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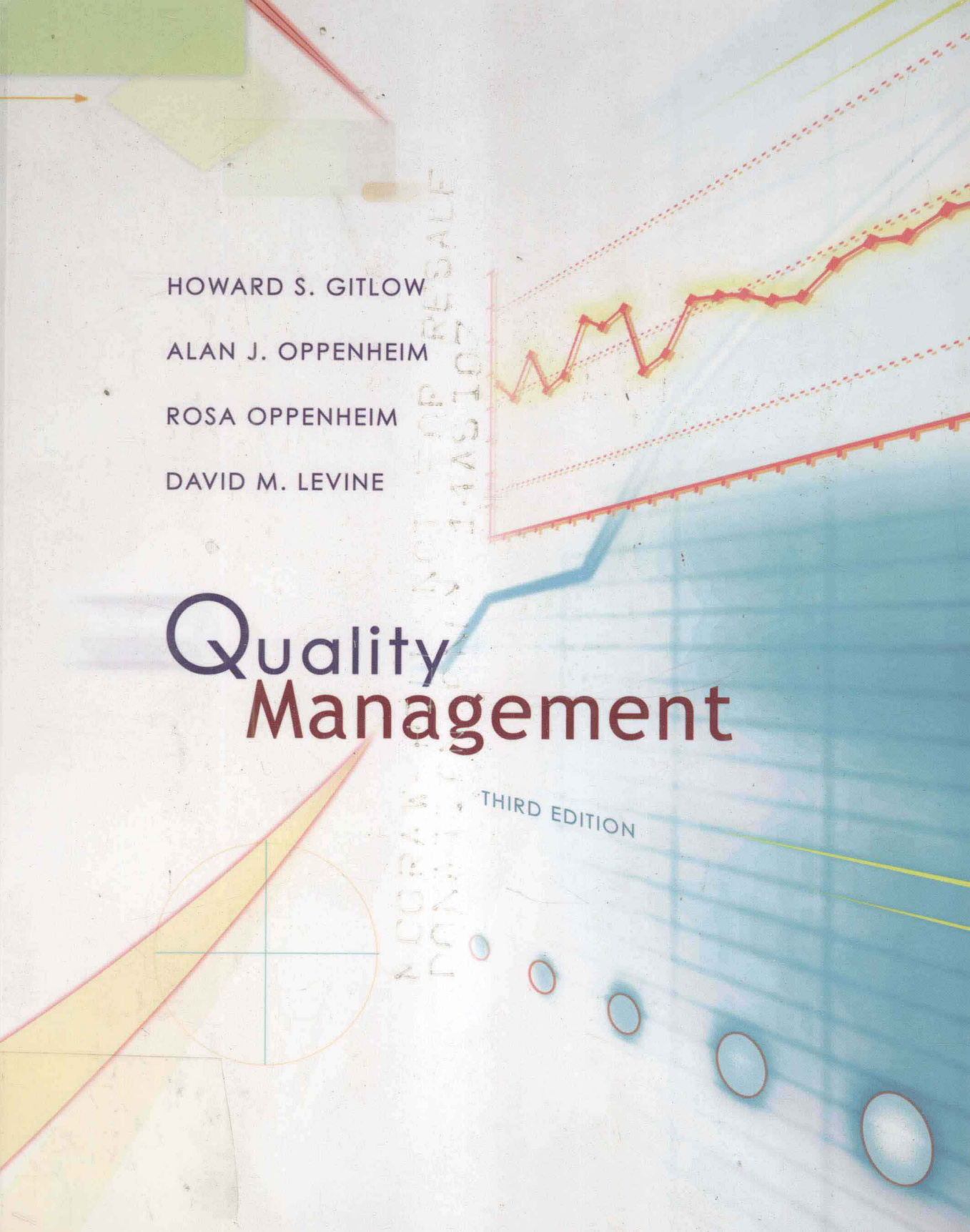
Quality Management

THIRD EDITION



Quality Management

Third Edition

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Dedicated to our families:

Shelly Gitlow
Ali Gitlow
Abraham Gitlow
Adam Oppenheim and Amy Sherman
David Oppenheim and Emily Boling
Sylvia Oppenheim
Esther Blitzer
Marilyn Levine
Sharyn Levine Rosenberg and Daniel Rosenberg

and to the memory of:

Beatrice Gitlow
Norman Oppenheim
Aaron Blitzer
Lee Levine
Reuben Levine

Preface

Continuous quality improvement is essential for any organization's survival in the twenty-first century. Leading corporations such as Motorola, General Electric, Allied Signal, Dupont, American Express, J.P. Morgan, and GE Capital have demonstrated that improved quality raises profits, reduces costs, and improves competitive position. Government agencies and other not-for-profit organizations have begun to reap the benefits of continuous improvement. The seemingly geometric growth in interest in quality bodes well for the future. Meaningful progress requires knowledge in many areas. We attempt here to present a unique and workable approach to the tools and methods necessary for real quality improvement.

Structure of the Book

This book is constructed in four parts. Part 1 describes the foundations of quality management. Part 2 presents the tools and methods for process improvement studies. Part 3 explains the administrative systems required for quality management. Finally, Part 4 showcases Six Sigma management, currently the most popular model for quality management.

Part 1: Foundations of Quality Management

Part 1 introduces the fundamental concepts that are necessary to understand and use quality management in an organization: a definition of quality and its relationship to costs and productivity, an appreciation of the theory underlying quality management, the fundamentals of statistical studies used in organizations employing quality management principles and practices, and a working knowledge of defining and documenting a process.

Part 2: Tools and Methods for Analytic Studies

Part 2 presents and discusses the tools and methods needed to conduct process improvement studies. These tools include graphical methods, descriptive statistics, control charts, brainstorming, cause-and-effect diagrams, check sheets, Pareto analysis, and design of experiments. These techniques form a powerful arsenal that can be used to pursue continuous, never-ending improvement.

Part 3: Administrative Systems for Quality Management

Top management, including the board of directors, must initiate and lead quality management efforts. One of the first tasks for top management is to learn about the various theories, models, and techniques in the field, and then formulate a quality management model suited to the nuances of the organization. Quality management models will differ from organization to organization. This part of the book presents one possible model, to stimulate the thinking of top managers. It represents an "ideal" for promoting quality management, which must be continuously pursued, and improved, by the leadership of an organization. The model presents a possible sequencing of activities that can be used to transform an organization.

Part 4: Current Thinking about Statistical Practice

Part 4 introduces Six Sigma management, developed at Motorola Corporation in the 1980s and popularized in large part by General Electric Corporation in the 1990s. Six Sigma management is the relentless and rigorous pursuit of the reduction of variation in all critical processes to achieve continuous and breakthrough improvements that impact the bottom line of the organization and increase customer satisfaction. Stated another way, it is an organizational initiative designed to create manufacturing, service and administrative processes that produce approximately 3.4 defects per million opportunities. The DMAIC (Define-Measure-Analyze-Improve-Control) model to improve processes is presented as a template for achieving the goals of Six Sigma management.

Educational Philosophy

This book endeavors to create a bridge between the theory and practice of quality management. All theories and practices are illustrated with detailed examples and/or actual case studies. The book ends by presenting the current best practices of quality management within the context of Six Sigma management. Consequently, the educational philosophy of this book is to present and illustrate best quality management practices in many different settings so that the reader can extend this to his or her own context.

Major New Additions in the Third Edition

The third edition of *Quality Management* has been dramatically modified and expanded, containing approximately twice as much material as the second edition.

- Part 1 now includes, in Chapter 1, discussions of Deming's well-known red bead experiment and Nelson's well-known funnel experiment. Both experiments highlight the destructive effects of treating common variation as special variation.
- Part 2 now includes the "seven new tools for management" in Chapter 10 and a presentation of factorial designs and fractional factorial designs in Chapter 12.
- Part 3 is entirely new and explains how to administer a quality management process in an organization "from soup to nuts." Chapter 14 explains how to initiate a quality management effort. Chapter 15 discusses the managerial issues in getting started. Chapter 16 discusses daily management. Chapter 17 discusses cross-functional management. Chapter 18 discusses policy management. Chapter 19 discusses the resources necessary for a quality management process.
- Part 4 is also entirely new. Chapter 20 presents Six Sigma management and the DMAIC model, along with a detailed case study.
- The third edition includes Minitab output for statistical analyses throughout the text. In addition, end-of-chapter Minitab appendices provide detailed yet easy-to-follow instructions (including screenshots of dialog boxes) for using Minitab 14, the latest version of Minitab. For a reasonable additional cost the student version of Minitab can be packaged with this text. To order this package, use ISBN 0-07-299692-7.

Continuing Features

- Chapter 1 of the second edition, "Fundamentals of Quality," is now covered in Chapters 1 and 2, "Fundamentals of Quality" and "W. Edwards Deming's Theory of Management."
- Chapter 2 of the second edition, "Fundamentals of Statistical Studies," is now covered in Chapter 3 under the same title.
- Chapter 3 of the second edition, "Defining and Documenting a Process," is now covered in Chapter 4 under the same title.
- Chapter 4 of the second edition, "Basic Probability and Statistics," is now covered in Chapter 5 under the same title.
- Chapter 5 of the second edition, "Stabilizing and Improving a Process with Control Charts," is now covered in Chapter 6 under the same title.
- Chapter 6 of the second edition, "Attribute Control Charts," is now covered in Chapter 7 under the same title.
- Chapter 7 of the second edition, "Variables Control Charts," is now covered in Chapter 8 under the same title.
- Chapter 8 of the second edition, "Out-of-Control Patterns," is now covered in Chapter 9 under the same title.
- Chapter 9 of the second edition, "Diagnosing a Process," is now covered in Chapter 10 under the same title.
- Chapter 10 of the second edition, "Specifications," is now covered in Chapter 11, "Process Capability and Improvement Studies."
- Chapter 11 of the second edition, "Process Capability and Improvement Studies," is now covered in Chapter 11 under the same title.
- Chapter 13 of the second edition, "Inspection Policy," is now covered in Chapter 13 under the same title.
- Chapter 14 of the second edition, "Deming's 14 Points and the Reduction of Variation," is now covered in Chapters 1 and 2, "Fundamentals of Quality" and "W. Edwards Deming's Theory of Management."

Structure for Alternative Courses

- Course 1: Tools and Methods of Quality Management
  section 1: Foundations of Quality Management (Chapters 1–4)
  section 2: Tools and Methods for Analytic Studies (Chapters 5–13)
  section 3: Current Thinking about Statistical Practice: Six Sigma management, focusing on quantitative tools and methods (Chapter 20)
  Prerequisite: None

- Course 2: Administrative Systems for Quality Management
  section 1: Foundations of Quality Management (Chapters 1–4)
  section 2: Administrative Systems for Quality Management (Chapters 14–19)
  Prerequisite: Course 1

Supplemental Packages

PowerPoint slides
Instructor's manual
CD-ROM containing datasets for Minitab

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