint Cost Allocation 448

Service Department Cost Allocation 449
Business Application: *Outsourcing Information Services—Managed Service Providers* 450

Methods of Allocating Service Department Costs 451
Allocation Bases 451
Direct Method 452
Step Method 455
Business Application: *Step Method at Stanford University* 458
Reciprocal Method 458
Comparison of Direct, Step, and Reciprocal Methods 359
The Reciprocal Method and Decision Making 462

Allocation of Joint Costs 464
Joint Costing Defined 464
Reasons for Allocating Joint Costs 465

Joint Cost Allocation Methods 465
Net Realizable Value Method 465
Physical Quantities Method 468
Evaluation of Joint Cost Methods 469

Deciding Whether to Sell Goods Now or Process Them Further 469
Business Application: *Different Demands for Different Parts* 470

Deciding What to Do with By-Products 470
The Debrief 471
Summary 472
Key Terms 473
Appendix: Calculation of the Reciprocal Method Using Computer Spreadsheets 473
Review Questions 475
Critical Analysis and Discussion Questions 475
Exercises 476
Problems 482
Integrative Cases 492
Solutions to Self-Study Questions 493

12
Fundamentals of Management Control Systems 498

Why a Management Control System? 499
Alignment of Managerial and Organizational Interests 500
Evolution of the Control Problem: An Example 500

Decentralized Organizations 500
Why Decentralize the Organization? 501
Advantages of Decentralization 501
Disadvantages of Decentralization 502
Business Application: *The Benefits and Costs of Decentralized Decision Making* 502

Framework for Evaluating Management Control Systems 503
Organizational Environment and Strategy 503
Results of the Management Control System 503
Elements of a Management Control System 504
Balancing the Elements 504

Delegated Decision Authority: Responsibility Accounting 505
Cost Centers 505
Discretionary Cost Centers 505
Revenue Centers 506
Profit Centers 506
Investment Centers 506
Responsibility Centers and Organization Structure 506

Measuring Performance 507
Two Basic Questions 508
Business Application: *Teacher Pay and Student Performance* 508
Cost Centers 508
Revenue Centers 509
Profit Centers 509
Investment Centers 509

Evaluating Performance 509
Relative Performance versus Absolute Performance Standards 510
Evaluating Managers' Performance versus Economic Performance of the Responsibility Center 510
Relative Performance Evaluations in Organizations 510

Compensation Systems 511
Business Application: *Performance Measures and Incentives—Veterans Affairs Hospitals* 511
Business Application: *Beware of the "Kink"* 512

Illustration: Corporate Cost Allocation 512
Incentive Problems with Allocated Costs 513
Effective Corporate Cost Allocation System 513

Do Performance Evaluation Systems Create Incentives to Commit Fraud? 514
Business Application: *An Accounting Scandal at Toshiba* 515

Internal Controls to Protect Assets and Provide Quality Information 516
Internal Auditing 517
The Debrief 517
Summary 517
Key Terms 518
Review Questions 518
Critical Analysis and Discussion Questions 519
Exercises 520
Problems 524
Integrative Cases 529
Solutions to Self-Study Questions 534

13
Planning and Budgeting 536

How Strategic Planning Increases Competitiveness 537
Business Application: *Using the Budget to Help Manage Cash Flow* 538

Overall Plan 538
Organization Goals 538
Strategic Long-Range Profit Plan 538
Master Budget (Tactical Short-Range Profit Plan): Tying the Strategic Plan to the Operating Plan 539

Human Element in Budgeting 540
Value of Employee Participation 540

Developing the Master Budget 540

Where to Start? 541
Sales Forecasting 541

Comprehensive Illustration 543
Forecasting Production 543
Forecasting Production Costs 544
Direct Labor 545
Overhead 546
Completing the Budgeted Cost of Goods Sold 547
Revising the Initial Budget 547

Marketing and Administrative Budget 548

Pulling It Together into the Income Statement 549

Key Relationships: The Sales Cycle 550

Using Cash Flow Budgets to Estimate Cash Needs 550
Multiperiod Cash Flows 550
Business Application: *The "Curse" of Growth* 552

Planning for the Assets and Liabilities on the Budgeted Balance Sheets 553

Big Picture: How It All Fits Together 553

Budgeting in Retail and Wholesale Organizations 553

Budgeting in Service Organizations 556
Business Application: *Budget Is the Law in Government* 556

Ethical Problems in Budgeting 556
Business Application: *"Use It or Lose It"* 557

Budgeting under Uncertainty 557
The Debrief 558
Summary 559
Key Terms 559
Review Questions 560
Critical Analysis and Discussion Questions 560
Exercises 560
Problems 569
Integrative Cases 577
Solutions to Self-Study Questions 579

14
Business Unit Performance Measurement 582

Divisional Performance Measurement 583
Business Application: *What Determines Whether Firms Use Divisional Measures for Measuring Divisional Performance?* 583

Accounting Income 584
Computing Divisional Income 584
Advantages and Disadvantages of Divisional Income 585
Some Simple Financial Ratios 585

Return on Investment 586
Performance Measures for Control: A Short Detour 587
Limitations of ROI 588
Business Application: *Performance Measurement at Walmart* 590

Residual Income Measures 591
Limitations of Residual Income 591

Economic Value Added (EVA) 592
Business Application: *EVA at Best Buy* 593
Limitations of EVA 593
Business Application: *Does Using Residual Income as a Performance Measure Affect Managers' Decisions?* 594

Divisional Performance Measurement: A Summary 595

Measuring the Investment Base 595
Gross Book Value versus Net Book Value 595
Historical Cost versus Current Cost 596
Beginning, Ending, or Average Balance 598

Other Issues in Divisional Performance Measurement 598
The Debrief 599
Summary 599
Key Terms 599
Review Questions 600
Critical Analysis and Discussion Questions 600

Exercises 600
Problems 605
Integrative Cases 611
Solutions to Self-Study Questions 617

15
Transfer Pricing 620

What Is Transfer Pricing and Why Is It Important? 621
Business Application: *Transfer Pricing at Weyerhaeuser* 622

Determining the Optimal Transfer Price 622
The Setting 623
Determining Whether a Transfer Price Is Optimal 624
Case 1: A Perfect Intermediate Market for Milk 624
Business Application: *Transfer Pricing in State-Owned Enterprises* 625
Case 2: No Intermediate Market 625

Optimal Transfer Price: A General Principle 628
Other Market Conditions 628

Applying the General Principle 629

How to Help Managers Achieve Their Goals While Achieving the Organization's Goals 630

Top-Management Intervention in Transfer Pricing 630

Centrally Established Transfer Price Policies 631
Establishing a Market Price Policy 631
Establishing a Cost-Based Policy 631
Alternative Cost Measures 632
Remedying Motivational Problems of Transfer Pricing Policies 633

Negotiating the Transfer Price 634

Imperfect Markets 634

Global Practices 635

Multinational Transfer Pricing 635
Business Application: *Tax Considerations in Transfer Pricing* 637

Segment Reporting 637
The Debrief 638

Summary 638
Key Terms 639
Appendix: Case 1A: Perfect Intermediate Markets—Quality Differences 639
Review Questions 641
Critical Analysis and Discussion Questions 641
Exercises 641
Problems 647
Integrative Cases 656
Solutions to Self-Study Questions 658

16
Fundamentals of Variance Analysis 660

Using Budgets for Performance Evaluation 661

Profit Variance 662
Business Application: *When a Favorable Variance Might Not Mean "Good" News* 663
Why Are Actual and Budgeted Results Different? 664

Flexible Budgeting 664

Comparing Budgets and Results 665
Sales Activity Variance 665

Profit Variance Analysis as a Key Tool for Managers 667
Sales Price Variance 667
Variable Production Cost Variances 667
Fixed Production Cost Variance 667
Marketing and Administrative Variances 667

Performance Measurement and Control in a Cost Center 669
Variable Production Costs 669

Variable Cost Variance Analysis 670
General Model 670
Direct Materials 671
Direct Labor 674
Variable Production Overhead 675
Variable Cost Variances Summarized in Graphic Form 677

Fixed Cost Variances 678
Fixed Cost Variances with Variable Costing 678
Absorption Costing: The Production Volume Variance 679

Summary of Overhead Variances 681
Key Points 681
Business Application: *Does Standard Costing Lead to Waste?* 682
The Debrief 682
Summary 682
Key Terms 683
Appendix: Recording Costs in a Standard Cost System 684
Review Questions 686
Critical Analysis and Discussion Questions 687
Exercises 687
Problems 696
Integrative Cases 705
Solutions to Self-Study Questions 708

17
Additional Topics in Variance Analysis 710

Profit Variance Analysis When Units Produced Do Not Equal Units Sold 711
Business Application: *Financial Analysis and Variance Analysis* 713
Reconciling Variable Costing Budgets and Full Absorption Income Statements 713

Materials Purchases Do Not Equal Materials Used 714

Market Share Variance and Industry Volume Variance 716

Sales Activity Variances with Multiple Products 718
Evaluating Product Mix 718
Evaluating Sales Mix and Sales Quantity 718
Business Application: *Sales Mix and Financial Reporting* 720

Production Mix and Yield Variances 720
Mix and Yield Variances in Manufacturing 720

Variance Analysis in Nonmanufacturing Settings 723
Using the Profit Variance Analysis in Service and Merchandise Organizations 723
Efficiency Measures 723
Mix and Yield Variances in Service Organizations 724

Keeping an Eye on Variances and Standards 725
How Many Variances to Calculate 725
When to Investigate Variances 725
Updating Standards 726
The Debrief 726
Summary 727
Key Terms 727
Review Questions 727
Critical Analysis and Discussion Questions 728
Exercises 728
Problems 733
Integrative Cases 740
Solutions to Self-Study Questions 743

18
Performance Measurement to Support Business Strategy 746

Strategy and Performance 747

The Foundation of a Successful Business Strategy 748
Porter Framework 748

Beyond the Accounting Numbers 749

Responsibilities According to Level of Organization 750

Business Model 751

Multiple Measures or a Single Measure of Performance? 752
Balanced Scorecard 753
Continuous Improvement and Benchmarking 756
Business Application: *Challenges to Identifying Appropriate Benchmarking Organizations* 759

Performance Measurement for Control 760

Some Common Nonfinancial Performance Measures 760
Customer Satisfaction Performance Measures 760
Functional Performance Measures 761
Productivity 762
Nonfinancial Performance and Activity-Based Management 765
Objective and Subjective Performance Measures 766
Business Application: *Is There a "Fixation" on Metrics?* 766

Employee Involvement 767

Business Application: *Empowering Employees to Compensate Customers for Service Failures* 768

Difficulties in Implementing Nonfinancial Performance Measurement Systems 768

Fixation on Financial Measures 768

Reliability of Nonfinancial Measures 768

Lack of Correlation between Nonfinancial Measures and Financial Results 768

The Debrief 769

Summary 769

Key Terms 770

Review Questions 770

Critical Analysis and Discussion Questions 770

Exercises 771

Problems 776

Integrative Cases 781

Solutions to Self-Study Questions 782

Appendix

Capital Investment Decisions: An Overview A-1

Glossary G-1

Index IND-1

Fundamentals of Cost Accounting

6e

1

Chapter One

Cost Accounting: Information for Decision Making

LEARNING OBJECTIVES

After reading this chapter, you should be able to:

LO 1-1 Describe the way managers use accounting information to create value in organizations.

LO 1-2 Distinguish between the uses and users of cost accounting and financial accounting information.

LO 1-3 Explain how cost accounting information is used for decision making and performance evaluation in organizations.

LO 1-4 Identify current trends in cost accounting.

LO 1-5 Understand ethical issues faced by accountants and ways to deal with ethical problems that you face in your career.

The Decision

"I opened this bakery on Atlantic Boulevard shortly after I graduated from a local culinary school. I have always enjoyed baking and owning my own bakery will allow me to experiment a bit. So far, the financial returns from the store have been sufficient for me to survive, but I am not sure if they will be enough for me to continue.

I read recently that about half of new businesses fail within five years. (See the Business Application item "Understanding Costs in a Small Business.") I took some courses at the local community college last year hoping to learn some business skills that will help me really take control and increase the store's value. One thing I need to do is develop a better understanding of my costs. This semester I'm taking a cost accounting class. I know a little bit about the subject, but I know there is a lot more to learn. I'm curious, though, how this class will help me. I need to decide whether to expand the business or fold. If I expand the business, I need some help on managing my costs and remaining profitable.

I need to decide soon whether to expand or to close down and maybe go to work as a pastry chef in one of the local restaurants."

Adam Mercer is the owner and founder of The AM Bakery, which he opened three years ago. The bakery has been marginally profitable, but Adam knows he must make a decision soon. Should he expand the business and work on making it financially viable, or should he abandon it and look for a job baking for someone else?

Adam wants to add value in his business. Like all managers, he wants the business to succeed financially. Like you, he is now studying cost accounting as one of the disciplines that he will use to do this. Adam knows that the world is a fast-changing place. He wants to learn not only what is current but also a way to think about problems that he can apply throughout his career. To do this, he knows that he must develop an intuition about the subject. He does not want to just learn a few facts that he is sure to forget soon. After developing this intuition, he can evaluate the merits of new cost accounting methods that he encounters throughout his career.

In this chapter, we give an overview of cost accounting and illustrate a number of the business situations we will study to put the topic in perspective. The examples we use and the description of how they apply to larger organizations (or to not-for-profit organizations or government agencies) are discussed in more detail in individual chapters. The examples also illustrate how the discipline of cost accounting can make a person a more valuable part of any organization.

Understanding Costs in a Small Business *Business Application*

Opening a small business is always risky. Based on information from the U.S. Bureau of Labor Statistics, about one-half of all new business fail within the first five years, and this rate has been relatively constant over the past 20 years. Understanding the costs and other financial issues is a large part of the problem: ". . . over half of businesses discontinue operations because of lack of profits or financial funding."

Source: Speights, Keith, "What Percentage of Businesses Fail in Their First Year?" *USA Today*, May 21, 2017.

Value Creation in Organizations

Why Start with Value Creation?

LO 1-1
Describe the way managers use accounting information to create value in organizations.

We start our discussion with the concepts of value creation and the value chain because in cost accounting our goal is to assist managers in achieving the maximum value for their organizations. Measuring the effects of decisions on the value of the organization is one of the fundamental services of cost accounting. As providers of information (accountants) or as the users of information (managers), we have to understand how the information can and will be used to increase value. We can then come back to questions about how to design accounting systems that accomplish this goal.

Value Chain

value chain
Set of activities that transforms raw resources into the goods and services that end users purchase and consume.

The **value chain** is the set of activities that transforms raw resources into the goods and services end users (households, for example) purchase and consume. It also includes the treatment or disposal of any waste generated by the end users. As an example, the value chain for gasoline stretches from the search and drilling for oil, through refining the oil into gasoline, to the distribution of gasoline to retail outlets such as convenience stores, and, finally, to the treatment of the emissions produced by automobiles or the waste oil recycled at a service station.

In much of our discussion about cost accounting, we will be concerned with the part of the value chain that comprises the activities of a single organization (a firm, for example). However, an important objective of modern cost accounting is to ensure that the entire value chain is as efficient as possible. It is necessary for the firm to coordinate with vendors and suppliers and with distributors and customers to achieve this objective. In the gasoline example, ExxonMobil must work with suppliers of drilling equipment to ensure the equipment is available when needed. It also needs to work with owners of its On the Run franchises to ensure that gasoline is delivered to the stations as needed.

The cost accounting system provides much of the information necessary for this coordination. Therefore, at times we will also consider where in the value chain it is most efficient to perform an activity.

value-added activities
Those activities that customers perceive as adding utility to the goods or services they purchase.

The **value-added activities** that the firms in the chain perform are those that customers perceive as adding utility to the goods or services they purchase. The value chain comprises activities from research and development (R&D) through the production process to customer service. Managers evaluate these activities to determine how they contribute to the final product's service, quality, and cost.

Exhibit 1.1 identifies the individual components of the value chain and provides examples of the activities in each component, along with some of the costs associated with these activities. Although the list of value chain components in Exhibit 1.1 suggests a sequential process, many of the components overlap. For example, the R&D and design processes might take place simultaneously. Feedback from production workers

Exhibit 1.1 The Value Chain Components, Example Activities, and Example Costs

Component	Example Activities	Example Costs
• Research and development (R&D)	• The creation and development of ideas related to new products, services, or processes.	• Research personnel • Patent applications • Laboratory facilities
• Design	• The detailed development and engineering of products, services, or processes.	• Design center • Engineering facilities used to develop and test prototypes
• Purchasing	• The acquisition of goods and services needed to produce a good or service.	• Purchasing department personnel • Vendor certification
• Production	• The collection and assembly of resources to produce a product or deliver a service.	• Machines and equipment • Factory personnel
• Marketing and sales	• The process of informing potential customers about the attributes of products or services that leads to their sale.	• Advertising • Focus group travel • Product placement
• Distribution	• The process for delivering products or services to customers.	• Trucks • Fuel • Website creation, hosting, and maintenance
• Customer service	• The support activities provided to customers for a product or service.	• Call center personnel • Returns processing • Warranty repairs

on existing products might be incorporated in the development of new models of a product. Companies such as Apple solicit "feature requests" from customers for new versions of software.

Most organizations operate under the assumption that each of the value chain components adds value to the product or service. Before product ideas are formulated, no value exists. Once an idea is established, however, value is created. When research and development of the product begins, value increases. As the product reaches the design phase, value continues to increase. Each component adds value to the product or service.

You may have noticed that administrative functions are not included as part of the value chain. They are included instead in every business function of the value chain. For example, human resource management is involved in hiring employees for all business value chain functions. Accounting personnel and other managers use cost information from each business function to evaluate employee and departmental performance. Many administrative areas cover each value chain business function.

Supply Chain and Distribution Chain

Firms buy resources from suppliers (other companies, employees, and so on). These suppliers form the **supply chain** for the firm. Firms also sell their products to distributors and customers. This is the **distribution chain** of the firm. At times in our discussion, we will consider the companies and individuals supplying to or buying from a firm and the effect of the firm's decisions on these suppliers and customers. We can think of these suppliers and customers as being on the firm's *boundaries.* Thus, the supply chain and distribution chain are the parts of the value chain outside the firm.

supply chain
Set of firms and individuals that sells goods and services to the firm.

distribution chain
Set of firms and individuals that buys and distributes goods and services from the firm.

The value chain is important because it creates the value for which the customer is willing to pay. The customer is not particularly concerned with how work is divided among firms producing the product or providing the service. Therefore, one decision firms must make is where in the value chain a value-added component is performed most cost effectively. Suppose, for example, that some inventory is necessary to provide timely delivery to the customer. Managers need accounting systems that will allow them to determine whether the firm or its supplier can hold the inventory at the lower cost.

Choosing Where to Produce in the Supply Chain — *Business Application*

Customers are concerned with the total cost of producing a product or service (because of the effect on its price) but are not concerned about which firm in the supply chain incurred the cost. Therefore, companies think about not only reducing their own costs but also reducing costs in the entire chain. Sometimes, a company might choose to have other firms produce parts used in its final product (outsourcing). Other times, the same company might decide to produce those same parts internally (in-sourcing). For example, Boeing and Airbus, makers of large commercial and military aircraft, have begun producing more of their own parts. Why? "They're acting under growing pressure to produce jets faster and cheaper."

Source: Page, Paul, "Today's Top Supply Chain and Logistics News from WSJ," *Wall Street Journal,* February 27, 2018.

Using Cost Information to Increase Value

How can cost information add value to the organization? The answer to this question depends on whether the information provided improves managers' decisions. Suppose a production process is selected based on cost information indicating that the process would be less costly than all other options. Clearly, the information adds value to the process and its products. The measurement and reporting of costs is a valuable activity. Suppose cost information is received too late to help managers make a decision. Such information would not add value.

Accounting and the Value Chain

If you have taken a financial accounting course, you focused, for the most part, on preparing and interpreting financial statements for the firm as a whole. You were probably not concerned with what stage in the value chain produced profits. In cost accounting, as we will see, we need to understand how the individual stages contribute to value and how to work with other managers to improve performance. Although financial accounting and cost accounting are related, there are important differences.

Accounting Systems

LO 1-2
Distinguish between the uses and users of cost accounting and financial accounting information.

All accounting systems are designed to provide information to decision makers. However, it is convenient to classify accounting systems based on the primary user of the information. Investors (or potential investors), creditors, government agencies, tax authorities, and so on, are outside the organization. Managers are *inside* the organization. The classification of accounting systems into financial and cost (or managerial) systems captures this distinction between decision makers.

Financial Accounting

financial accounting
Field of accounting that reports financial position and income according to accounting rules.

Financial accounting information is designed for decision makers who are not directly involved in the daily management of the firm. These users of the information are often external to the firm. The information, at least for firms that are publicly traded, is public and typically available on the company's website. The managers in the company are keenly interested in the information contained in the financial accounting reports generated. However, the information is not sufficient for making operational decisions.

Individuals making decisions using financial accounting data are often interested in comparing firms, deciding whether, for example, to invest in Bank of America or Wells Fargo. An important characteristic of financial accounting data is that it be *comparable* across firms. That is, it is important that when an investor looks at, say, revenue for Bank of America, it represents the same thing that revenue for Wells Fargo does. As a result, financial accounting systems are characterized by a set of rules that define how transactions will be treated.

Cost Accounting

cost accounting
Field of accounting that measures, records, and reports information about costs.

Cost accounting information is designed for managers. Because the managers are making decisions only for their own organization, there is no need for the information to be comparable to similar information in other organizations. Instead, the important criterion is that the information be relevant for the decisions that managers operating in a particular business environment with a particular strategy make. Cost accounting information is commonly used in developing financial accounting information, but we are concerned primarily with its use by managers to make decisions.

This book is about accounting for costs; it is for those who currently (or will) use or prepare cost information. The book's perspective is that managers (you) add value to the organization by the decisions they (you) make. From a different perspective, accountants (you) add value by providing good information to managers making the decision. The better the decisions, the better the performance of your organization—whether it is a manufacturing firm, bank, not-for-profit hospital, government agency, school club, or, yes, even a business school. We have already identified some of the decisions managers make and will discuss many of the current trends in cost accounting. We do this to highlight the theme we follow throughout: The cost accounting system is not designed in a vacuum. It is the result of the decisions managers in an organization make and the business environment in which they make them.

Exhibit 1.2 Comparison of Financial and Cost Accounting

	Financial Accounting	Cost Accounting
• Users of the information (decision makers)	• External (investors, creditors, and so on)	• Internal (managers)
• Important criteria	• Comparability, decision relevance (for investors)	• Decision relevance (for managers), timeliness
• Who establishes or defines the system?	• External standard-setting group (FASB in the United States)	• Managers
• How to determine accounting treatment	• Standards (rules)	• Relevance for decision making

Exhibit 1.2 summarizes some of the major differences between financial and cost accounting.

Cost Accounting, GAAP, and IFRS

The primary purpose of financial accounting is to provide investors (for example, shareholders) or creditors (for example, banks) information regarding company and management performance. The financial data prepared for this purpose are governed by **generally accepted accounting principles (GAAP)** in the United States and **international financial reporting standards (IFRS)** in many other countries. GAAP and IFRS provide consistency in the accounting data used for reporting purposes from one company to the next. This means that the cost accounting information used to compute cost of goods sold, inventory values, and other financial accounting information used for external reporting must be prepared in accordance with GAAP or IFRS. Although GAAP and IFRS are converging, differences remain. For the reasons discussed in the next paragraph, these differences are not important for our discussion, but you should remain aware of them.

generally accepted accounting principles (GAAP)
Rules, standards, and conventions that guide the preparation of financial accounting statements for firms registered in the United States.

international financial reporting standards (IFRS)
Rules, standards, and conventions that guide the preparation of the financial accounting statements in many other countries.

In contrast to cost data for financial reporting to shareholders, cost data for managerial use (that is, within the organization) need not comply with GAAP or IFRS. Management is free to set its own definitions for cost information. Indeed, the accounting data used for external reporting are often entirely inappropriate for managerial decision making. For example, managerial decisions deal with the future, so estimates of future costs are more valuable for decision making than are the historical and current costs that are reported externally. Unless we state otherwise, we assume that the cost information is being developed for internal use by managers and does not have to comply with GAAP or IFRS.

This does not mean there is no "right" or "wrong" way to account for costs. It does mean that the best, or correct, accounting for costs is the method that provides relevant information to the decision maker so that he or she can make the best decision.

Customers of Cost Accounting

To management, customers are the most important participants in a business. Without customers, the organization loses its ability and its reason to exist; customers provide the organization's focus. There are fewer and fewer markets in which managers can assume that they face little or no competition for the customer's patronage.

Cost information itself is a product with its own customers. The customers are managers. At the production level, where products are assembled or services are performed, information is needed to control and improve operations. This information is provided frequently and is used to track the efficiency of the activities being performed. For example, if the average defect rate is 1 percent in a manufacturing process and data from the cost accounting system indicate a defect rate of 2 percent on the previous day, shop-floor

employees would use this information to identify what caused the defect rate to increase and to correct the problem.

At the middle management level, where managers supervise work and make operating decisions, cost information is used to identify problems by highlighting when some aspect of operations is different from expectations. At the executive level, financial information is used to assess the company's overall performance. This information is more strategic in nature and typically is provided on a monthly, quarterly, or annual basis. Cost accountants must work with the users (or customers) of cost accounting information to provide the best possible information for managerial purposes.

Many proponents of improvements in business have been highly critical of cost accounting practices in companies. Many of the criticisms—which we discuss throughout the book—are warranted. The problem, however, is more with the misuse of cost accounting information, not the information itself. The most serious problems with accounting systems appear to occur when managers attempt to use accounting information that was developed for external reporting for decision making. Making decisions often requires different information from that provided in financial statements to shareholders. It is important that companies realize that different uses of accounting information require different types of accounting information.

Our Framework for Assessing Cost Accounting Systems

Individuals form organizations to achieve some common goal. Although the focus in this book is on economic organizations, such as the firm, most of what we discuss applies equally well to social, religious, or political organizations. The ability of organizations to remain viable and achieve their goals, whether profit, community well-being, or political influence, depends on the decisions made by managers of the organization.

Throughout the text, we emphasize that it is individuals (people) who make decisions. This theme and the following framework give us a common basis we can use to assess alternative accounting systems:

- Decisions determine the performance of the organization.
- Managers use information from the accounting system to make decisions.
- Owners evaluate organizational and managerial performance with accounting information.

The Manager's Job Is to Make Decisions

LO 1-3
Explain how cost accounting information is used for decision making and performance evaluation in organizations.

Why do organizations employ people? What do they do to add value? For *line employees*, those directly involved in production or who interact with customers, the answer to this question is clear. They produce the product or service and deal with the customer. The job of managers, however, is more difficult to describe because it tends to be varied and ambiguous. The common theme among all managerial jobs, however, is decision making. Managers are paid to make decisions.

Decision Making Requires Information

Accounting systems are important because they are a primary source of information for managers. We describe here some common decisions that managers make. Many, if not most, decisions require information that is likely to come from the accounting system. Our concern with the accounting system is whether it is providing the "best" information to managers. The decisions managers make will be only as good as the information they have.

Finding and Eliminating Activities That Don't Add Value

How do managers use cost information to make decisions that increase value? In their quest to improve the production process, companies seek to identify and eliminate **nonvalue-added activities,** which often result from the current product or process design. If a poor facility layout exists and work-in-process inventory must be moved during the production process, the company is likely to be performing nonvalue-added activities.

nonvalue-added activities Activities that do not add value to the good or service.

Why do managers want to eliminate nonvalue-added activities? An important concept in cost accounting is that *activities cause costs.* Moving inventory is a nonvalue-added activity that causes costs (for example, wages for employees and costs of equipment to move the goods). Reworking defective units is another common example of a nonvalue-added activity. In general, if activities that do not add value to the company can be eliminated, then costs associated with them will also be eliminated. At the same time, the value to the customer is not affected, leading to an overall increase in value to the organization.

A well-designed cost accounting system also can identify nonvalue-added activities that cross boundaries in the value chain. For example, many companies such as Alaska Airlines, Hyatt Hotels, and National Car Rental allow customers to purchase tickets and reserve rooms and cars directly using the company website. This change has eliminated the need for as many dedicated telephone agents. Not only does this save clerical costs, but it reduces the chances of costly errors in the details of the order.

A major activity of managers is evaluating proposed changes in the organization. Ideas often sound reasonable, but if their benefits (typically measured in savings or increased profits) do not outweigh the costs, management will likely decide against them. The concept of considering both the costs and benefits of a proposal is **cost-benefit analysis.** Managers should perform cost-benefit analyses to assess whether proposed changes in an organization are worthwhile. The concept of cost-benefit analysis applies equally to deciding whether to implement a new cost accounting system. The benefits from an improved cost accounting system come from better decision making. If the benefits do not exceed the cost of implementing and maintaining the new system, managers will not implement it.

cost-benefit analysis Process of comparing benefits (often measured in savings or increased profits) with costs associated with a proposed change within an organization.

Identifying Strategic Opportunities Using Cost Analysis

Using the value chain and other information about the costs of activities, companies can identify strategic advantages in the marketplace. For example, if a company can eliminate nonvalue-added activities, it can reduce costs without reducing the value of the product to customers. By reducing costs, the company can lower the price it charges customers, giving it a cost advantage over competitors. Or the company can use the resources saved from eliminating nonvalue-added activities to provide better service to customers.

Alternatively, a company can identify activities that customers value and which the company can provide at lower cost. Many logistics companies, such as Owens & Minor, a healthcare services provider, offer their customers consulting services and inventory management.

The idea here is simple. Look for activities that do or do not add value. If your company can save money by eliminating those that do not, then do so. You will save your company money. Implement those activities that do. In both cases, you will make the organization more competitive.

Owners Use Cost Information to Evaluate Managers

We have seen that it is important that managers make good decisions if they are to increase organizational value, but how will we know if they make good decisions? If managers own the organization, it is their money and resources that are at risk. We can

assume that they will make decisions that are in their own interest. In other words, the interest of the organization and the owner-manager can be assumed to be the same, or *aligned.* However, most large organizations, especially businesses, are not owned by the managers but by a large number of shareholders. Most of these shareholders are not involved in managing the business. Therefore, there is a second role of the accounting system in addition to aiding managerial decision making. It is to provide information, perhaps indirectly through financial reports, to the owners of the organization about the performance of the organization and the manager.

Cost Data for Managerial Decisions

This book covers many topics on the use of cost data for managers. The following sections provide examples of these topics.

Costs for Decision Making

One of the most difficult tasks in calculating the financial consequences of alternatives is estimating how costs (or revenues or assets) among the alternatives will differ. For example, The AM Bakery has been making and selling a variety of cookies through a small store. One of Adam's customers, who works at a local office park, suggests to Adam that he expand his operation and sell the bakery offering at the morning and afternoon break times at the office park using a food truck. The key is to determine which would be more profitable—remain the same size or expand operations by adding a new distribution channel.

Now Adam has the difficult task of estimating how revenues and costs will change if he expands into this new distribution channel. He uses his work experience and knowledge of the company's costs to estimate cost changes. He identifies **cost drivers,** which are factors that cause costs. For example, to make scones requires labor. Therefore, the number of scones made is a cost driver that causes, or drives, labor costs. To estimate the effect of adding a food truck channel, Adam estimates how much additional product he would have to make. Based on that estimate, he determines the additional costs and revenues to the company that selling additional merchandise will generate.

cost driver
Factor that causes, or "drives," costs.

Do we "know" how this decision will affect the firm? We do not, of course. These are *estimates* that require making many assumptions and forecasts, some of which may not be realized. This is what makes this type of analysis both fun and challenging. In business, nobody knows for certain what will happen in the future. In making decisions, however, managers constantly must try to predict future events. Cost accounting has more to do with estimating future costs than recording past costs. For decision making, information about the past is a means to an end; it helps you predict what will happen in the future.

To complete the example, assume that Adam estimates that his revenues would increase by 50 percent; ingredients and labor would increase by 45 percent; and utilities would increase 20 percent. Rent per month would not change. Adam knows that he will need a strong marketing campaign to create awareness, so he plans to triple his marketing budget. The new channel would require a lease for a truck at $900 per month, and he would incur truck operating expenses of $150 per month. Adam enters the data into a spreadsheet to estimate how profits would change if he were to add the new channel. See Columns 1 and 2 of Exhibit 1.3 for the present and estimated costs, revenues, and profits for the business. The costs shown in Column 3 are the differences between those in Columns 1 and 2.

differential costs
With two or more alternatives, costs that differ among or between alternatives.

differential revenues
Revenues that change in response to a particular course of action.

We refer to the costs and revenues that appear in Column 3 as **differential costs** and **differential revenues.** These are the costs and revenues, respectively, that change in response to a particular course of action. The costs in Column 3 of Exhibit 1.3 are differential costs because they differ if Adam decides to sell bakery goods off the food truck.

	A	B	C	D	E	F	G	H	I
1	**THE AM BAKERY**								
2	Projected Income Statement								
3	For a Representative Week								
4									
5			(1)			(2)			(3)
6						Alternative			
7			Status Quo:			Original Bakery			
8			Original Bakery			Plus Food			
9			Sales Only			Truck Sales			Difference
10	Sales revenue		$11,200			$16,800	(a)		$5,600
11	Costs								
12	Ingredients (Flour, butter, and so on)		$2,700			$3,915	(b)		$1,215
13	Labor		3,100			4,495	(b)		1,395
14	Utilities		500			600	(c)		100
15	Rent		900			900	(d)		0
16	Marketing		25			75	(e)		50
17	Truck lease		0			900	(f)		900
18	Truck operating costs		0			150	(f)		150
19	Total costs		$7,225			$11,035			$3,810
20	Operating profits		$3,975			$5,765			$1,790
21									
22	(a) 50 percent higher than status quo.								
23	(b) 45 percent higher than status quo.								
24	(c) 20 percent higher than status quo.								
25	(d) No additional rent required.								
26	(e) 300 percent higher than status quo.								
27	(f) New costs for food trucks only.								

Exhibit 1.3
Differential Costs, Revenues, and Profits

The analysis shows a $1,790 increase in operating profits if Adam adds this new selling option. Based on this analysis, Adam decides to expand his bakery business. Note that only differential costs and revenues affect the decision. For example, rent does not change, so it is irrelevant to the decision.

In Chapters 2 through 11, we discuss methods to estimate and analyze costs, as well as how accounting systems record and report cost information.

Reducing Costs by Making Small Changes *Business Application*

It is not just small businesses that think about costs. With increased energy and labor costs and strong competition pressuring prices, even large companies look for any edge they can find. For example, United Airlines found that by reducing the weight of the paper used to print its in-flight magazine and safety cards found in the seat back pockets, it is saving "170,000 gallons of fuel each year, or $290,000 in annual fuel costs." Previously it had dropped the sale of duty-free items sold on board; reduced weight resulted in fuel savings of $2.3 million.

Source: Martin, Hugo, "United Airlines Saves 170,000 Gallons of Fuel by Using Lighter Paper on Inflight Magazine," *Los Angeles Times,* January 22, 2018.

Costs for Control and Evaluation

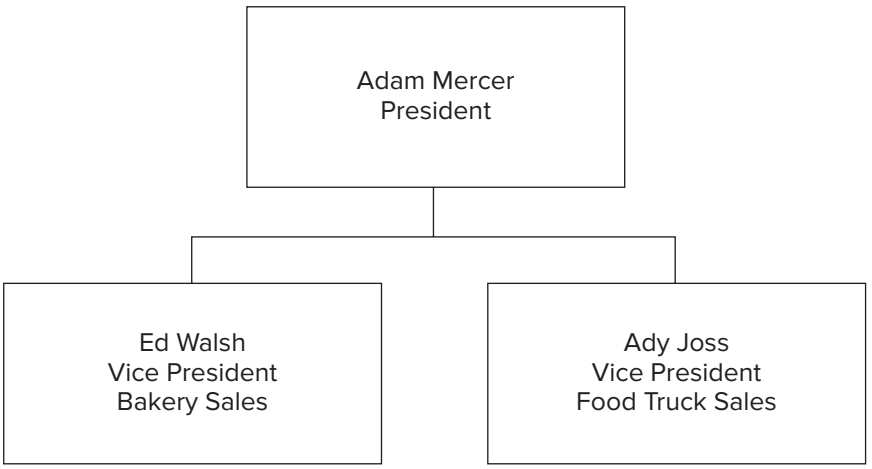
An organization of any but the smallest size divides responsibility for specific functions among its employees. These functions are grouped into organizational units. The units, which may be called *departments, divisions, segments,* or *subsidiaries,* specify the reporting relations within the firm. These relations are often shown on an organization chart. The organizational units can be based on products, geography, or business function. We use the general term **responsibility center** to refer to these units. The manager assigned to lead the unit is accountable for, that is, has responsibility for, the unit's operations and resources.

responsibility center
Specific unit of an organization assigned to a manager who is held accountable for its operations and resources.

For example, the chief of internal medicine is responsible for the operations of a particular part of a hospital. The president of GM China is responsible for most of the company's operations in China. The president of a company is responsible for the entire company.

Consider The AM Bakery. When he first opened the store, Adam managed the entire operation himself. As the enterprise became more successful, he added a new distribution

Exhibit 1.4
Responsibility Centers, Revenues, and Costs



	A	B	C	D
1	**THE AM BAKERY**			
2	Income Statement			
3	For the Month Ending August 31			
4		Sales Channel		
5		Bakery	Food Trucks	Total
6	Sales revenue	$52,200	$28,000	$80,200
7	Channel costs			
8	Ingredients (Flour, butter, and so on)	$12,500	$6,100	$18,600
9	Labor (Note a)	15,200	7,000	22,200
10	Utilities	2,400	550	2,950
11	Rent	3,600	0	3,600
12	Marketing	200	225	425
13	Truck lease	0	3,900	3,900
14	Truck operating cost	0	700	700
15	Total channel costs	33,900	18,475	52,375
16	Channel margin (Note b)	$18,300	$9,525	$27,825
17	General and administrative costs			
18	Corporate office operations (Note c)			5,400
19	Other			2,900
20	Total general and administrative costs			$8,300
21	Operating profit			$19,525
22				
23	Notes:			
24	a. Includes channel managers' salaries, but excludes the President's (Adam's) salary.			
25	b. The difference between revenues and costs attributable to a specific channel.			
26	c. Includes the General Manager's salary.			

channel using food trucks after the initial experiment proved successful. He then hired two managers: Ed Walsh to manage the original retail store and Ady Joss to manage the food truck channel. Adam, as president, oversaw the entire operation. See the top part of Exhibit 1.4 for the company's organization chart.

Exhibit 1.4 also includes the company income statement, along with the statements for the two centers. Each manager is responsible for the revenues and costs of his or her center. The Total column is for the entire company. Note that the costs at the bottom of the income statement are not assigned to the centers; they are the costs of running the company. These costs are not the particular responsibility of either Ed or Ady. Consider the other (administrative) costs. Adam, not Ed or Ady, is responsible for designing the administrative systems (e.g., accounting and payroll), so Adam manages this cost as part of his responsibility to run the entire organization. Ed and Ady, on the other hand, focus on managing ingredient and labor costs (other than their own salaries) and responsibility center revenues.

Budgeting You have probably had to budget—for college, a vacation, or living expenses. Even the wealthiest people should budget to make the best use of their resources. (For some, budgeting could be one reason for their wealth.) Budgeting is very important to the financial success of individuals and organizations.

Each responsibility center in an organization typically has a **budget** that is its financial plan for the revenues and resources needed to carry out its tasks and meet its financial goals. Budgeting helps managers decide whether their goals can be achieved and, if not, what modifications are necessary.

budget
Financial plan of the revenues and resources needed to carry out activities and meet financial goals.

Managers are responsible for achieving the targets set in the budget. The resources that a manager actually uses are compared with the amount budgeted to assess the responsibility center's and the manager's performance. For example, managers in an automobile dealership compare the daily sales to a budget every day. (Sometimes that budget is the sales achieved on a comparable day in the previous year.) Every day, managers of American Airlines compare the percentage of their airplanes' seats filled (the *load factor*) to a budget. Every day, managers of hotels and hospitals compare their occupancy rates to their budgets. By comparing actual results with budgets, managers can do things to change their activities or revise their goals and plans.

As part of the planning and control process, managers prepare budgets containing expectations about revenues and costs for the coming period. At the end of the period, they compare actual results with the budget. This allows them to see whether changes can be made to improve future operations. See Exhibit 1.5 for the type of statement used to compare actual results with the planning budget for The AM Bakery.

For instance, Ed observes that the bakery responsibility center sold merchandise as budgeted but that actual costs were higher than budgeted. Costs that appear to need follow-up are those for flour, fruit, and nuts. Should Ed inquire whether there was waste in using flour? Did the cost of nuts per pound rise unexpectedly? Was the company buying fruit from the best source? Was there theft of some ingredients? As we will see, even costs that are lower than expected (like oil) should be evaluated. For example, is lower-quality

	A	B	C	D
1	**THE AM BAKERY**			
2	Bakery Sales			
3	Actual and Budgeted Costs			
4	For the Month Ending August 31			
5		Actual	Budgeted	Difference
6	Ingredients			
7	Flour	$3,900	$3,700	$200
8	Butter	3,500	3,400	100
9	Oil	1,700	1,800	(100)
10	Fruit	1,300	1,000	300
11	Nuts	900	800	100
12	Chocolate	800	800	0
13	Other	400	300	100
14	Total ingredients	$12,500	$11,800	$700
15	Labor			
16	Channel manager	$4,500	$4,500	$0
17	Other	10,700	10,900	(200)
18	Utilities	2,400	2,300	100
19	Rent	3,600	3,600	0
20	Marketing	200	100	100
21	Total bakery costs	$33,900	$33,200	$700
22				
23	Revenues	$52,200	$52,200	$0

Exhibit 1.5
Budget versus Actual Data

oil being purchased? These are just a few questions that the information in Exhibit 1.5 would prompt.

We discuss developing budgets and measuring the performance of managers and responsibility centers in Chapters 12 through 18.

Different Data for Different Decisions

One principle of cost accounting is that different decisions often require different cost data. "One size fits all" does *not* apply to cost accounting. Each time you face a cost information problem in your career, you should first learn how the data will be used. Are the data needed to value inventories in financial reports to shareholders? Are they for managers' use in evaluating performance? Are the data to be used for decision making? The answers to these questions will guide your selection of the most appropriate accounting data.

Self-Study Questions

1. Suppose that the ingredients, labor, and utilities for The AM Bakery (Exhibit 1.3) were differential and increased proportionately with sales revenue. Adam plans to increase marketing costs to $60 per week with the new channel. Rent would not change. The truck expenses would be as given in Exhibit 1.3 with the new channel. What would have been the impact on profits of adding the new distribution channel?
2. For what decisions would estimated cost information be useful if you were a hospital administrator? The director of a museum? The marketing vice president of a bank?

The solutions to these questions are at the end of the chapter.

Trends in Cost Accounting throughout the Value Chain

LO 1-4
Identify current trends in cost accounting.

Cost accounting continues to experience dramatic changes. Developments in information technology (IT) have nearly eliminated manual bookkeeping. Emphasis on cost control is increasing in banks, hospitals, manufacturing industries (from computers to automobiles), airlines, school districts, and many other organizations that have traditionally not focused on it. Cost accounting has become a necessity in virtually every organization, including fast-food outlets, professional organizations, and government agencies.

One reason for this rapid change is that managers at each stage of the value chain require information on the performance of products, services, suppliers, customers, and employees. Managers of the activities and cost accountants must work together at each stage to make decisions that increase firm value. Because these processes themselves have undergone great change in recent years, cost accountants and cost accounting methods must continuously adapt to changes in all business areas.

Cost Accounting in Research and Development (R&D)

Lean manufacturing techniques, in which Toyota Motor Company is considered a leader, are not simply about production. Companies partner with suppliers in the development stage to ensure cost-effective designs for products. Product engineers need cost accounting information to make decisions about alternative materials. For example, Tesla, a manufacturer of electric cars, needs to make trade-offs between battery life and weight. A larger battery, providing greater range, weighs more, resulting in reduced efficiency. Understanding the life-cycle costs of different technologies (including operation and disposal) is important in balancing performance and efficiency.

Cost Accounting in Design

An important activity in product development is design. Product designers must write detailed specifications on a product's design and manufacture. The design of a product can have a significant impact on the cost to manufacture it. Designs that are complex might add additional functions, which, while making a product more desirable, may also require complex and expensive manufacturing processes. Design for manufacturing (DFM) is the concept that manufacturing cost and complexity need to be considered in the design of the product. Cost accountants help designers understand the trade-off by using methods such as **activity-based costing,** which considers the activities or processes that will be required to bring a product to market. Designers at IKEA, for example, use costing information to engineer costs out of their designs, which can take up to five years to develop.

activity-based costing (ABC) Costing method that first assigns costs to activities and then assigns them to products based on the products' consumption of activities.

Activity-based costing is a product costing method that has received a great deal of attention since the 1990s. This costing method is more detailed and complicated than conventional costing methods, but it can provide more accurate cost numbers. ABC assigns costs to products based on several different activities, depending on how they drive costs, whereas traditional costing methods assign costs to products based on only one or two factors, generally based on volume. In general, ABC provides more detailed cost information, enabling managers to make more informed decisions.

Cost Accounting in Purchasing

Companies now partner with suppliers to increase the efficiency in the supply chain. Partnering requires information on the performance of partners to ensure the relationship adds value. **Performance measures** are being used to evaluate the performance of key suppliers and business partners. For example, United Technologies has an extensive supplier metrics system. Included in the supplier assessment are factors such as quality, delivery performance, and customer satisfaction.

performance measure Metric that indicates how well an individual, business unit, product, firm, and so on, is working.

The use of cost accounting methods such as target costing, activity-based costing, performance measures, and incentive systems that support teamwork helps firms such as FedEx and Dell Inc. manage their partnerships to keep the supply chain "lean" and add value throughout the chain. Some firms like Sainsbury, a supermarket chain in the United Kingdom, maintain a web portal for their suppliers that allows them to see their own performance over time and compare it to the average performance of other comparable suppliers. In the United States, Boeing Aircraft and United Technologies also use the Internet to provide comparative performance data to suppliers.

These approaches to managing suppliers allow firms to support continual improvement throughout the supply chain by facilitating **benchmarking.** Using benchmarking methods, managers measure a company's own products, services, and activities against the best levels of performance that can be found either inside or outside the manager's own organization. Because managers seek continual improvement, they do not treat benchmarking as a one-time event but as an ongoing process.

benchmarking Continuous process of measuring a company's own products, services, or activities against competitors' performance.

Cost Accounting in Production

Operations managers and financial accountants use cost information in the production stage to understand and report the costs of the multiple products produced. One of the most important developments in production, associated with lean manufacturing, is the use of **just-in-time (JIT) methods.** Using just-in-time methods, companies produce or purchase units just in time for use, keeping inventories at a minimum. If inventories are low, accountants can spend less time on inventory valuation for external reporting and more time on managerial activities.

just-in-time (JIT) method In production or purchasing, each unit is purchased or produced just in time for its use.

The economic justification for JIT comes from the trade-off between the costs of setup and stock-outs as compared with the costs of holding inventory (obsolescence, storage space and associated tax and insurance, and costs associated with organizing and

keeping track of inventory). Modern cost accounting systems have helped managers better understand the relative costs so that appropriate inventory policies can be set and targeted improvements sought.

Firms that use lean manufacturing techniques look to the cost accounting system to support these techniques by providing useful measurements at the work cell or process level. **Lean accounting** systems provide these measures. In addition, these systems are designed to avoid unnecessary transactions, in effect, eliminating "waste" from the accounting processes, just as lean manufacturing is designed to eliminate waste from the manufacturing process.

lean accounting
Cost accounting system that provides measures at the work cell or process level and minimizes wasteful or unnecessary transaction processes.

The production process is not limited to manufacturing. Service firms, such as banks, insurance companies, and theme parks, produce or provide services demanded by customers. Efficient use of capacity (employees) in providing services is critical in increasing value. Managers look to cost accounting information to help them understand and plan capacity. For example, the University of Utah Health Care System uses detailed cost data to understand the costs of various services.

Cost Accounting in Marketing

Marketing managers require cost accounting information to understand the profitability of different customer groups. Advances in accounting information systems that capture data at various levels of detail have made possible **customer relationship management (CRM),** which allows firms to target more precisely those customers who are profitable by assessing the costs to serve a customer along with the revenues a customer generates. For example, Harrah's Entertainment is able to compete on the basis of providing complimentary services to customers (typically called "comping") based on their expected personal profitability.

customer relationship management (CRM)
System that allows firms to target profitable customers by assessing customer revenues and costs.

Cost Accounting in Distribution

Earlier, we said that managers use accounting information to determine where in the supply chain value-added activities will take place. Cost accountants work with managers to estimate whether it is more efficient (less costly) to perform an activity in the firm or to have another firm produce the product or perform the service. This is referred to as **outsourcing.** Firms frequently consider activities in the distribution stage for outsourcing. As business becomes more global, specialized information on markets, regulations, and customs is critical to the speed of delivery. As a result, cost information often identifies specialized companies as being more efficient in distributing products, as opposed to handling distribution internally.

outsourcing
Having one or more of the firm's activities performed by another firm or individual in the supply or distribution chain.

The Japanese camera manufacturer Nikon, for example, relies on UPS for distribution where it used to handle this activity internally. In fact, many distribution companies such as UPS and FedEx have developed entirely new businesses consulting with firms in regard to distribution solutions. These consulting services rely heavily on cost information to identify cost-effective distribution systems.

Cost Accounting in Customer Service

Many companies have adopted the concept of **total quality management (TQM),** which means that the organization is managed to excel on all dimensions and the customer ultimately defines quality. The customers determine the company's performance standards according to what is important to them (which is not necessarily what is important to product engineers, accountants, or marketers). Companies can indicate the high quality to consumers through the product warranty. Cost accountants help managers make decisions about quality in two ways. First, **cost of quality (COQ)** systems identify the costs associated with producing defective units as well as the lost sales associated with poor-quality products. Second, they provide information on the projected warranty claims, which can be compared to the increase in revenues estimated from offering a longer or more comprehensive warranty.

total quality management (TQM)
Management method by which the organization seeks to excel on all dimensions, with the customer ultimately defining quality.

cost of quality (COQ)
System that identifies the costs of producing low-quality items, including rework, returns, and lost sales.

For example, Korean manufacturer Hyundai Motors determined that its quality improvements justified offering a 10-year warranty, something unique in the automobile industry. This decision was based on estimates of warranty costs and studies concerning the sales impact of the longer warranty.

Enterprise Resource Planning

We have seen how cost accounting is used throughout the value chain. It is important that the information be consistent in all components of the chain.

As the cost of information technology falls and the value of information increases, managers have adopted **enterprise resource planning (ERP)** systems. ERP systems are integrated information systems that link various activities in an organization. Typical systems include modules for production, purchasing, human resources, and finance. By integrating these systems, managers hope to avoid lost orders, duplication of effort, and costly studies to determine what is the current state of the enterprise.

enterprise resource planning (ERP) Information technology that links the various systems of the enterprise into a single comprehensive information system.

Because all of the company's systems are integrated, the potential for ERP to provide information on costs of products and services is large. Implementation problems and the scale of the task in large firms (enterprises) have kept many companies from realizing that potential so far. However, with the increased emphasis on internal control from the Sarbanes-Oxley Act (discussed later in the chapter), ERP systems will become even more valuable.

Creating Value in the Organization

These trends in the way organizations do business create exciting times in cost accounting and excellent future opportunities for you to make important contributions to organizations. Keep in mind that these new methods are not ends in themselves. They are tools to help you add value to organizations and their employees, customers, shareholders, and communities.

Self-Study Question

3. What are the major causes of changes in cost accounting systems in recent years?

The solution to this question is at the end of the chapter.

Key Financial Players in the Organization

All managers in the organization, not just financial professionals, use cost accounting information. Because our focus is on cost accounting and decision making, we will often be viewing a decision from an operational manager's perspective. For example, we might look at a pricing decision or a sourcing decision that a marketing or production manager has to make.

As a financial or operational manager in an organization, you will work closely with many financial professionals. See Exhibit 1.6 for a list of the typical financial titles in organizations and examples of their activities. If you work in the accounting or finance function in an organization, you are likely to have one of these jobs. If you are an auditor or consultant, you will work with many of these financial managers. If you work in marketing, operations, or management, these financial managers will be on one of many teams working with you.

Whatever your job, you will work in cross-functional teams of people from many areas such as engineering, production, marketing, finance, and accounting. Consider a

Exhibit 1.6 Key Financial Managers in an Organization

Title	Major Responsibilities and Primary Duties	Example Activities
• Chief financial officer (CFO)	• Manages entire finance and accounting function	• Signs off on financial statements • Determines policy on debt versus equity financing
• Treasurer	• Manages liquid assets • Conducts business with banks and other financial institutions • Oversees public issues of stock and debt	• Determines where to invest cash balances • Obtains lines of credit
• Controller	• Plans and designs information and incentive systems	• Determines cost accounting policies • Maintains the accounting records
• Internal auditor	• Ensures compliance with laws, regulations, and company policies and procedures • Provides consulting and auditing services within the firm	• Ensures that procurement rules are followed • Recommends policies and procedures to reduce inventory losses
• Cost accountant	• Records, measures, estimates, and analyzes costs • Works with financial and operational manager to provide relevant information for decisions	• Evaluates costs of products and processes • Recommends cost-effective methods to distribute products

project to identify a new design for an airplane. Cross-functional teams add value to decision making by:

- Bringing a variety of expertise and perspectives to the problem.
- Ensuring that the product is appropriate for its customer base (requiring interaction between engineering and marketing).
- Giving production a chance to formulate an efficient production process (requiring interaction between engineering and production).
- Obtaining financing for the project (requiring interaction among all groups, including finance and accounting).
- Determining whether the project is economically feasible (requiring interaction among all functions).

Choices: Ethical Issues for Accountants

LO 1-5
Understand ethical issues faced by accountants and ways to deal with ethical problems that you face in your career.

We have discussed decisions that you will make in using or preparing cost accounting information. Now, we alert you to ethical issues that you will have to face. The sooner you are aware of these issues, the better you will be able to deal with them in your career. The design of cost systems is ultimately about the assignment of costs to various activities, products, projects, corporate units, and people. How that is done affects prices, reimbursement, and pay. As you know from current events, the design of the cost accounting system has the potential to be misused to defraud customers, employees, or shareholders. As a user or preparer of cost information, you need to be aware of the implications of the way in which information is used. Most important, you need to be aware of when the system has the potential for abuse.

What Makes Ethics So Important?

Unethical behavior often leads to illegal activities as managers attempt to improve reported results. See the Business Application item on revenue and expense recognition for an example and the text in this section for some approaches to handling ethical problems. ©PhotoDisc/Getty Images

Accountants report information that can have a substantial impact on the careers of managers. Managers are generally held accountable for achieving financial performance targets. Failure to achieve them can have serious negative consequences for the managers, including losing their jobs. If a division or company is having trouble achieving financial performance targets, accountants may find themselves under pressure by management to make accounting choices that will improve performance reports.

As a professional accountant, manager, or business owner, you will face ethical situations on an everyday basis. Your personal ethical choices can affect not only your own self-image but also others' perception of you. Ultimately, the ethical decisions you make directly influence the type of life you are likely to lead. You should confront ethical dilemmas bearing in mind the type of life that you want to lead.

Many students think that businesspeople who are unethical are sleazy characters. In fact, most are hard-working people who are surprised that they have gotten caught up in unethical activities. Even people who commit organizational crimes are often surprised by their own behavior. A former federal prosecutor told us, "Most businesspeople who commit crimes are very surprised that they did what they did." For example, managers at a British retailer were charged with fraud for improper accounting treatment of routine expenses for a retailer, including promotional discounts and so on (see the Business Application in this section). These managers thought they were helping their company and not (directly) enriching themselves. This example (and it is only one) shows the pressure managers and accountants find themselves under to present favorable results.

In an attempt to influence the accounting profession, many of its professional organizations such as the Institute of Management Accountants (IMA), Institute of Internal Auditors (IIA), and the American Institute of Certified Public Accountants (AICPA) have developed codes of ethics to which their members are expected to adhere. Similarly, businesses such as Johnson & Johnson generally use these codes as a public statement of their commitment to certain business practices with respect to their customers and as a guide for their employees.

Throughout this book, we include discussions of ethical issues. Our aim is to make you aware of potential problems that you and your colleagues will face in your careers. Many accountants, managers, and business owners have found themselves in serious trouble because they did many small things, none of which appeared seriously wrong, only to find that these small things added up to big trouble. If you know the warning signs of potential ethical problems, you will have a chance to protect yourself and set the proper moral tone for your company and your profession at the same time.

The IMA code of conduct appears in the Appendix to this chapter. In its "Statement of Ethical Professional Practice," the IMA states that management (and cost) accountants have a responsibility to maintain the highest levels of ethical conduct. They also have a responsibility to maintain professional competency, refrain from disclosing confidential information, and maintain integrity and objectivity in their work. These standards recommend that accountants faced with ethical conflicts follow the established policies that deal with them. If the policies do not resolve the conflict, accountants should consider discussing the matter with superiors, potentially as high as the audit committee of the board of directors. In extreme cases, the accountant could have no alternative but to resign.

Many people believe that the appropriate way to deal with ethical issues is not by requiring employees to read and sign codes of ethics but to rely on more fundamental concepts of right and wrong. Codes of conduct look good on paper, but ultimately much of ethical behavior comes from an individual's personal beliefs. We are certain that you

will be faced with important ethical choices during your career, and we wish you well in making the right choices.

Ethics

The IMA Code of Ethics discusses the steps cost accountants should take when faced with an ethical conflict. Essentially, these steps are:

- DISCUSS the conflict with your immediate superior or, if the conflict involves your superior, the next level in authority. This might require contacting the board of directors or an appropriate committee of the board, such as the audit committee or the executive committee;
- CLARIFY the relevant issues and concepts by discussions with a disinterested party or by contacting an appropriate and confidential ethics "hotline";
- CONSULT your attorney about your rights and obligations.

During the wave of corporate scandals after the turn of the century, two accountants distinguished themselves for their courage in bringing unethical behavior to light. These two accountants—Cynthia Cooper at WorldCom and Sherron Watkins at Enron—along with an FBI agent, were named Persons of the Year by *Time* magazine. Although these accountants have been publicly applauded for their courage and integrity, they were heavily criticized for not being team players when they brought their concerns to top management. But they persisted and would not back down. You, too, might be called upon by circumstances to blow the whistle on unethical practices where you work.

The Sarbanes-Oxley Act of 2002 and Ethics

When the public perception of widespread ethical problems in business exists, the result is often legislation making certain conduct not only unethical but also illegal. In the late 1990s and early 2000s, the investing and consuming public became aware of several practices, including manipulation of accounting results, designed to increase the compensation of managers at several firms. These practices came to light with the failure of many of these businesses when the "tech bubble" burst in early 2000.

The United States Congress passed legislation in 2002 that was intended to address some of the more serious problems of corporate governance. The legislation, termed the *Sarbanes-Oxley Act of 2002,* has many provisions and affects both companies and accounting firms. For our purposes, some of the important provisions concern those in Title III and Title IV that deal with corporate responsibility and enhanced financial disclosure, respectively. The CEO and CFO are responsible for signing financial statements and stipulating that the financial statements do not omit material information. The requirement that these officers sign the company's financial statements makes it clear that the "buck stops" with the CEO and CFO and that they are personally responsible for the financial statements. They cannot legitimately claim that lower-level managers or employees misled them about the financial statements, as was stated by defendant executives in many fraud trials in the past. We have learned that top executives are taking this sign-off very seriously, especially knowing that misrepresentation of their company's financial reports could mean substantial prison time. They must further disclose that they have evaluated the company's internal controls and that they have notified the company's auditors and the audit committee of the board of any fraud that involves management.

Section 404 of Title IV requires managers to attest to the adequacy of their internal controls. Good internal controls assure that financial records accurately and fairly reflect transactions and that expenditures are in accordance with the authorization of company management and directors. Further, good internal controls help protect against the unauthorized purchase, use, or sale of company assets.

An example of an internal control is the requirement that two people, not just one, sign checks. Requiring two people to sign checks reduces the probability that someone will divert the company's cash to personal use.

Accounting Decisions at Tesco: Choices and Consequences *Business Application*

An accounting scandal at British retailer Tesco in 2014 led to fraud charges being filed against three former employees. At the time of the fraud, Tesco suspended eight managers thought to be involved in a scheme to book revenues early and delay reporting of expenses. Such a practice would lead to overstating profits and making company performance look better than it actually was.

Although criminal charges have been filed, the company did not believe that the managers benefited personally. Some managers resigned before the scandal broke feeling ". . . 'compromised' as a financial professional." Others were "too scared to speak out because they're worried about losing their jobs and paying their mortgages."

Tesco paid a fine of $162 million and compensation to shareholders as a result of the activities.

Sources: Jolly, David, and Chad Bray, "3 Former Tesco Executives Charged with Fraud Over Accounting Scandal," *New York Times,* September 9, 2016; "Tesco Agrees to Pay $162 Million Fine over Accounting Scandal," *Fortune,* March 28, 2017; Colson, Thomas, "'The Current Environment Has Broken Me:' Tesco Accounting Scandal 'Compromised' Staff and Sparked Resignations. *Business Insider,* October 3, 2017.

Sarbanes-Oxley is important for managers who design cost information systems. Whether the cost information is used for pricing decisions or performance evaluation, the manager must be aware of the potential that the resulting information could be misleading or support fraudulent activity. Compliance with Sarbanes-Oxley does not, however, mean that the manager has met all of his or her ethical responsibilities. Sarbanes-Oxley is a law; ethics is based on behavior. The IMA guidelines suggest you answer the following questions when faced with an ethical dilemma:

- Will my actions be fair and just to all parties affected?
- Would I be pleased to have my closest friends learn of my actions?

Consider the *Business Application* discussion of accounting choices. You as the manager or cost accountant need to be aware of the powerful incentives created by performance measurement and compensation systems and how those incentives could lead to unethical (or even illegal) conduct. For example, imagine the pressure you would feel to remain silent about unfavorable accounting implications of actions that your boss (the CEO) wanted to take. You would probably find it difficult to tell your boss about these implications, especially when he or she would stand to benefit personally from the actions.

Self-Study Question

4. What are the three essential steps a cost accountant should take when faced with an ethical conflict?

The solution to this question is at the end of the chapter.

Cost Accounting and Other Business Disciplines

Finally, keep in mind that cost accounting does not exist in a vacuum. The boundary between what is cost accounting and what belongs in another discipline is often blurred. This is natural because in the "real world," problems are generally multidisciplinary. Production managers use cost accounting data to make scheduling and inventory decisions requiring concepts from operations. We will look to some concepts from organizational behavior because changes in the cost accounting system must be implemented by individuals in the organization who will react in different ways. Marketing issues arise when we use cost accounting data to evaluate pricing decisions. Throughout the book, we will venture into these other disciplines as a matter of course.

The Debrief

Adam takes a break from the kitchen and talks about what he has learned so far in his cost accounting class:

> *"Before taking this class, I wondered whether I should sell the bakery and take a job with another firm. What I learned just from the introduction to my cost accounting class is that there are tools I can learn to use to identify areas for improvement and that can help me analyze some of the decisions I have to make.*
>
> *The example of finding other activities that can add value made me think of something I can add to my business—catering! I have a lot of customers who hold events at their business. I suspect that some of those events, especially in the morning, would benefit from some freshly baked goodies.*
>
> *For now, I've decided to stick with the bakery. I am especially excited that I will learn how to combine what I learn in cost accounting with what I will learn in marketing, operations, finance, and management."*

Adam identified three important things he picked up from the introduction:

1. His bakery is made up of a series of activities (the value chain) that combine to add value to the business.
2. He can use cost information to help him make decisions to increase value, but this information needs to be tailored to the decision he is trying to make.
3. Business decisions, including the development and use of accounting information, often require us to ask not just what is best in terms of increasing value, but also what is ethical. Accountants, like all managers, need to understand the ethical implications of their actions.

SUMMARY

This chapter discusses the use of cost accounting in its two primary managerial uses: decision making and performance evaluation. The following summarizes key ideas tied to the chapter's learning objectives. For example, LO 1-1 refers to the first learning objective in the chapter.

LO 1-1 Describe the way managers use accounting information to create value in organizations. Managers make decisions to increase the value of the organization using information from the accounting system. Cost information helps identify value-increasing alternatives and activities that do not add value to the product or service.

LO 1-2 Distinguish between the uses and users of cost accounting and financial accounting information. Financial accounting information provides information to users (decision makers) who are not involved in the operations and strategy of the firm. These users are often external to the firm. While cost accounting information is often used in the financial accounting system, its primary role is to aid managers inside the firm in making operational and strategic decisions.

LO 1-3 Explain how cost accounting information is used for decision making and performance evaluation in organizations. Cost accounting information can be used for decision making by assessing differential costs associated with alternative courses of action. Accounting information also can be used to evaluate performance by comparing budget amounts to actual results.

LO 1-4 Identify current trends in cost accounting. Cost accounting changes with changes in information technology and the adoption of new operational techniques.

LO 1-5 Understand ethical issues faced by accountants and ways to deal with ethical problems that you face in your career. Ethical standards exist for management accountants. These standards are related to competence, confidentiality, integrity, and objectivity.

KEY TERMS

activity-based costing (ABC), *15*
benchmarking, *15*
budget, *13*
cost accounting, *6*
cost-benefit analysis, *9*
cost driver, *10*
cost of quality (COQ), *16*
customer relationship management (CRM), *16*

differential costs, *10*
differential revenues, *10*
distribution chain, *5*
enterprise resource planning (ERP), *17*
financial accounting, *6*
generally accepted accounting principles (GAAP), *7*
international financial reporting standards (IFRS), *7*
just-in-time (JIT) method, *15*
lean accounting, *16*
nonvalue-added activities, *9*
outsourcing, *16*
performance measure, *15*
responsibility center, *11*
supply chain, *5*
total quality management (TQM), *16*
value-added activities, *4*
value chain, *4*

APPENDIX: INSTITUTE OF MANAGEMENT ACCOUNTANTS CODE OF ETHICS

In today's modern world of business, individuals in management accounting and financial management constantly face ethical dilemmas. For example, if the accountant's immediate superior instructs the accountant to record the physical inventory at its original cost when it is obvious that the inventory has a reduced value due to obsolescence, what should the accountant do? To help make such a decision, here is a brief general discussion of ethics and the "Statement of Ethical Professional Practice" by the Institute of Management Accountants (IMA). Ethics, in its broader sense, deals with human conduct in relation to what is morally good and bad, right and wrong. To determine whether a decision is good or bad, the decision maker must compare his/her options with some standard of perfection. This standard of perfection is not a statement of static position but requires the decision maker to assess the situation and the values of the parties affected by the decision. The decision maker must then estimate the outcome of the decision and be responsible for its results. Two good questions to ask when faced with an ethical dilemma are "Will my actions be fair and just to all parties affected?" and "Would I be pleased to have my closest friends learn of my actions?"

Individuals in management accounting and financial management have a unique set of circumstances relating to their employment. To help them assess their situation, the IMA has developed the following "Statement of Ethical Professional Practice," which is available on their website.

Statement of Ethical Professional Practice

Members of the IMA shall behave ethically. A commitment to ethical professional practice includes overarching principles that express our values, and standards that guide member conduct.

Principles

IMA's overarching ethical principles include: Honesty, Fairness, Objectivity, and Responsibility. Members shall act in accordance with these principles and shall encourage others within their organizations to adhere to them.

Standards

IMA members have a responsibility to comply with and uphold the standards of Competence, Confidentiality, Integrity, and Credibility. Failure to comply may result in disciplinary action.

I. Competence

1. Maintain an appropriate level of professional leadership and expertise by enhancing knowledge and skills.
2. Perform professional duties in accordance with relevant laws, regulations, and technical standards.
3. Provide decision support information and recommendations that are accurate, clear, concise, and timely. Recognize and help manage risk.

II. Confidentiality

1. Keep information confidential except when disclosure is authorized or legally required.
2. Inform all relevant parties regarding appropriate use of confidential information. Monitor to ensure compliance.
3. Refrain from using confidential information for unethical or illegal advantage.

III. Integrity

1. Mitigate actual conflicts of interest. Regularly communicate with business associates to avoid apparent conflicts of interest. Advise all parties of any potential conflicts of interest.
2. Refrain from engaging in any conduct that would prejudice carrying out duties ethically.
3. Abstain from engaging in or supporting any activity that might discredit the profession.
4. Contribute to a positive ethical culture, and place integrity of the profession above personal interests.

IV. Credibility

Each member has a responsibility to:

1. Communicate information fairly and objectively.
2. Provide all relevant information that could reasonably be expected to influence an intended user's understanding of the reports, analyses, or recommendations.
3. Report any delays or deficiencies in information, timeliness, processing, or internal controls in conformance with organization policy and/or applicable law.
4. Communicate professional limitations or other constraints that would preclude responsible judgment or successful performance of an activity.

Resolving Ethical Issues In applying the Standards of Ethical Professional Practice, the member may encounter unethical issues or behavior. In these situations, the member should not ignore them but, rather, should actively seek resolution of the issue. In determining which steps to follow, the member should consider all risks involved and whether protections exist against retaliation.

When faced with unethical issues, the member should follow the established policies of his or her organization, including use of an anonymous reporting system if available.

If the organization does not have established policies, the member should consider the following courses of action:

- The resolution process could include a discussion with the member's immediate supervisor. If the supervisor appears to be involved, the issue could be presented to the next level of management.
- IMA offers an anonymous helpline that the member may call to request how key elements of the IMA Statement of Ethical Professional Practice could be applied to the ethical issue.
- The member should consider consulting his or her own attorney to learn of any legal obligations, rights, and risks concerning the issue.

If resolution efforts are not successful, the member may wish to consider disassociating from the organization.

Source: IMA, https://www.imanet.org/-/media/b6fbeeb74d964e6c9fe654c48456e61f.ash.

REVIEW QUESTIONS

1-1. Explain why it is important to consider the concepts of value and value creation in a textbook about cost accounting.

1-2. Explain the differences between financial accounting and cost accounting. Why are these differences important?

1-3. Place the letter of the appropriate accounting cost in Column 2 in the blank next to each decision category in Column 1.

Column 1	Column 2
_____ Providing cost information for financial reporting	A. Costs for performance evaluation
_____ Identifying the best store in a chain	B. Costs for inventory valuation
_____ Determining which plant to use for production	C. Costs for decision making

1-4. Distinguish among the value chain, the supply chain, and the distribution chain.

1-5. Who are the customers of cost accounting?

1-6. How can cost accounting information, together with a classification of activities into those that are value-added and those that are nonvalue-added, help managers improve an organization's performance?

1-7. Identify three key financial managers in an organization and their major responsibilities.

1-8. Does the passage of Sarbanes-Oxley mean that codes of ethics are no longer necessary?

CRITICAL ANALYSIS AND DISCUSSION QUESTIONS

1-9. After the first day of cost accounting, your friend says, "The role of accountants is to report what happened. Why do we care about value creation? That's not my responsibility." Do you agree? Explain.

1-10. An airline executive asks you, "How would you calculate the cost of a passenger?" What will be your first question to the manager?

1-11. You are considering lending a car to a friend so she can drive to Aspen. What costs would you ask her to reimburse? How would your answer change, if at all, if you decided to go along? Identify the possible options and explain your choices.

1-12. "It's not the job of accounting to determine strategy. It is only used to measure results." Discuss.

1-13. Would you support a proposal to develop a set of "generally accepted" accounting standards for measuring executive performance that would be used to determine compensation? Why or why not?

1-14. How would cost accounting information help managers in a not-for-profit organization? Is it as important as in a publicly traded, for-profit firm?

1-15. Airlines are well known for using complex pricing structures. For example, it is often (but not always) less expensive to buy a ticket in advance than it is on the day of the flight. However, if the airline offered this lower ("discount") fare for all seats, it could not remain in business. Why offer fares with different prices? What, if any, costs are different?

1-16. Hostess Brands makes a variety of baked goods just like The AM Bakery. In what ways are the cost accounting issues the same? In what ways are they different?

1-17. What potential conflicts might arise between marketing managers and the controller's staff? How might these potential conflicts be resolved with a minimum of interference from the chief executive officer?

1-18. Refer to the Business Application discussion of supply chain costs. A colleague says, "We don't have to worry about other firms in the supply chain. If every firm in the chain minimizes its own cost, we can minimize the total cost and give the customer the best value." Do you agree?

1-19. Refer to the Business Application discussion of accounting choices. In the case of Tesco, managers made choices about the timing of revenues and expenses that led to fraud charges. In order to avoid that, perhaps accountants should always assume the worst-case outcome. Then they will not be accused of misleading investors. What do you think about this approach?

1-20. Why does a cost accountant need to be familiar with new developments in information technology?

1-21. Will studying cost accounting increase the chances that The AM Bakery will succeed? How? Will it guarantee success? Explain.

1-22. Many companies, especially in the travel industry (airlines, hotels, and so on), have so-called loyalty programs offering members benefits that depend on the frequency of purchases, miles traveled, or amount of money spent, among other measures. One example is an upgrade to a better seat or to a better room for the same price as a regular seat or regular room. Such upgrades are generally based on availability, meaning the hotel or airline does not believe it will sell the room or seat. What, if anything, does such an upgrade cost the hotel or airline? Would these costs show up in the accounting records? Explain.

EXERCISES

All applicable Exercises are included in Connect.

(LO 1-1) **1-23. Value Chain and Classification of Costs**

Apple Inc. incurs many types of costs in its operations.

Required

For each cost in the following table, identify the stage in the value chain where this cost is incurred.

Cost	Stage in the Value Chain
____ Programmer costs for a new operating system	1. Marketing
____ Costs to ship computers to customers	2. Production
____ Call center costs for support calls	3. Customer service
____ Salaries for employees working on new product designs	4. Research and development
____ Costs to purchase advertising at university stores	5. Design
____ Costs of memory chips to make computers	6. Distribution

(LO 1-1) **1-24. Value Chain and Classification of Costs**

Pfizer Inc., a pharmaceutical firm, incurs many types of costs in its operations.

Required

For each cost in the following table, identify the stage in the value chain where this cost is incurred.

Cost	Stage In the Value Chain
____ Salaries for employees to develop most efficient dropper to administer drug	1. Customer service
____ Cost of chemicals to make the drug	2. Design
____ Cost to visit doctor to explain the value of the drug	3. Research and development
____ Expenses to deliver products to customers	4. Marketing
____ Laboratory experiments to evaluate drug effectiveness	5. Production
____ Employee costs to work with hospitals to ensure adequate supplies	6. Distribution

(LO 1-1) **1-25. Value Chain and Classification of Costs**

Tesla, Inc., incurs many types of costs in its automobile operations.

Required

For each cost in the following table, identify the stage in the value chain where this cost is incurred.

Cost	Stage In the Value Chain
____ Engineering cost to develop optimal batteries	1. Production
____ Costs for employees to develop grill logo	2. Customer service
____ Costs to assemble cars	3. Design
____ Costs to attend the Detroit Auto Show	4. Marketing
____ Costs to ship cars to sales centers for customer delivery	5. Distribution
____ Call center to handle maintenance calls from customers with problems on the road	6. Research and development