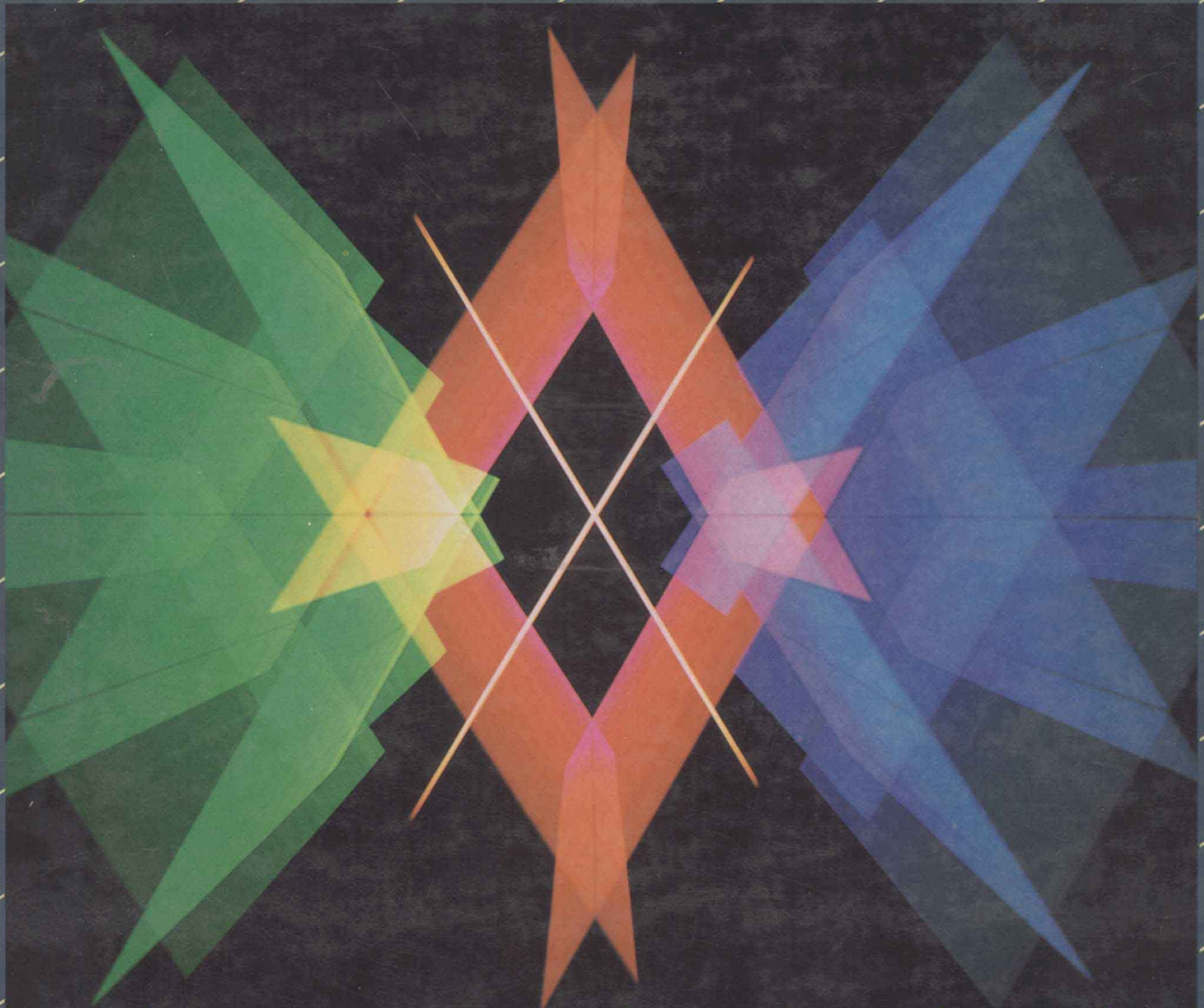


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PRODUCTION/OPERATIONS MANAGEMENT

Concepts and
Situations



Roger W. Schmenner

PRODUCTION/OPERATIONS MANAGEMENT

Concepts and Situations

Fourth Edition

ROGER W. SCHMENNER

School of Business
Indiana University

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To my father, a helluva operations manager

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PREFACE

The reception that this book has received in all three of its previous editions has been very gratifying. With this fourth edition, I have once again had the opportunity to approach anew the original vision that I had for the book. I saw it as unifying the best elements of two schools of thought about production/operations management (POM): one anchored in the application of various techniques to POM problems; the other anchored in the dilemmas and decision making of the operating manager. With this fourth edition, I am closer to that original vision.

The fourth edition has undergone several significant alterations. A recounting of them is instructive:

1. *Reorganization.* Several of the chapters in the previous editions were rather long. This edition has divided the material—especially that of the traditional core aspects of POM: production planning, scheduling, inventory management, production control, queuing, forecasting, project management, and so on—into more easily digestible bites. This is particularly evident in the chapter titles and section headings of Segment II, *Improving Existing Operations*.
2. *More Focus on Some Traditional Topics.* With this reorganization there has been additional space and care taken in the handling of a variety of traditional topics: more text, more diagrams, and more end-of-chapter problems.
3. *Separate Chapter on JIT.* The material on Just-in-Time manufacturing has been augmented substantially and has been grouped together in a single chapter to highlight its distinctive and increasingly important features.
4. *Revamped Chapters on Quality and Technology.* Although every chapter has undergone at least some alteration, the most significant revisions to existing chapters have occurred in Chapter 8, *Making Quality Happen*, and in Chapter 11, *Dealing with Technological Change*. Both of these areas of study have been subject to much more intensive investigation in recent years, and the revamped chapters on them reflect this heightened interest and importance.
5. *Updated Plant and Service Tours.* All of the plant and service tours have been brought up-to-date as of the summer and fall of 1988. There are new tours of the Burger King in Noblesville, Indiana, and of Ogle-Tucker Buick in Indianapolis.
6. *More End-of-Chapter Questions and Problems.* This edition sports a substantial set

of new questions and problems at the end of most of the chapters. They can serve to solidify student understanding.

ACKNOWLEDGMENTS

This edition, as with the previous ones, has benefited greatly from the cooperation I have received from a number of companies. Although I cannot acknowledge the contributions of everyone in those companies, I would like to mention some who have been especially helpful with this edition: Robert S. Hogan of International Paper, Joseph and Lillian Gehret of Norcen Industries, Edward Jecelin of Jos. A. Bank Clothiers, James Kovacs of General Motors (C-P-C Group—Tarrytown), Colleen Meyer and Alicia Hayes of Burger King, Al Sanfilippo of Stroh Brewery, Gregg Hutchinson of Ogle—Tucker Buick, W. Kimball Price of Thalhimers, Frank Jonas of Arthur Andersen & Co., Kenneth Good of Black & Decker, and Frank Coyne and Victor Baldrige. My sincere thanks to them and to their colleagues.

Some of the problems and situations for study from the earlier editions of this book are due to Joseph R. Biggs and Thomas F. Callarman. They reduced the burden for me at an important time in this book's development.

I would also like to thank the following reviewers of my manuscript for the 4th edition: C. W. Dane, Oregon State University; Douglas A. Elvers, University of North Carolina at Chapel Hill; James A. Fitzsimmons, University of Texas at Austin; Ernst Koenigsberg, University of California, Berkeley; and Daniel Shimshak, University of Massachusetts.

Sue Denny helped me prepare aspects of the manuscript for this edition and Morgan Swink tracked down numerous bibliographic references for me.

My wife, Barbie, and my children, Will and Andrew, were again most forgiving of my attachment to this book. I apologize for all the time I spent with it that I could have spent with them. I owe them much and hope that someday they may even read what all the fuss was about.

Roger W. Schmenner

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INTRODUCTION

Operations—For many people, mentioning the word brings on a rush of disagreeable feelings and sensations. Details. Pressure. Long hours. Inhospitable working conditions. Dull colleagues. For these people, a company's operating managers—usually typed as engineers who could not hack it in the “more creative” design aspects of the business—lead very unromantic careers. Moreover, operations is viewed as a dead-end job with no future in the upper layers of management.

This description is an exaggeration, of course, but it conveys some of the impressions that people hold about operations. This book is a crusade against that kind of stereotype of the operations manager. In fact, operations offers an exciting and dynamic management challenge that is as absorbing and rewarding as any marketing or finance can offer. After all, for the typical company, most of its assets and people are devoted to the production function. Moreover, a badly run operation can be a staggering drain on corporate profits and morale, as a number of even large corporations can attest; conversely, a well-run operation can be a competitive weapon every bit as potent as any in the corporate arsenal.

For many senior managers, the path to the top snaked through operations—even for those

whose climb has been in so-called “marketing companies.” Many others would admit that a tour of duty in operations was an important part of their general management education and background. The point is that operations is and rightly should be a key concern for most companies and one that all students of business who aspire to general management responsibilities ought to know about.

The importance of operations has been highlighted in recent years. Numerous articles have appeared in business periodicals stressing the need for young managers, especially those fresh from business schools, to seek out careers in operations jobs. The success of the Japanese has reinforced this view in many people's eyes, since the prowess of the Japanese is widely recognized to be in manufacturing.

What makes for an outstanding operating manager is an elusive concept that no doubt will be debated for years to come. One recent thoughtful analysis, however, was made by Wickham Skinner and Earl Sasser.* Citing a study of a number of managers thrust into some very different situations, they suggest

* Wickham Skinner and W. Earl Sasser, “Managers with Impact: Versatile and Inconsistent,” *Harvard Business Review* 55, no. 6 (November–December 1977): 140–48.

that the managers who are real achievers demonstrate four distinct characteristics:

- They employ analytical tools with discipline and consistency and are careful to keep information and data flowing.
- They truly motivate their subordinates and know what satisfies their own superiors.
- They manage themselves—their time, their temper, their clout, their thinking.
- They focus on one task of prime importance at a time.

In this book, we cannot hope to teach you, the reader, how to manage yourself or all the subtleties in the interpersonal interactions that abound in business organizations. We can, however, open the doors to some useful ways of looking at operations, of identifying and analyzing their problems, and of judging what merits chief concern and attention as well as to possible means of solving problems. Instilling this awareness is the goal of this book.

THE PHILOSOPHY AND ORGANIZATION OF THE BOOK

In this book, operations management is approached from the bottom up. I am convinced that a sound grounding in the nitty-gritty of existing operations is a prerequisite to a fuller understanding of what it means to alter a production system or to design a new one. Therefore, in Segment I we describe in detail nine manufacturing and service processes that differ from one another in important ways and represent the entire spectrum of process choice. Each process is analyzed in turn, and then all of them are compared and contrasted against one another, so as to highlight the particular features that define a production process. In the remainder of the book

we build on the foundation provided by these processes.

In Segment II we consider some of the typical problems of ongoing operations and how these operations can be improved over the short run. The areas of management concern addressed in Segment II include breaking production bottlenecks; managing the workforce; planning, scheduling, and controlling production over the near term (say 6 to 18 months); managing materials (purchasing, inventories, and logistics); making quality happen, and implementing just-in-time manufacturing principles.

In Segment III we take operations one step further, by considering more drastic changes to the production process—capacity change, technological change—all of which require advance planning and, usually, a year or more to implement.

In Segment IV we then tie together Segments I, II, and III by focusing on the broad issue of operations strategy and organization. It is only here that the design of a production system—its facilities, technology, policies, and organization—is discussed in full. It is here too that the use of operations as a competitive weapon can be appreciated most keenly.

It has been my experience that nothing serves better to stimulate interest in a problem or topic than seeing it come to life in a real-world situation. With this in mind, Segments II through IV are liberally sprinkled with production and operations situations demanding management decisions and derived from the travails of managers in a host of industries; these situations supplement and reinforce the process descriptions in Segment I. In fact, several of them revisit the companies described in Segment I to provide a more detailed picture of selected aspects of their operations. All of these situations are like small case studies that make very specialized points about operations. They

serve as a touchstone for both the reader's understanding of the nature and importance of a particular concept and the ensuing discussion of possible resolutions of the problems and opportunities exposed by each situation. Thus much of the format of this book consists of a particular situation followed by discussion of that situation and its more general implications.

For the situations that initiate the discussion of operations concepts, we draw on both manufacturing and nonmanufacturing company experience. At regular intervals throughout the book the similarities and differences between manufacturing and nonmanufacturing industry operations are highlighted.

With this as a prologue, let us begin our exploration of various production processes.