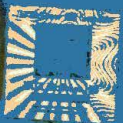


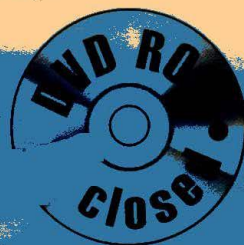
# Operations Management

E I G H T H E D I T I O N

William J. Stevenson



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# Preface

The material in this book is intended as an introduction to the field of operations management. The subject matter incorporates concepts from general management, cost accounting, marketing, industrial engineering, and statistics. The topics covered include both strategic issues and practical applications. Among the topics are forecasting, product and service design, capacity planning, management of quality and quality control, inventory management, scheduling, supply chain management, and project management.

My purpose in writing this book continues to be to provide a clear presentation of the concepts, tools, and applications of the field of operations management. Operations management is evolving and growing, and I have found updating and integrating new material to be both rewarding and challenging, particularly due to the plethora of new developments in the field, while facing the practical limits on the length of the book.

**About the cover.** The cover illustration was chosen because the stream symbolizes the flow of work through a system. An important goal for operations systems is to achieve a smooth flow of work through the system. And just as rocks in the stream on the cover disrupt the smooth flow of water and cause turbulence, inefficiencies, variability, and uncertainties in operations systems cause problems that disrupt the smooth flow of work through the system, increasing time and cost, and decreasing productivity and customer service.

This flow concept applies not only to organizations, but also to their supply chains. This textbook introduces concepts and methods that can help achieve a smooth flow in operations systems.

## Acknowledgments

I want to thank the many contributors to this edition. Over the recent editions, reviewers and adopters of the text have provided a “continuously improving” wealth of ideas and suggestions. It is encouraging to me as an author. While the volume and quality of these suggestions has honestly exceeded the time and space available, and so, many could not be incorporated, I hope all reviewers and readers will know their sugges-

tions were valuable, were considered, and are sincerely appreciated. The list includes post-publication reviewers, focus group participants, and manuscript reviewers: Sanjay Ahire, University of Dayton; Gary Alcorn, University of Pittsburgh; Kimball Bullington, Middle Tennessee State University; David Cook, Old Dominion University; Chris Craighead, University of North Carolina—Charlotte; Sidhartha Das, George Mason University; Kiran Desai, University of Memphis; Shad Dowlatshahi, University of Missouri; Ronald Farina, University of Denver; Gene Fliedner, Oakland University; Scott Grasman, University of Missouri—Rolla; Fess Green, Radford University; John Hebert, The University of Akron; Craig Hill, Georgia State University; Tim Ireland, Oklahoma State University; Xenophon Koufteros, Florida Atlantic University; Kathleen McFadden, Northern Illinois University; Ceyhun Ozgur, Valparaiso University; Carl Poch, Northern Illinois University; David Ronen, University of Missouri; Paul Schikora, Indiana State University; Michael Smith, Western Carolina University; V. Sridharan, Clemson University; and Geoff Willis, University of Central Oklahoma.

Special thanks to Chuck Koster for suggestions on the project management chapter.

I also would like to thank the many reviewers of previous editions for their contributions.

Other contributors included accuracy checkers: Don Robinson, Illinois State University, and Renato De Matta, University of Iowa; Test Bank: Carl Poch, Northern Illinois University; Instructor’s Manual: Ceyhun Ozgur, Valparaiso University; Study Guide: Paul Van Ness; PowerPoints: Ralph Butler, Arizona State University; Data Sets: Mehdi Kaighobadi, Florida Atlantic University; and Excel Templates and Screencam Tutorials: Lee Tangedahl, University of Montana.

Finally I would like to thank all the people at McGraw-Hill/Irwin for their efforts and support. It is always a pleasure to work with such a professional and competent group of people. Special thanks go to Dick Hercher, Executive Editor; Wanda Zeman, Senior Developmental Editor; Mary Conzachi, Lead Project Manager; Cathy Tepper, Lead Supplements Producer; and many others who worked “behind the scenes.”

*William J. Stevenson*



# Note to the Student

The material in this text is part of the core knowledge in your education. Consequently, you will derive considerable benefit from your study of operations management, *regardless of your major*. Practically speaking, operations is a course in *management*.

This book describes principles and concepts of operations management. You should be aware that many of these principles and concepts are applicable to other aspects of your professional and personal life. You can expect the benefits of your study of operations management to serve you in those other areas as well.

Some students approach this course with apprehension, and perhaps even some negative feelings. It may be that they have heard that the course contains a certain amount of quantitative material that they feel uncomfortable with, or that the subject matter is dreary, or that the course is about “factory management.” This is unfortunate, because the subject matter of this book is interesting and vital for all business students. While it is true that some of the material is quantitative, numerous examples, solved problems, and answers at the back of the book will help you with the quantitative material. As for “factory management,” there is material on manufacturing as well as on services. Manufacturing is important, and something that you should know about for a number of reasons. Look around you. Most of the “things” you see were manufactured: cars, trucks, planes, clothing, shoes, computers, books, pens and pencils, desks, and cell phones. And these are just the tip of the iceberg. So it makes sense to know something about how these things are produced. Beyond all that is the fact that manufacturing is largely responsible for the high standard of living people have in industrialized countries.

After reading each chapter or supplement in the text, attending related classroom lectures, and completing assigned questions and problems, you should be able to do each of the following:

1. *Identify the key features* of that material.
2. *Define and use terminology*.
3. *Solve typical problems*.
4. *Recognize applications* of the concepts and techniques covered.
5. *Discuss the subject matter* in some depth, including its relevance, managerial considerations, and advantages and limitations.

You will encounter a number of chapter supplements. Check with your instructor to determine whether or not to study them.

This book places an emphasis on problem solving. There are many examples throughout the text illustrating solutions. In addition, at the end of most chapters and supplements you will find a group of solved problems. The examples within the chapter itself serve to illustrate concepts and techniques. Too much detail at those points would be counterproductive. Yet, later on, when you begin to solve the end-of-chapter problems, you will find the solved problems quite helpful. Moreover, those solved problems usually illustrate more and different details than the problems within the chapter.

I suggest the following approach to increase your chances of getting an “A” in the course:

1. Look over the chapter outline and learning objectives.
2. Read the chapter summary, and then skim the chapter.
3. Read the chapter and take notes using the study outlines on the DVD.
4. Look over and try to answer the discussion and review questions.
5. Solve the problems, referring to the solved problems and chapter examples as needed.
6. Take the quizzes on the DVD.

Note that the answers to many problems are given at the end of the book. Try to solve each problem before turning to the answer. Remember—tests don’t come with answers.

A study guide (ISBN 0-07-286911-9) is also available. It includes a list of key ideas, study tips, glossaries, sample quizzes with answers, and problems with solutions. If your bookstore does not stock it, you can ask them to order it for you.

An Online Learning Center (OLC) is also available, containing many of the same study tools found in the text and study guide. Links to articles and real-world companies as well as operations related websites are also included on the OLC.

Enjoy the journey!

W.J.S.