

7th
EDITION

OPERATIONS MANAGEMENT

Russell & Taylor



International Student Version

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Operations Management

International Student Version

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Virginia Polytechnic Institute and State University

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Preface

CHANGES IN THE SEVENTH EDITION

This new seventh edition is organized around the increasingly important and prevalent topic of operations as the creation of value along the supply chain. We describe how every chapter topic fits within a supply chain framework in a company or organization in a global operating environment. To this end two chapters deal directly with supply chain management: Chapter 10, Supply Chain Management Strategy and Design, and Chapter 11, Global Supply Chain Procurement and Distribution. However, every chapter includes material relating the chapter topic(s) to supply chain management. In addition, Chapter 5, Service Design, reflects the expanding presence and importance of service companies in operations management. We have also added new material in almost every chapter on an increasingly important global topic: sustainability.

To help us show how the OM topics in this new edition all fit together within a supply chain framework, we open each chapter with a specific example about one product: chocolate. Chocolate is an ideal product to use as an example to introduce the various OM topics in this text because its supply chain is global, and its production process is straightforward and interesting.

In addition to opening each chapter with a chocolate example, this new edition also includes numerous new “Along the Supply Chain” boxes within each chapter that describe real-world business applications of OM topics. This edition includes discussion questions that accompany many of these boxes for in-class or online discussion.

Chapter 1 focuses on examples of excellence in operations management and on the strategic design of operations and supply chain management. Chapter 2, Quality Management, emphasizes quality management systems and has expanded coverage of Six Sigma, including the Six Sigma process, Six Sigma tools, Six Sigma and profitability, and lean Six Sigma.

Chapter 4, has new sections on Design for the Environment. Chapter 5, Service Design, includes discussions of the service economy, characteristics of services, the service design process, and tools for service design. A streamlined waiting line analysis section is included in this chapter. Chapter 6 emphasizes process analysis skills, and Chapter 7 contains examples of various service layouts.

Both Chapter 8, Human Resources, and Chapter 9, Project Management, emphasize diversity in the workplace and global diversity issues. Chapter 10, Supply Chain Management Strategy and Design, and Chapter 11, Supply Chain Procurement and Distribution, both focus on creating value along the supply chain and include new material on sustainability. Chapter 11 includes a section on China’s increasing role in the global supply chain. Chapter 12, Forecasting, and Chapter 13, Inventory Management, both emphasize the important role of these topics in operations and supply chain management.

Chapter 14 introduces Sales and Operations Planning into the aggregate planning process. Chapter 15, updates resource planning with discussions of SOA (service oriented architecture) and PLM (product lifecycle management). Chapter 16, has sections on leaning the supply chain, lean services, value stream mapping, and lean and the environment.

MAJOR TEXT THEMES

OPERATIONS STRATEGY: CREATING VALUE ALONG THE SUPPLY CHAIN

A company’s plan for being competitive is its strategy. The success of a strategic plan is largely determined by how well a company coordinates all of its internal processes, including operations, with its suppliers and customers to produce products and services that provide value. Throughout this book, we try to show how the functions and processes described in each chapter fit into a company’s strategic

design for the creation of value. In each chapter, we emphasize the need for considering the overall strategic implications of particular operating decisions.

One way in which companies can gain a competitive edge is by deploying the basic functions of operations management in a more effective manner than their rivals, e.g., build a better supply chain. Therefore, we give literally dozens of examples that explain how companies deploy specific operations functions along their supply chain to provide value and make them successful. Throughout the book, “Along the Supply Chain” boxes describe how successful companies have gained a competitive edge through operations.

GLOBAL OPERATIONS

Companies and organizations today must increasingly compete in a global marketplace. The establishment of new trade agreements between countries, innovations in information technology, and improvements in transport and shipping are just a few of the factors that have enabled companies to develop global supply chains. The opening of the global marketplace has only served to introduce more competitors and make competition tougher, thus making strategic supply chain design even more important for achieving success. In this edition, we have sought to introduce this global aspect of operations into our discussion at every opportunity. In each chapter, we include examples that touch on the impact of global operations relative to the topic under discussion, and we discuss how globalization affects supply chain management.

SUSTAINABILITY

Environmental concerns are changing every aspect of operations and supply chain management from product and service design, to supplier sourcing, to manufacture and delivery. In virtually every chapter of this text we address the impact of “sustainability” (i.e., meeting present needs without sacrificing future resources) and give examples of “green practices”. For example, in Chapter 4 on product design, we discuss the design for environment lifecycle, eco-labeling, recycling and reuse, and sustainable operations. In Chapter 6 on processes we discuss green manufacturing; in Chapter 7 on facilities we discuss LEED certified green buildings; in Chapter 10 on supply chain management we discuss green sourcing; and in Chapter 16 on lean systems we discuss lean and the environment.

SERVICES AND MANUFACTURING

We have attempted to strike a balance between manufacturing and service operations in this book. Traditionally, operations management was thought of almost exclusively in a manufacturing context. However, in the United States and other industrialized nations, there has been a dramatic shift toward service industries. Thus, managing service operations is an important area of study. In many cases, operations management processes and techniques are indistinguishable between service and manufacturing. However, in many other instances, service operations present unique situations and problems that require focused attention and unique solutions. We have tried to reflect the uniqueness of service operations by providing focused discussions on service operations throughout the text. For example, in Chapter 2 on quality management we specifically address the importance of quality management in service companies, in Chapter 5 on Service Design we emphasize the differences in design considerations between manufacturing and services, and in Chapter 14 we discuss aggregate planning in services. One type of service examined in virtually every chapter in the book is health care.

QUALITATIVE AND QUANTITATIVE PROCESSES

We have also attempted to strike a balance between the qualitative (or managerial) aspects of operations management and the quantitative aspects. In the contemporary world of operations management, the quantitative and technological aspects are probably more important than ever. The ability to manage people and resources effectively, to motivate, organize, control, evaluate, and adapt to change, have become critical to competing in today’s global markets. Thus, throughout this book we seek to explain and clearly demonstrate how the successful operations manager manages and how to use quantitative techniques and technology when they are applicable.

However, we attempt to present these quantitative topics in a way that’s not overly complex or mathematically intimidating. Above all, we want to show how the quantitative topics fit in with, and

complement, the qualitative aspects of operations management. We want you to be able to see both “the forest and the trees.”

TEACHING AND LEARNING SUPPORT FEATURES

This text is accompanied by many features and supplements both in the text and online for students and instructors.

PEDAGOGY IN THE TEXTBOOK

“Along the Supply Chain” Boxes

These boxes are located in every chapter in the text. They describe the application of operations in a real world company, organization or agency related to specific topics in each chapter. They emphasize how companies effectively compete with operations management in the global marketplace. The descriptions of operations at actual companies in these boxes help the student understand how specific OM techniques and concepts are used by companies, which also make the topics and concepts easier to understand. In addition, we have added discussion questions to these boxes to help students and teachers “connect” the example to the chapter topics.

OM Dialogue Boxes

These boxes include dialogues with recent college business school graduates who are working in operations management in the real world. They describe how they apply various OM topics in the text in their own jobs and the value of their own OM training in college. This provides students with a perspective on the benefit of studying operations management now and its future benefit.

Marginal Notes

Notes are included in the margins that serve the same basic function as notes that students themselves might write in the margin. They highlight important topics, making it easier for students to locate them; they summarize important points and key concepts and provide brief definitions of key terms.

Examples

The primary means of teaching the various quantitative topics in this text is through examples. These examples are liberally distributed throughout the text to demonstrate how problems are solved in a clear, straightforward approach to make them easier to understand.

Solved Example Problems

At the end of each chapter, just prior to the homework questions and problems, there is a section with solved examples to serve as a guide for working the homework problems. These examples are solved in a detailed step-by-step manner.

Summary of Key Formulas

These summaries at the end of each chapter and supplement include all of the key quantitative formulas introduced in the chapter in one location for easy reference.

Summary of Key Terms

Located at the end of each chapter these summaries provide a list of key terms introduced in that chapter and their definitions in one convenient location for quick and easy reference.

Homework Problems, Questions and Cases

Our text contains a large number of end-of-chapter exercises for student assignments. There are over 560 homework problems and 55 more advanced end-of-chapter case problems. There are also 420 end-of-chapter discussion questions including new questions. Answers to selected odd-numbered homework problems are included in the back of the book. As we mention in the following “Online Resources for Instructors” section, Excel spreadsheet solution files are available to the instructor for the majority of the end-of-chapter problems and cases.

ONLINE RESOURCES FOR STUDENTS, WWW.WILEY.COM/GO/GLOBAL/RUSSELL

No other innovation has affected operations management in the past few years as much as computer technology and the Internet, and this is no less true in education. Therefore, we make full use of this technology as a learning and teaching medium in the courses we teach and in our text. Students can link to the text Web site where an exciting set of Internet resources have been compiled.

The text Web site contains animated demo problems, interactive applications and exercises, and direct links to other sources on the Internet. These various resources and learning tools are organized by chapter and are flagged in the textbook with a web icon. Here are some of the items found on the text web site.

Web links for companies and concepts discussed in each chapter can be accessed online. These provide enrichment for those students who want to learn more about a topic, and serve as a valuable resource for student assignments and papers.

Virtual Tours provided for each chapter bring operations management to life. Selected tours are accompanied by a set of questions directly related to concepts discussed in the chapter.

Internet Exercises provide up-to-date access to current issues in operations. These add immediacy to classroom discussions and ensure that operations management topics remain relevant to the student.

Practice Quizzes are provided online where students can get immediate feedback on their progress.

EXCEL FILES OF EXHIBITS

Excel is used extensively throughout the text to solve various quantitative problems and many Excel illustrations are provided throughout the text.

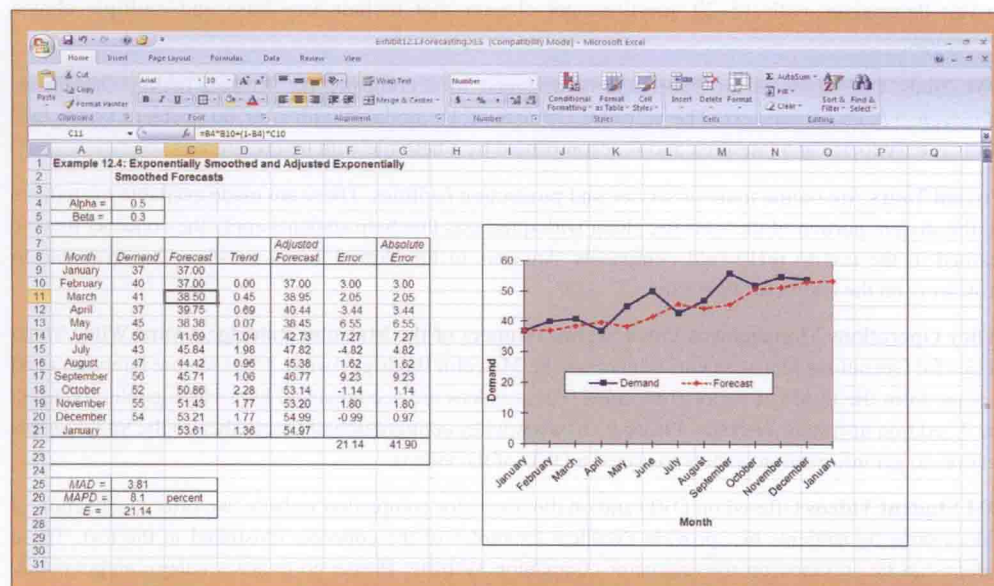


Exhibit 12.1

Every Excel spreadsheet used to prepare the examples in the text is available on the text Web site for students and instructors. They are organized by chapter and are listed by their exhibit number. Above is an example of Exhibit 12.1 from Chapter 12 (Forecasting). Notice the file name is simply the Exhibit number (i.e., Exhibit 12.1.xls). Please look in each file carefully. In many cases several sheets in one file have been used to display different parts of a problem, such as a graphical solution as well as a numerical solution. Example files are also available for MS Project files in Chapter 9.

ONLINE RESOURCES FOR INSTRUCTORS

www.wiley.com/go/global/russell

Instructor's Manual The Instructor's Manual, updated by the authors, features sample course syllabi, chapter outlines, teaching notes, experiential exercises, alternate examples to those provided in the text, pause and reflect questions for classroom discussion, practice quizzes, videos guide, projects,

Test Bank Fully revised from the previous edition by Scott Hedin of Gonzaga University this test bank consists of true/false, multiple-choice, short answer, and essay questions. All questions have been carefully accuracy-checked to ensure the highest quality of materials for our customers. The questions are also available electronically on the textbook support site. The Computerized Test Bank, for use on a PC running Windows, is from a test-generating program that allows instructors to modify and add questions in order to customize their exams.

PowerPoint Presentation Slides The PowerPoint presentation slides, revised by Lance Matheson of Virginia Tech, include outlines for every chapter, exhibits from the text, and additional examples, providing instructors with a number of learning opportunities for students. The PowerPoint slides can be accessed on the instructor's portion of the 7th edition Web site and lecture notes accompany each slide.

Instructor Solutions Manual The Instructor Solutions Manual, updated by the authors, features detailed answers to end-of-chapter questions, homework problems, and case problems.

Excel Homework Solutions and Excel Exhibit Files Excel solution files for the instructor are provided on the Web site for the majority of these problems. In addition, Microsoft Project solution files are provided for most of the homework problems in Chapter 9 (Project Management). Excel worksheets for class handouts or homework assignments are provided for QFD, process flow charts, MRP matrices, and others. Excel exhibit files for every example in the text solved with Excel are provided as templates for solving similar problems for both student and instructor and are available on the text website.

Web Quizzes These online quizzes, revised by Scott Hedin of Gonzaga University vary in level of difficulty and are designed to help your students evaluate their individual progress through a chapter. Web quizzes are available on the student portion of the Web site. Here students will have the ability to test themselves with 15–20 questions per chapter that include true-false and multiple choice questions.

OM Tools OM Tools is an Excel add-in designed to accompany the Russell/Taylor, *Operations Management*, 7th edition text. The software consists of 18 modules with over 60 problem types. OM Tools is easy to use and interpret, and is accompanied by a help file with text references.

Virtual Tours Are online tours of service and production facilities. These are made available to students on the student portion of the website, along with questions that help students apply the concepts they've learned in the text to real-world companies. Answers to the Virtual Tours questions are available to professors on the instructor Web site.

Wiley Operations Management Video Series, Winners of the Malcolm Baldrige Award Wiley Video Series for Operations Management: Winners of the Malcolm Baldrige Award. Clips feature interviews and footage from the inside of major companies. These videos are accompanied by a video guide, found on the 7th edition instructor Web site. Please go to www.wiley.com/go/global/russell, then to the Supplements section, to get information on how to access a DVD of the videos.

OM Student Videos Offered on DVD and on the instructor companion website, we offer a collection of videos done by students that provide excellent examples of the concepts illustrated in the text. These videos can be accessed on the instructor companion Website. Please go to www.wiley.com/go/global/russell, then to the Supplements section, for more information.

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WileyPLUS is an innovative, research-based, online environment for effective teaching and learning.

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- Physics Demonstrations (video)
- Links to real world application examples from The Flying Circus of Physics
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- Presentation
- Print Tests
- Concept Mastery
- Project

Course Materials and Assessment Content:

- Lecture Notes PowerPoint Slides
- Classroom Response System (Clicker) Questions
- Image Gallery
- Instructor's Manual
- Gradable Reading Assignment Questions (embedded with online text)
- Question Assignments: all end-of-chapter problems coded algorithmically with hints, links to text, whiteboard/show work feature and instructor controlled problem solving help.
- Testbank

Gradebook: WileyPLUS provides instant access to reports on trends in class performance, student use of course materials and progress towards learning objectives, helping inform decisions and drive classroom discussions.

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