

INTEGRATED **OPERATIONS MANAGEMENT**

Adding Value for Customers

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**MARK D. HANNA
W. ROCKY NEWMAN**

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INTEGRATED OPERATIONS MANAGEMENT

ADDING VALUE FOR CUSTOMERS

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Why do I need to know Operations Management if I'm majoring in Marketing, Information Technology, or Finance?

In today's world, most businesses are being managed from a *cross-functional perspective*. These businesses place greater emphasis on accomplishing goals through teamwork—on major projects that *involve all areas of an organization*. So everyone in the firm must, at some point, consider *operational issues*. Therefore, it's important to understand core operations concepts and how they affect marketing, information technology, finance, and vice versa. **This book is the first book written with YOU in mind!**

A Cross-Functional Theme

This forward-thinking text strongly emphasizes the *cross-functional role of operations*. It helps show students how operations issues impact other functional areas and how each person in a company plays a role in operations decisions. This text offers a relevant perspective for both OM majors and non-majors alike.

We link the cross-functional topics from chapter to chapter with a variety of sections and boxed features...

"...Back at the Rec Center"

The authors have designed a unique and intriguing opening vignette that is revisited at the beginning of each chapter. In these vignettes, reminiscent of Goldratt's *The Goal*, four fictional managers meet at the gym each morning, discuss the issues they face at work every day, and reveal how operations affect their daily lives.



OPERATIONS MANAGERS AT THE RECREATION CENTER

We begin this chapter by introducing you to four managers and their work. The four, Tom Jackson, Cheryl Sanders, Luis Flores, and Fred Silver meet early each morning as they work out before heading off to their jobs in a diverse set of industries. They are all members of the same recreational facility on the campus of a nearby university. (The facility is modeled after one on our own campus—so it's probably much like one on your campus too. We'll call it "the Rec Center" from here on out.) The four, quite different in backgrounds, jobs, and personalities, have formed a common friendship. In addition to their interest in working out, they have found they can share thoughts on a variety of issues. In fact, over the last few months, they have found the issues they face have quite a bit in common. In each of the following chapters of this text, conversations between these managers are used to highlight some of the chapter's topics. We think reading these conversations will provide a context for understanding what the chapter is about and what to look for as you study.

The four managers represent the diversity of jobs that exist in operations management. Two in the manufacturing industry and two



in manufacturing. Two work in businesses that customize their offerings and two work for operations that have standardized offerings. Both involved large businesses.

Managers are at different stages of career advancement. Because the managers and their jobs are so diverse, you'll be able to learn about a lot of different issues and gain

issues and gain a broad exposure to the field from their conversations. For example, just reading the biographical sketches at the beginning of this chapter will help you learn what operations management is all about.



Tom Jackson is a 48-year-old chief of operations for a small but growing airline based in the large southwestern city where he lives. Tom, who is married and has two children, has an undergraduate degree in engineering. He earned an MBA part time at night while serving full time as an Air Force officer. Tom has spent the last 18 years in the reserves, and will retire in two to three years. He has spent his civilian career with two airlines, leaving a larger company three years ago when an old Air Force friend offered him a chance to get in at the ground level of a new start-up.

Tom now flies a regional carrier that offers frequent flights on selected routes. The company is always looking for a way to cut costs and pass the savings on to customers. Minimizing fuel on frequent flights along high-traffic routes has made the service both inexpensive by industry standards and highly reliable—points that the airline prides itself on. But the company is less flexible than

a Saturday day as a prerequisite for a discounted fare. It does restrict ticket exchanges when a passenger's plans change after the last minute. While punctual departure and arrival are a top priority, the airline's check-in time is a little earlier than most other airlines, and employees will not hold a plane for anyone. Tom's airline offers only one passenger class on its flights, and restricts carry-on luggage more than most of its competitors.



Cheryl Sanders, 32 years old and single, is a hospital administrator at a small general hospital located in the suburbs outside the city where Tom works. The hospital's administrator is part of a much larger chain of hospitals and allied health care facilities based in the Southwest. Cheryl has a master's degree in health administration from a well-known eastern school, and an undergraduate degree in business administration. She began her career with the chain seven years ago and transferred to the hospital where she now works, after receiving a major promotion. While Cheryl is gaining experience at this hospital, she will oversee the entire administrative staff. Cheryl is considered to be a rising star in her corporation. She has not yet had a chance to

cross functional boundaries, or "outside the box," has not gone unnoticed by senior managers. Since assuming her new position, Cheryl has begun to feel more and more pressure to control costs while maintaining excellence in the delivery of a wide range of services. She sees the hospital's mission as providing high-quality health care for common health problems, and when necessary transferring more complicated cases to specialist hospitals.



Fred Silver, 30 years old and married, is a division manager at a large furniture manufacturing company. He has been with the company for almost ten years. Before that he worked for a division that manufactured cutting-edge products. Innovation was not only rewarded but expected, and the pace of product development was exhilarating. Fred dealt with a variety of customers and products on a day-to-day basis, a challenge he truly enjoyed. Adjusting to the new job that product designs rarely change, and the only improvement anyone wanted to talk about is squeezing pennies from product cost by enhancing the manufacturing process. While Fred understands the need to cut costs to meet the requirements of a cost-conscious market segment, he begrudges the make-in-advance to succeed in the new division.

Luis Flores is a 27-year-old production supervisor for a small, privately owned furniture manufacturing company with revenues of about \$8 million last year. He met his wife, a high school teacher, while attending college at the college. Luis, who is in his eighth year with the company, has always been a self-starter with a great work ethic. He spent his first six years with the company as a machine operator on the factory floor, then moved into a supervisory position after completing his degree in business administration. An accounting major in college, Luis

realized early that he wanted to be close to "where the rubber meets the road," as he likes to put it, thus his decision to stay on the floor after graduation. Luis's company manufactures a wide variety of products, primarily of upholstered wood. Recently the what they see as an increasingly cost-conscious market for their products. The company is known for the quality and contemporary styling of its furniture. But in the last few years, discount-priced competitors, whose products have quality and styling, have been able to expand their product line and increase quality without raising their prices significantly. At least for now, Luis feels that the upper styling of his company's products will protect the firm's market share, yet no one can predict how long that situation will last.

ABOUT THE AUTHORS



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Mark Hanna is a professor in the Management Department of the Richard T. Farmer School of Business Administration at Miami University, Oxford, Ohio. Originally from Sonapurhat, West Bengal, India, he earned his B.A. in Mathematics from LeTourneau University (Longview, Texas). His M.S. in Management and Ph.D. in Industrial Management were earned at Clemson University. In addition to Miami University, Dr. Hanna has taught at Winthrop University and Clemson University. He has taught in the Farmer School's London, England summer program and has received a grant from the U. S. Department of State to introduce Quality Management curricula at Kiev State University in Kiev, Ukraine.

Prior to his university teaching career, Dr. Hanna worked for Dependa Graphics, a small entrepreneurial enterprise in the printing industry. Like many employees in small businesses, he experienced diverse responsibilities ranging from sales, to financial management, operations management, quality control, process redesign, and project management. More recently, he has worked exclusively with the Ohio Manufacturer's Association to promote Employee Involvement and team-based process improvement practices through their Case Studies in Team ExcellenceSM Competition.

Dr. Hanna's research has mainly focused on Operations Strategy, Quality Management, and Environmental issues in OM. It may be found in *The Journal of Operations Management*, *Production and Operations Management*, *The International Journal of Operations and Production Management*, *The International Journal of Production Economics*, *The Journal of Production and Inventory Management*, *The International Journal of Quality and Reliability Management*, and other journals. Dr. Hanna reviews papers for a variety of journals and also serves on the editorial review board of *Production and Operations Management* as well as *The Mid-American Journal of Business*. He is a lifetime member of the Production and Operations Management Society and is active in the Decision Science Institute.



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From a practical perspective, Dr. Newman has experienced the operational side of businesses ranging from that of a machine operator in a GM plant to that of a consultant working with Fortune 500 companies that include Cummins Engine, Andrew Jergens, Motorola, and Daimler-Chrysler on a variety of projects. He is very involved

PREFACE

WHY DID WE WRITE THIS BOOK?

We started our study of operations management (OM) in the early 1980s and began teaching the subject during our doctoral studies later that decade. And OM has held our fascination—today we’re still students of the subject.

Since taking our first course in operations, a lot has changed in business and in OM. Many firms have adopted the just-in-time management system. Total quality management has changed the way we think about employees, customers, suppliers, business processes, and quality. Business process re-engineering has helped firms achieve revolutionary process improvements. The practice of theory of constraints has allowed firms to better manage facilities containing capacity-constrained resources.

There has also been a dramatic shift in OM from a traditional, manufacturing focus to a focus on the service sector. Many businesses are now managed from a cross-functional perspective, which emphasizes how operations issues affect—and are affected by—all the areas of a firm.

Along with these developments has been the computer revolution. Think back on what the business world was like without PCs, Internet service providers, the World Wide Web, dot-coms, information systems, and the software that runs on information systems. E-commerce and supply chain management—the most recent products of this new computer infrastructure—are central to state-of-the-art OM. Frankly, if the OM courses that we took were taught today, they’d be as useful as an 8-track tape player.

Over the years, we’ve noticed that OM books have generally kept up with the changes by adding a chapter about the latest developments in OM to the traditional content. But not integrating these changes into the entire text has created some problems for instructors. For example, a chapter on total quality management would suggest the importance of customer-focused operations as well as cross-training workers and including them in improvement efforts. Later chapters on location and scheduling issues would then ignore these concepts and present cost-centered local optimization models, while job design content would focus heavily on job specialization through traditional work standards approaches. Similarly, a chapter on just-in-time systems would present suggestions for customer and supplier relationship management but would not explain how those concepts fit (or didn’t fit) in other operational environments.

Further, service operations were usually treated as separate from manufacturing operations, even though most customers expect (and most businesses provide) a combination of service and manufactured value. The service content seemed to always follow the manufacturing content as an obligatory end-of-chapter appendix.

As a result of the add-on approach, we became increasingly frustrated in our efforts to teach a current, state-of-the-art, OM course to non-operations majors. We needed a book that integrated the changes of the last twenty years into each topic area. Also, we needed a book that helped business majors integrate their knowledge of other functional areas with what they were learning in OM. We didn’t think any of the available texts met these needs, so we developed such a book—and this is the result.

KEY STRENGTHS

- ◆ The book focuses on satisfying customers. We present OM as the part of a company that provides the value customers require, but OM must work effectively with other functional areas to achieve that value. So our focus on satisfying customers requires that we present every topic from a cross-functional business perspective, not from a functional perspective focused entirely on operations management.
- ◆ The book has internal consistency. We do not treat recent developments as chapter or supplement add-ons. Instead, coverage in all operational areas influenced by recent developments reflects current practice. So, perspectives found in our coverage of supply chain management, e-commerce, and total quality management are reflected in our coverage of other operations topics.
- ◆ The book integrates service and manufacturing. Because customers usually buy a package of service and manufactured value, the OM function in most companies has to create a product-service bundle. We avoid the artificial separation between service operations management and manufacturing operations management.
- ◆ The book is not designed around operational tools and models. We present decision-making tools and models that operations managers use as *factors* in business decisions, not as the force that drives the decisions. Before we present any tool, we tell students how, and in what situations, it applies.
- ◆ The book's organization reflects the business context of operations. For example, we don't have chapters based on a particular type of tool, such as forecasting or material requirements planning (MRP). Instead, we discuss these tools in their business contexts—how they help businesspeople make decisions.

Pedagogical Features in the Book

In writing this fully integrated OM text, focused on approaches that provide the value required to satisfy customers, we provide pedagogical features that reinforce the book's uniqueness. Among these features are:

- ◆ **Back at the Rec Center:** a conversation between four fictional managers, at the beginning of each chapter, that provides practical insight into chapter issues. The managers are a chief of operations for a small, growing airline; a hospital administrator; a marketing manager for a large electronics firm; and a production supervisor for a privately owned furniture manufacturer. In Chapter 6 (Quality Improvement Tools) for example, the manager of the large electronics firm gets help from the other managers in improving the casings and buttons on the firm's pagers. This feature allows us to illustrate OM concepts in depth because we don't need to repeat the descriptions of operations at the managers' firms.
- ◆ **Integrating OM with Other Functions:** a section and figure in each chapter that highlights the relevance of the chapter's material to professionals in other functional areas. For example, this section in Chapter 2, Supply Chain Strategy, explains that marketing and engineering are most affected by supply chain configuration strategies.
- ◆ **Illustrations of chapter content from Miami University's Recreation Center:** a section in each chapter that illustrates some aspect of the chapter's content in the operations of a typical college recreational facility. The purpose of this feature is to illustrate how operations are applied in a facility that most students are familiar with.
- ◆ **E-commerce perspectives:** found throughout the text where relevant. For example, Chapter 12, which focuses on inventory management and master scheduling issues, contains significant content on enterprise resources planning systems and

electronic data interchange. Similarly, Chapter 8 discusses geographic information systems in the context of location decisions.

- ◆ **Real-world examples woven into the text:** examples from both service-intensive and manufacturing-intensive businesses. For example, our chapter on material planning and scheduling in complex environments contains information about the yield management practices of major airlines as well as the practices of Hill-Rom corporation (America's leading manufacturer of hospital furniture).
- ◆ **"Integrated Operations Management: Satisfying Customers at . . ." boxed inserts:** succinct illustrations of current companies' integrated operations practices, found in each chapter.
- ◆ **Integrating Operations Management:** a section in each chapter that describes the main links between the chapter's topics and other topics covered elsewhere in the text.
- ◆ **End of chapter materials including Key Words, Solved Problems, Discussion Questions, Problems, and Cases:** designed to stress the integrated nature of the chapter's coverage as well as reinforce the OM topics covered.

Add Value to Your Course with these Student Ancillaries

A Free Student CD-ROM

The CD-ROM to accompany this book contains Excel OM, ExtendLT, extensive lecture notes, quizzes, and interactive exercises based on Miami University's Recreation Center.

- ◆ **Excel OM is Prentice Hall's exclusive user-friendly Excel Add-in.** Excel OM automatically creates worksheets to model and solve problems. Users select a topic from the pull-down menu, fill in the data, and then Excel will display and graph (where appropriate) the results. This software is great for student homework, "what if" analysis, or classroom demonstration.
- ◆ **Extend LT is a graphic simulation program that allows you to build dynamic models and systems.** The version contained in this textbook is a limited version, but it is a very rich package complete with tutorials, an online manual, and "save and print" capabilities. In addition, the version contains 10 manufacturing and service models that correspond to chapter topics. These models, prepared by Robert Klassen of University of Western Ontario, are described in Word documents and can be used for homework, team projects, and classroom demonstrations. The limited version of Extend is an excellent package for demonstrating operations processes and teaching simulation.
- ◆ **Extensive lecture notes provide reinforcement of the main points of each chapter and allow students to review the chapter material.** The Lecture notes are available in both a slide-show format, with audio clips, for in-class viewing, and in a printable format to be used as a helpful study guide.
- ◆ **Quizzes allow students to test their understanding of each chapter**
- ◆ **Interactive exercise—Miami Recreation Center** These interactive exercises, developed by Scott Sampson of Brigham Young University, feature operational issues at Miami University's Recreation Center. Each of the 13 exercises ask students to view a short video clip, read about a key topic, and then answer follow-up discussion questions. Students can e-mail answers to their instructor after they're done.

MyPHLIP: Prentice Hall's Learning on the Internet Partnership

MyPHLIP is a companion Web site that allows students and professors to create their own personal access page to all of the book's online resources. Students and professors can use the personal reminder and reference features, download key book resources

(such as Power Point slides), and search all myPHLIP resources for relevant articles and exercises. Visit www.prehall.com/hanna

More Ancillaries

In addition to the free CD-ROM and myPHLIP, *Integrated Operations Management* comes with these student and instructor ancillaries.

Instructor's Resource Manual:

A complete instructor's manual that includes sample course outlines, such as quantitative, case-oriented, service-oriented, and MBA-level course outlines. Video notes, a bibliography of OM Web sites, Internet exercises, and faculty notes compliment our PowerPoint lecture presentations. 013-032690-9

Instructor's Solutions Manual:

Provides solutions for all cases and problems in the textbook. 013-032697-6

Test Item File:

Includes true/false, multiple-choice, short-essay, and quantitative problems. Because this test item file provides the difficulty level, as well as the section and subject reference for each question, instructors can build "balanced" tests. 013-032695-X

PHLIP/CW:

Provides updated articles and Internet exercises, as well as numerous helpful student and faculty resources. The interactive study guide for students provides challenging quizzes for test preparation and mastery of knowledge in OM. www.prenhall.com/hanna

Videos:

Includes clips of topics in OM from various companies, plus clips that are specific to the Miami Recreation Center in the book. The book-specific clips feature operations in a service environment.

Instructor's Resource CD-ROM:

Provides word documents of all print ancillaries. Also provides PowerPoint lecture presentations and a computerized test bank. 013-032698-4

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