



Service Management

Operations, Strategy, Information Technology

Ninth Edition



**Mc
Graw
Hill**
Education

Bordoloi • Fitzsimmons • Fitzsimmons

Service Management

Operations, Strategy,
Information Technology

Ninth Edition

Sanjeev Bordoloi

*Associate Professor of Operations
Management
University of St. Thomas, Minnesota*

James A. Fitzsimmons

*Seay Professor of Business Emeritus
University of Texas at Austin*

Mona J. Fitzsimmons





SERVICE MANAGEMENT: OPERATIONS, STRATEGY, INFORMATION TECHNOLOGY, NINTH EDITION

Published by McGraw-Hill Education, 2 Penn Plaza, New York, NY 10121. Copyright © 2019 by McGraw-Hill Education. All rights reserved. Printed in the United States of America. Previous editions © 2014, 2011, and 2008. No part of this publication may be reproduced or distributed in any form or by any means, or stored in a database or retrieval system, without the prior written consent of McGraw-Hill Education, including, but not limited to, in any network or other electronic storage or transmission, or broadcast for distance learning.

Some ancillaries, including electronic and print components, may not be available to customers outside the United States.

This book is printed on acid-free paper.

1 2 3 4 5 6 7 8 9 LWI 21 20 19 18

ISBN 978-1-259-78463-7
MHID 1-259-78463-0

Portfolio Manager: *Noelle Bathurst*
Product Developer: *Ryan McAndrews*
Marketing Manager: *Harper Christopher*
Content Project Managers: *Pat Frederickson* and *Angela Norris*
Buyer: *Laura Fuller*
Designer: *Matt Diamond*
Content Licensing Specialist: *Lori Slattery*
Cover Image: ©Shutterstock/Monkey Business Images, ©wavebreakmediamicro/123RF, ©geopaul/Getty Images, ©KidStock/Blend Images LLC
Compositor: *SPi Global*

All credits appearing on page or at the end of the book are considered to be an extension of the copyright page.

Library of Congress Cataloging-in-Publication Data

Names: Bordoloi, Sanjeev, author. | Fitzsimmons, James A., author. | Fitzsimmons, Mona J., author.

Title: Service management : operations, strategy, information technology / Sanjeev Bordoloi, Associate Professor of Operations Management, University of St. Thomas, Minnesota, James A. Fitzsimmons, Seay Professor of Business Emeritus, University of Texas at Austin, Mona J. Fitzsimmons, University of Texas at Austin.

Description: 9 Edition. | Dubuque : McGraw-Hill Education, [2018] | Revised edition of the authors' Service management, 2014.

Identifiers: LCCN 2017048452 | ISBN 9781259784637 (alk. paper)

Subjects: LCSH: Service industries—Management.

Classification: LCC HD9980.5 .F549 2018 | DDC 658—dc23 LC record available at <https://lccn.loc.gov/2017048452>

The Internet addresses listed in the text were accurate at the time of publication. The inclusion of a website does not indicate an endorsement by the authors or McGraw-Hill Education, and McGraw-Hill Education does not guarantee the accuracy of the information presented at these sites.

The McGraw-Hill/Irwin Series in Operations and Decision Sciences

SUPPLY CHAIN MANAGEMENT

Benton
Purchasing and Supply Chain Management
Second Edition

Burt, Petcavage, and Pinkerton
Supply Management
Eighth Edition

Bowersox, Closs, Cooper, and Bowersox
Supply Chain Logistics Management
Fourth Edition

Johnson and Flynn
Purchasing and Supply Management
Fifteenth Edition

Simchi-Levi, Kaminsky, and Simchi-Levi
Designing and Managing the Supply Chain: Concepts, Strategies, Case Studies
Third Edition

PROJECT MANAGEMENT

Brown and Hyer
Managing Projects: A Team-Based Approach
First Edition

Larson and Gray
Project Management: The Managerial Process
Seventh Edition

SERVICE OPERATIONS MANAGEMENT

Bordoloi, Fitzsimmons, and Fitzsimmons
Service Management: Operations, Strategy, Information Technology
Ninth Edition

MANAGEMENT SCIENCE

Hillier and Hillier
Introduction to Management Science: A Modeling and Case Studies Approach with Spreadsheets
Sixth Edition

Stevenson and Ozgur
Introduction to Management Science with Spreadsheets
First Edition

MANUFACTURING CONTROL SYSTEMS

Jacobs, Berry, Whybark, and Vollmann
Manufacturing Planning & Control for Supply Chain Management
Sixth Edition

BUSINESS RESEARCH METHODS

Cooper and Schindler
Business Research Methods
Twelfth Edition

BUSINESS FORECASTING

Keating and Wilson
Business Forecasting
Seventh Edition

LINEAR STATISTICS AND REGRESSION

Kutner, Nachtsheim, and Neter
Applied Linear Regression Models
Fourth Edition

BUSINESS SYSTEMS DYNAMICS

Sterman
Business Dynamics: Systems Thinking and Modeling for a Complex World
First Edition

OPERATIONS MANAGEMENT

Cachon and Terwiesch
Operations Management
First Edition

Cachon and Terwiesch
Matching Supply with Demand: An Introduction to Operations Management
Third Edition

Finch
Interactive Models for Operations and Supply Chain Management
First Edition

Jacobs and Chase
Operations and Supply Chain Management
Fifteenth Edition

Jacobs and Chase
Operations and Supply Chain Management: The Core
Fourth Edition

Jacobs and Whybark
Why ERP? A Primer on SAP Implementation
First Edition

Schroeder and Goldstein
Operations Management in the Supply Chain: Decisions and Cases
Seventh Edition

Stevenson
Operations Management
Twelfth Edition

Swink, Melnyk, Hartley, and Cooper
Managing Operations Across the Supply Chain
Third Edition

PRODUCT DESIGN

Ulrich and Eppinger
Product Design and Development
Sixth Edition

BUSINESS MATH

Slater and Wittry
Practical Business Math Procedure
Twelfth Edition

Slater and Wittry
Math for Business and Finance: An Algebraic Approach
Second Edition

BUSINESS STATISTICS

Bowerman, O'Connell, and Murphree
Business Statistics in Practice
Eighth Edition

Bowerman, O'Connell, Murphree, and Orris
Essentials of Business Statistics
Fifth Edition

Doane and Seward
Applied Statistics in Business and Economics
Sixth Edition

Doane and Seward
Essential Statistics in Business and Economics
Second Edition

Lind, Marchal, and Wathen
Basic Statistics for Business and Economics
Ninth Edition

Lind, Marchal, and Wathen
Statistical Techniques in Business and Economics
Seventeenth Edition

Jaggia and Kelly
Business Statistics: Communicating with Numbers
Third Edition

Jaggia and Kelly
Essentials of Business Statistics: Communicating with Numbers
First Edition

McGuckian
Connect Master: Business Statistics

To Our Families:

Basanti and Chandra Dhar Bordoloi

Mandira, Indira, Ranjeeta, Rajeev, and Trideev

Michael, Kate, and Colleen

Gary

Samantha and Jordan

In memory of Melba Jett

About the Authors

Sanjeev K. Bordoloi, Associate Professor of Operations and Supply Chain Management in the Opus College of Business at the University of St. Thomas, Minnesota, received his B.Tech. in electrical engineering from the Indian Institute of Technology, Varanasi; an MBA from Xavier Labour Relations Institute (XLRI); and a Ph.D. from The University of Texas at Austin. His prior full-time teaching experience includes the University of Illinois at Urbana-Champaign, the College of William and Mary, and the University of Alaska Fairbanks. He won the Alfred Page Graduate Teaching Award at the College of William and Mary and was featured in the “List of Teachers Ranked by Students as Excellent” at the University of Illinois at Urbana-Champaign. His research interests include operations management, process analysis and design, lean management, and theory of constraints. He has worked full-time in the service industry at the executive level, primarily in project management and technology management. He has consulted for several firms, including Sentara Healthcare, TRIA Orthopaedic Center, Archer Daniels Midland, Accenture India, Northwestern University medical unit, Fairbanks Memorial Hospital, ServiceWare (knowledge management), Humanics Incorporated, and Intandem Incorporated (event management).

James A. Fitzsimmons, Seay Professor of Business Emeritus, McCombs School of Business, The University of Texas at Austin, received a B.S.E. from the University of Michigan, an MBA from Western Michigan University, and a Ph.D. with distinction from the University of California at Los Angeles. His research in the area of emergency ambulance location won the Stan Hardy Award in 1983 for the best paper published in the field of operations management. Consulting assignments include the RAND Corporation; the U.S. Air Force; the cities of Los Angeles, Denver, Austin, Melbourne, and Auckland; the Texas comptroller; General Motors; La Quinta Motor Inns; Greyhound; TRICON Restaurants International; and McDonald’s. Teaching experience includes faculty appointments at the University of California at Los Angeles, California State University at Northridge, the University of New Mexico, Boston University Overseas Graduate Program, California Polytechnic State University at San Luis Obispo, Seoul National University, and the Helsinki School of Economics and Business. He is a registered professional engineer in the state of Michigan and has held industrial engineering positions at Corning Glass Works and Hughes Aircraft Company. He served in the U.S. Air Force as an officer in charge of base construction projects. During his tenure at The University of Texas, he was Ph.D. graduate advisor, chair of the undergraduate programs committee, and nominated for six teaching awards. He is a Franz Edelman Laureat in the class of 1973. In 2004 he received an IBM Faculty Award in recognition for his contributions to the field of service operations management.

Mona J. Fitzsimmons, a graduate of the University of Michigan, received her undergraduate degree in journalism with major supporting work in chemistry and psychology. Her graduate work was in geology and she has taught in public and private schools and at the university level. She has done writing and editing for the Encyclopaedia Britannica Education Corporation and for various professional journals and organizations. With James Fitzsimmons she edited *New Service Development: Creating Memorable Experiences* published in 2000 by Sage Publications. Her nonprofessional activities have included volunteer work for the Red Cross aquatics program and in wildlife rehabilitation. She has particular interests in the areas of environmental issues and the responsibilities of patients and physicians in health care.

Preface

Services touch the lives of every person in this country every day: food services, communication services, and emergency services, to name only a few. Our welfare and the welfare of our economy now are based on services. The activities of manufacturing and agriculture always will be necessary, but we can eat only so much food and we can use only so many goods. Services, however, are largely experiential, and we always will have a limitless appetite for them.

Service operations management is established firmly as a field of study that embraces all service industries. The discipline was first recognized as an academic field by the Decision Sciences Institute (DSI) at its 1987 Boston meeting. In 1989 the *International Journal of Service Industry Management* was inaugurated. The First International Research Seminar in Service Management was held in France in 1990.

The *Journal of Service Research* was first published in August 1998 and quickly became the leading journal of the field. At the 2004 Boston meeting of the Production and Operations Management Society (POMS), a College on Service Operations was established. In 2005 the IBM Almaden Research Center launched an initiative to establish a new discipline called Service Science, Management, and Engineering (SSME). Visit the Academic Initiative SSME website at <https://developer.ibm.com/academic/> to find articles, case studies, and lecture materials. The first issue of *Service Research* was published by INFORMS in September 2011.

This edition continues to acknowledge and emphasize the essential uniqueness of service management. These are some key features:

- The book is written in an engaging literary style, makes extensive use of examples, and is based on the research and consulting experience of the authors.
- The theme of managing services for competitive advantage is emphasized in each chapter and provides a focus for each management topic.
- The integration of technology, operations, and human behavior is recognized as central to effective service management.
- Emphasis is placed on the need for continuous improvement in quality and productivity in order to compete effectively in a global environment.
- To motivate the reader, a vignette of a well-known company starts each chapter, illustrating the strategic nature of the topic to be covered.
- Each chapter has a preview, a closing summary, key terms and definitions, a service benchmark, topics for discussion, an interactive exercise, solved problems and exercises when appropriate, and one or more cases.
- Available on the text's Online Learning Center at www.mhhe.com/bordoloi9e, is access to the Mortgage Service Game, a facility location Excel spreadsheet, chapter quizzes, and websites.
- The instructor's side of the text website contains an instructor's manual, case analyses, exercise solutions, sample syllabi, a yield management game, and lists of supplementary materials.

Key Updates in the Ninth Edition

This edition has benefited greatly from thoughtful suggestions from students, colleagues, and reviewers. In particular, we have incorporated emerging technologies throughout the book. We note several changes and additions to this new edition:

- A new Service Benchmark in Chapter 1, The Service Economy, features the pioneers of the emerging sharing economy Uber and Airbnb.

- Chapter 2, Service Strategy, introduces two new topics: recent advances in the mathematical analysis of big data or data analytics and the Internet of Things (IoT), an extension of the Internet into our everyday lives.
- The disruptive technology called blockchain based upon the internet currency Bitcoin is explored in Chapter 3, New Service Development, with illustrations of its impact on financial services. The stages of building a service blueprint are illustrated by taking us to a San Francisco Giants baseball game.
- In Chapter 7, Process Improvement, the topic of Lean Service is extended to include value-stream mapping using an example of a loan approval process.
- The emerging idea of using multiple sources and distribution methods is captured in the concept of omnichannel supply chain found in Chapter 9, Service Supply Relationships.
- In Chapter 11, Managing Capacity and Demand, the daily workshift scheduling problem is illustrated with a new example, Marin County 911 Response.
- The interactive exercise found in Chapter 14, Forecasting Demand for Services, now engages students in a Delphi exercise to forecast the date that a human colony on Mars will be established.

Special thanks and acknowledgment go to the following people for their valuable reviews of the first edition: Mohammad Ala, California State University, Los Angeles; Joanna R. Baker, Virginia Polytechnic Institute and State University; Mark Davis, Bentley College; Maling Ebrahimpour, University of Rhode Island; Michael Gleeson, Indiana University; Ray Haynes, California Polytechnic State University at San Luis Obispo; Art Hill, the University of Minnesota; Sheryl Kimes, Cornell University; and Richard Reid, the University of New Mexico.

The second edition benefited from the constructive comments of the following reviewers: Kimberly Bates, New York University; Avi Dechter, California State University, Northridge; Scott Dellana, East Carolina University; Sheryl Kimes, Cornell University; Larry J. LeBlanc, Vanderbilt University; Robert Lucas, Metropolitan State College of Denver; Barbara Osyk, University of Akron; Michael Showalter, Florida State University; and V. Sridharan, Clemson University.

The following reviewers contributed their experience and wisdom to the third edition: Sidhartha Das, George Mason University; Avi Dechter, California State University at Northridge; Byron Finch, Miami University of Ohio; Edward M. Hufft, Jr., Metropolitan State College of Denver; Ken Klassen, California State University at Northridge; Richard Reid, University of New Mexico, Albuquerque; Ishpal Rekki, California State University at San Marcos; and Ronald Satterfield, University of South Florida.

The fourth edition reflected the insights and suggestions of the following reviewers: Sanjeev Bordoloi, College of William and Mary; Sid Das, George Mason University; John Goodale, Ball State University; Ken Klassen, California State University, Northridge; Peggy Lee, Penn State University; Matthew Meuter, California State University, Northridge; Jaideep Motwani, Grand Valley State University; Elzbieta Trybus, California State University, Northridge; Rohit Verma, University of Utah; and Janet Sayers, Massey University, New Zealand. A special thanks to colleagues Ed Anderson and Doug Morrice for permission to include their Mortgage Service Game and to Mark Linford, an MBA student at the University of Texas at Austin, for preparing the computer software.

The fifth edition benefited from insights gathered at a focus group session in Washington, DC, at the 2003 Decision Sciences Institute annual meeting. We are grateful for the many suggestions provided by the following participants: Uday Apte, Southern Methodist University; Sanjeev Bordoloi, College of William and Mary; Joe Felan, University of Arkansas at Little Rock; Richard Franze, Kennesaw State University; Craig Froehle, University of Cincinnati; Yung Jae Lee, St. Mary's College of California; Katherine McFadden, Northern Illinois University; Mary Meixell, George Mason University; Elliott (Chip) Minor, Virginia Commonwealth University; and Jake Simons, Georgia Southern University. We are also indebted to Mrs. Margaret Seay who continues her generous support.

The sixth edition benefited greatly from the thoughtful suggestions of an outstanding group of reviewers: Sanjeev Bordoloi, University of Illinois-Urbana; Robert Burgess, Georgia Institute of Technology; Maureen Culleeney, Lewis University; Dick Fentriss, University of Tampa; Craig Froehle, University of Cincinnati; Susan Meyer Goldstein, University of Minnesota; Jaideep Motwani, Grand Valley State University; Rodney Runyan, University of South Carolina; and Rajesh Tyagi, DePaul University. We give special thanks to Ravi Behara, Florida Atlantic University, for his comprehensive revision plan.

The seventh edition benefited from the constructive suggestions of the following reviewers: Michael Bendixen, Nova Southeastern University; Dan Berg, Rensselaer Polytechnic Institute; Elif Kongar, Bridgeport University; Stephen Kwan, San Jose State University; Mary McWilliams, LeTourneau University; Kenneth Shaw, Oregon State University; and Donna Stewart, University of Wisconsin-Stout. We appreciate the contributions for improvements from Jeanne Zilmer, Copenhagen Business School.

The following reviewers contributed their generous time and expertise to the eighth edition: Laura Forker, University of Massachusetts-Dartmouth; Mike Galbreth, University of South Carolina; David Geigle, Texas A&M University; Lowell Lay, Texas Tech University; Mark Leung, University of Texas at San Antonio; Mark McComb, Mississippi College; Jaideep Motwani, Grand Valley State University; Rene Reitsma, Oregon State University; Jeff Smith, Florida State University; G. Peter Zhang, Georgia State University; and Shu Zhou, San Jose State University.

We thank the following reviewers for their thoughtful comments on our preparation of the ninth edition: Ajay Das, Baruch College; Adelina Gnanlet, California State University Fullerton; Diana Merenda, Baruch College; Jose Santiago, Baruch College; and Sheneeta White, University of St. Thomas.

We wish to acknowledge two students who assisted us. Fang Wu, Ph.D. student at The University of Texas at Austin, assisted in the development of some exercises and preparation of the PowerPoint lecture presentations for the second edition. Edmond Gonzales, an MBA student at Texas, prepared the chapter quizzes for the third edition CD-ROM. A special thanks is extended to Christine Bunker of the ProModel Corporation for allowing us the use of Process Simulator to illustrate applications of computer simulation to process analysis.

We express special appreciation to all of our friends who encouraged us and tolerated our social lapses while we produced this book. In particular, James and Mona Fitzsimmons are indebted for the support of Richard and Janice Reid, who have provided lively and stimulating conversations and activities over many years, and who generously allowed us the use of their mountain retreat. The beginning of the first edition was written in the splendid isolation of their part of the Jemez Mountains of New Mexico. No authors could want for better inspiration.

Sanjeev K. Bordoloi

James A. Fitzsimmons

Mona J. Fitzsimmons

Overview of the Book

Part One begins with a discussion of the role of services in an economy. We first look at the historical evolution of societies based on economic activity and conclude with a discussion of the emerging experience economy. Next, we consider the distinctive characteristics of service operations, concluding with an open-systems view of service operations management. The strategic service vision begins the final chapter in this section. The concept of sustainability and triple bottom line in services is introduced. The impact of data analytics and the Internet of Things (IoT) on services is explored. Competitive service strategies are discussed with an emphasis on the role of information as illustrated by the virtual value chain.

Designing the service enterprise to support the competitive strategy is the topic of Part Two. New services are developed using techniques such as a service blueprint that diagrams the flow of activity occurring onstage above a line of visibility and backstage functions that are not seen by the customer. The notion of a service encounter describes the interaction between service provider and customer in the context of a service organization. The importance of the supporting facility is captured by how the servicescape affects customer and employee behavior. Process analysis is treated in depth by identifying the bottleneck and calculating performance metrics such as throughput time. The challenge of delivering exceptional service quality is addressed by comparing customers' perceptions and expectations. The process improvement chapter describes tools and programs for continuous improvement, and a supplement measures service productivity using data envelopment analysis. The strategic importance of service facility location is explored with analytical models in the conclusion of this part.

Management of service operations is addressed in Part Three. The topic of service supply relationships includes a discussion of professional services and the disruptive impact of the blockchain technology. The next chapter is devoted to the topic of service-firm growth and the importance of globalization in services. Strategies to manage capacity and demand follow including the concept of yield management. We address the question of managing waiting lines from a psychological viewpoint. Capacity planning using queuing models with a supplement on computer simulation featuring a Visio plug-in Process Simulator concludes this part.

Part Four is devoted to quantitative models for service management. The first chapter addresses the topic of forecasting service demand using exponential smoothing models. The next chapter explores models for managing service inventory and discusses the uses of RFID. The topic of project management using Microsoft® Project software as the foundation concludes the final part.

Supplemental Features

INSTRUCTOR LIBRARY

A wealth of information is available online through McGraw-Hill's *Connect*. In the *Connect* Instructor Library, you will have access to supplementary materials specifically created for this text, such as:

- Instructor Solutions Manual
- PowerPoint Presentations
- Instructor Video List
- Digital Image Library
- Test Bank

ASSURANCE OF LEARNING

Many educational institutions today are focused on the notion of assurance of learning, an important element of some accreditation standards. *Service Management: Operations, Strategy, Information Technology* is designed specifically to support your assurance of learning initiatives with a simple, yet powerful, solution.

Each test bank and end-of-chapter question for *Service Management: Operations, Strategy, Information Technology* maps to a specific chapter learning goal listed in the text. You can use the test bank software to easily query for learning goals that directly relate to the learning objectives for your course. You then can use the reporting features of the software to aggregate student results in similar fashion, making the collection and presentation of assurance of learning data simple and easy.

MCGRAW-HILL CUSTOMER CARE CONTACT INFORMATION

At McGraw-Hill, we understand that getting the most from new technology can be challenging. That's why our services don't stop after you purchase our products. You can e-mail our Product Specialists 24 hours a day to get product training online. Or you can search our knowledge bank of Frequently Asked Questions on our support website.

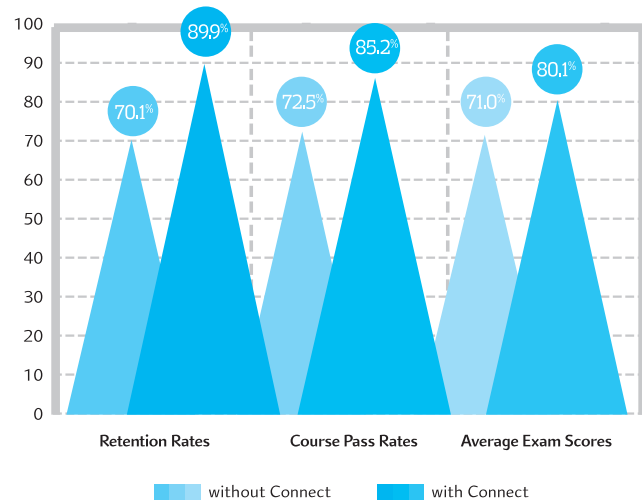
For Customer Support, call **800-331-5094** or visit www.mhhe.com/support. One of our Technical Support Analysts will be able to assist you in a timely fashion.

McGraw-Hill Connect® is a highly reliable, easy-to-use homework and learning management solution that utilizes learning science and award-winning adaptive tools to improve student results.

Homework and Adaptive Learning

- Connect's assignments help students contextualize what they've learned through application, so they can better understand the material and think critically.
- Connect will create a personalized study path customized to individual student needs through SmartBook®.
- SmartBook helps students study more efficiently by delivering an interactive reading experience through adaptive highlighting and review.

Connect's Impact on Retention Rates, Pass Rates, and Average Exam Scores



Using **Connect** improves retention rates by **19.8%**, passing rates by **12.7%**, and exam scores by **9.1%**.

Over **7 billion questions** have been answered, making McGraw-Hill Education products more intelligent, reliable, and precise.

73% of instructors who use **Connect** require it; instructor satisfaction **increases by 28%** when **Connect** is required.

Quality Content and Learning Resources

- Connect content is authored by the world's best subject matter experts, and is available to your class through a simple and intuitive interface.
- The Connect eBook makes it easy for students to access their reading material on smartphones and tablets. They can study on the go and don't need internet access to use the eBook as a reference, with full functionality.
- Multimedia content such as videos, simulations, and games drive student engagement and critical thinking skills.



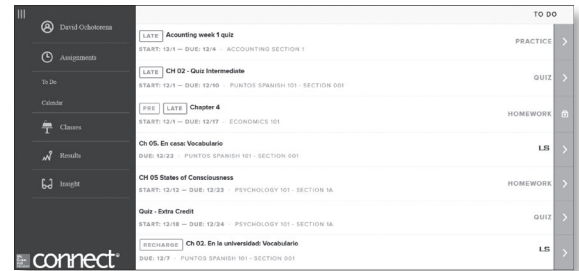
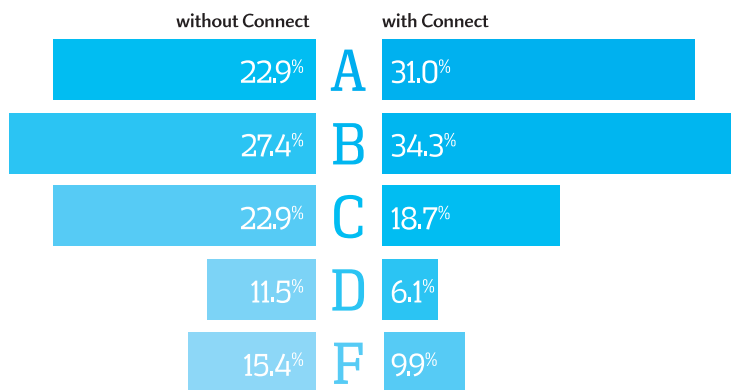
Robust Analytics and Reporting

- Connect Insight® generates easy-to-read reports on individual students, the class as a whole, and on specific assignments.
- The Connect Insight dashboard delivers data on performance, study behavior, and effort. Instructors can quickly identify students who struggle and focus on material that the class has yet to master.
- Connect automatically grades assignments and quizzes, providing easy-to-read reports on individual and class performance.



©Hero Images/Getty Images

Impact on Final Course Grade Distribution



More students earn
As and Bs when they
use **Connect**.

Trusted Service and Support

- Connect integrates with your LMS to provide single sign-on and automatic syncing of grades. Integration with Blackboard®, D2L®, and Canvas also provides automatic syncing of the course calendar and assignment-level linking.
- Connect offers comprehensive service, support, and training throughout every phase of your implementation.
- If you're looking for some guidance on how to use Connect, or want to learn tips and tricks from super users, you can find tutorials as you work. Our Digital Faculty Consultants and Student Ambassadors offer insight into how to achieve the results you want with Connect.

Brief Contents

PART ONE

Understanding Services 1

- 1 The Service Economy 3
- 2 Service Strategy 27

PART TWO

Designing the Service Enterprise 61

- 3 New Service Development 63
- 4 The Service Encounter 95
- 5 Supporting Facility and Process Flows 119
- 6 Service Quality 149
- 7 Process Improvement 187
- Supplement:** Data Envelopment Analysis (DEA) 209
- 8 Service Facility Location 219

PART THREE

Managing Service Operations 247

- 9 Service Supply Relationships 249
- 10 Globalization of Services 279
- 11 Managing Capacity and Demand 301
- 12 Managing Waiting Lines 335
- 13 Capacity Planning and Queuing Models 357
- Supplement:** Computer Simulation 382

PART FOUR

Quantitative Models for Service Management 401

- 14 Forecasting Demand for Services 403
- 15 Managing Service Inventory 427
- 16 Managing Service Projects 461

APPENDIX

- A** Areas of Standard Normal Distribution 495
- B** Uniformly Distributed Random Numbers [0, 1] 496
- C** Values of L_q for the $M/M/c$ Queuing Model 497
- D** Equations for Selected Queuing Models 499

NAME INDEX 505

SUBJECT INDEX 509

Table of Contents

PART ONE

UNDERSTANDING SERVICES 1

Chapter 1

The Service Economy 3

Learning Objectives	3
Chapter Preview	4
Service Definitions	4
Facilitating Role of Services in an Economy	4
Economic Evolution	5
Stages of Economic Development	6
<i>Preindustrial Society</i>	6
<i>Industrial Society</i>	7
<i>Postindustrial Society</i>	7
Nature of the Service Sector	8
The Experience Economy	9
<i>Consumer Service Experience</i>	10
<i>Business Service Experience</i>	10
Service-Dominant Logic	11
Distinctive Characteristics of Service Operations	13
<i>Customer Participation</i>	13
<i>Simultaneity</i>	14
<i>Perishability</i>	14
<i>Intangibility</i>	15
<i>Heterogeneity</i>	15
<i>Nontransferable Ownership</i>	16
The Service Package	17
Grouping Services by Delivery Process	18
Open-Systems View of Service Operations Management	20
Service Benchmark: Sharing Economy Pioneers Uber and Airbnb	22
Summary	22
Key Terms and Definitions	22
Topics for Discussion	23
Interactive Exercise	23
CASE 1.1: Village Volvo	23
CASE 1.2: Xpresso Lube	24
Selected Bibliography	26
Endnotes	26

Chapter 2

Service Strategy 27

Learning Objectives	27
Chapter Preview	27
The Strategic Service Vision	28
Understanding the Competitive Environment of Services	29

Competitive Service Strategies	30
<i>Overall Cost Leadership</i>	30
<i>Differentiation</i>	31
<i>Focus</i>	32
Strategic Analysis	33
<i>Porter's Five Forces Analysis</i>	33
<i>SWOT Analysis: Strengths, Weaknesses, Opportunities, Threats</i>	34
Winning Customers in the Marketplace	34
<i>Qualifiers</i>	35
<i>Service Winners</i>	35
<i>Service Losers</i>	36
Sustainability in Services	36
<i>Triple Bottom Line (TBL)</i>	36
The Competitive Role of Information in Services	38
<i>Creation of Barriers to Entry</i>	38
<i>Revenue Generation</i>	40
<i>Database Asset</i>	40
<i>Productivity Enhancement</i>	41
The Internet of Things (IoT)	42
Data Analytics in Services	44
The Virtual Value Chain	45
<i>First Stage (New Processes)</i>	46
<i>Second Stage (New Knowledge)</i>	47
<i>Third Stage (New Products)</i>	47
<i>Fourth Stage (New Relationships)</i>	47
Economics of Scalability	47
Limits in the Use of Information	48
<i>Anticompetitive</i>	48
<i>Fairness</i>	49
<i>Invasion of Privacy</i>	49
<i>Data Security</i>	49
<i>Reliability</i>	49
Using Information to Categorize Customers	49
Stages in Service Firm Competitiveness	50
<i>Available for Service</i>	50
<i>Journeyman</i>	50
<i>Distinctive Competence Achieved</i>	50
<i>World-Class Service Delivery</i>	52
Service Benchmark: Outside the Box	52
Summary	52
Key Terms and Definitions	53
Topics for Discussion	53
Interactive Exercise	54
CASE 2.1: United Commercial Bank and El Banco	54
CASE 2.2: The Alamo Drafthouse	56
Selected Bibliography	58
Endnotes	59

PART TWO**DESIGNING THE SERVICE ENTERPRISE 61****Chapter 3****New Service Development 63**

Learning Objectives 63

Chapter Preview 64

Sources of Service Sector Growth 64

*Information Technology 64**The Internet as a Service Enabler 65**Innovation 66**Changing Demographics 66*

Innovation in Services 67

*Challenges of Adopting New Technology in Services 70**Readiness to Embrace New Technology 70*

New Service Development 70

Service Design Elements 72

Strategic Positioning through Process

Structure 73

Service Blueprinting 74

Taxonomy for Service Process Design 76

*Degree of Divergence 77**Object of the Service Process 77**Type of Customer Contact 77*

Generic Approaches to Service System Design 78

*Production-Line Approach 79**Customer as Coproducer 80**Customer Contact Approach 81**Information Empowerment 83*

Intellectual Property 84

Service Benchmark: Ten Things Google

Has Found To Be True 85

Summary 85

Key Terms and Definitions 86

Topics for Discussion 86

Interactive Exercise 86

CASE 3.1: 100 Yen Sushi House 86

CASE 3.2: Commuter Cleaning—A New Venture

Proposal 87

CASE 3.3: Amazon.com 89

Selected Bibliography 92

Endnotes 92

Chapter 4**The Service Encounter 95**

Learning Objectives 95

Chapter Preview 95

Technology in the Service Encounter 96

The Emergence of Self-Service 97

The Service Encounter Triad 98

*Encounter Dominated by the Service Organization 99**Contact Personnel-Dominated Encounter 99**Customer-Dominated Encounter 99*

The Service Organization 100

*Culture 100**Empowerment 101**Control Systems 102**Customer Relationship Management 102*

Contact Personnel 103

*Selection 103**Training 104**Creating an Ethical Climate 105*

The Customer 106

*Expectations and Attitudes 106**The Role of Scripts in Coproduction 107*

Creating a Customer Service Orientation 108

Service Profit Chain 109

Service Benchmark: Miss Manners on Complaint

Handling 111

Summary 111

Key Terms and Definitions 112

Topics for Discussion 112

Interactive Exercise 112

CASE 4.1: Amy's Ice Cream 112

CASE 4.2: Enterprise Rent-A-Car 113

Selected Bibliography 116

Endnotes 117

Chapter 5**Supporting Facility and Process Flows 119**

Learning Objectives 119

Chapter Preview 120

Environmental Psychology and Orientation 120

Servicescapes 120

*Behaviors in Servicescapes 121**Environmental Dimensions of Servicescapes 122*

Facility Design 124

*Nature and Objectives of Service Organizations 124**Land Availability and Space Requirements 125**Flexibility 125**Security 125**Aesthetic Factors 126**The Community and Environment 126*

Process Analysis 127

*Types of Processes 127**Flowcharting 127**Gantt Chart 128**Process Terminology 129*

Facility Layout 131

*Flow Process Layout and the Work Allocation Problem 131**Job Shop Process Layout and the Relative Location**Problem 133*

Summary 136

Service Benchmark: Where, Oh Where Shall We Go? 137

Key Terms and Definitions 137

Topics for Discussion 138

Interactive Exercise 138

Solved Problems	138
Exercises	140
CASE 5.1: Health Maintenance Organization (A)	143
CASE 5.2: Health Maintenance Organization (B)	144
CASE 5.3: Esquire Department Store	144
CASE 5.4: Central Market	145
Selected Bibliography	147
Endnotes	147

Chapter 6

Service Quality 149

Learning Objectives	149
Chapter Preview	149
Defining Service Quality	150
<i>Dimensions of Service Quality</i>	150
<i>Gaps in Service Quality</i>	151
Measuring Service Quality	153
<i>SERVQUAL</i>	153
<i>Walk-through Audit</i>	154
Quality Service by Design	158
<i>Incorporation of Quality in the Service Package</i>	158
<i>Taguchi Methods</i>	159
<i>Poka-Yoke (Failsafing)</i>	160
<i>Quality Function Deployment</i>	161
Achieving Service Quality	163
<i>Cost of Quality</i>	163
<i>Statistical Process Control</i>	164
<i>Unconditional Service Guarantee</i>	168
<i>Stages in Quality Development</i>	170
Service Recovery	170
<i>Approaches to Service Recovery</i>	172
<i>Complaint Handling Policy</i>	173
Service Benchmark: Bronson Methodist Hospital	173
Summary	174
Key Terms and Definitions	174
Topics for Discussion	174
Interactive Exercise	175
Solved Problems	175
Exercises	176
CASE 6.1: Clean Sweep, Inc.	179
CASE 6.2: The Complaint Letter	180
CASE 6.3: The Helsinki Museum of Art and Design	182
Selected Bibliography	183
Endnotes	185

Chapter 7

Process Improvement 187

Learning Objectives	187
Chapter Preview	187
Quality and Productivity Improvement Process	188
<i>Foundations of Continuous Improvement</i>	188
<i>Plan-Do-Check-Act (PDCA) Cycle</i>	188
<i>Problem Solving</i>	189

Quality Tools for Analysis and Problem Solving 190

<i>Check Sheet</i>	190
<i>Run Chart</i>	190
<i>Histogram</i>	190
<i>Pareto Chart</i>	191
<i>Flowchart</i>	191
<i>Cause-and-Effect Diagram</i>	192
<i>Scatter Diagram</i>	193
<i>Control Chart</i>	193
Benchmarking	194
Improvement Programs	195
<i>Deming's 14-Point Program</i>	195
<i>ISO 9001</i>	196
<i>Six Sigma</i>	196
<i>Lean Service</i>	200
Service Benchmark: When Something Doesn't Work—Sometimes Just Hit it with a Hammer!	203
Summary	203
Key Terms and Definitions	204
Topics for Discussion	204
Interactive Exercise	204
CASE 7.1: Sonora County Sheriff	204
CASE 7.2: Mega Bytes Restaurant	205
Chapter 7 Supplement: Data Envelopment Analysis (DEA) 209	
Measuring Service Productivity	209
<i>The DEA Model</i>	209
<i>DEA and Strategic Planning</i>	215
Exercises	216
CASE 7.3: Mid-Atlantic Bus Lines	216
Selected Bibliography	217
Endnotes	218

Chapter 8

Service Facility Location 219

Learning Objectives	219
Chapter Preview	219
Strategic Location Considerations	220
<i>Competitive Clustering</i>	220
<i>Saturation Marketing</i>	220
<i>Marketing Intermediaries</i>	221
<i>Substitution of Communication for Travel</i>	221
<i>Separation of Front from Back Office</i>	222
<i>Impact of the Internet on Service Location</i>	222
<i>Site Considerations</i>	223
Geographic Information Systems	223
Facility Location Modeling Considerations	225
<i>Geographic Representation</i>	225
<i>Number of Facilities</i>	227
<i>Optimization Criteria</i>	227
Facility Location Techniques	229
<i>Cross-Median Approach for a Single Facility</i>	230
<i>Huff Model for a Retail Outlet</i>	232
<i>Location Set Covering for Multiple Facilities</i>	234

Regression Analysis in Location Decisions	235
Summary	236
Service Benchmark: Here a Bun, There a Bun, Everywhere a Bun-Bun	237
Key Terms and Definitions	237
Topics for Discussion	238
Interactive Exercise	238
Solved Problems	238
Exercises	240
CASE 8.1: Health Maintenance Organization (C)	242
CASE 8.2: Athol Furniture, Inc.	242
Selected Bibliography	245
Endnotes	245

PART THREE

MANAGING SERVICE OPERATIONS 247

Chapter 9

Service Supply Relationships 249

Learning Objectives	249
Chapter Preview	249
Supply Chain Management	250
<i>Network Model</i>	250
<i>Managing Uncertainty</i>	251
<i>Omnichannel Supply Chain</i>	251
Service Supply Relationships	253
<i>Customer-Supplier Duality</i>	253
<i>Service Supply Relationships Are Hubs, Not Chains</i>	254
Managing Service Relationships	254
<i>Bidirectional Optimization</i>	255
<i>Productive Capacity</i>	256
<i>Perishability</i>	256
Social Media in Services	257
<i>Social Media as a Competitive Strategy</i>	258
<i>Social Media and Customer Convenience</i>	258
<i>Social Media for Organizing and Co-creation of Value</i>	259
Professional Service Firms	259
<i>Attributes of Professional Services</i>	259
<i>Service Consulting</i>	260
<i>Operational Characteristics</i>	261
Outsourcing Services	263
<i>Benefits and Risks of Outsourcing Services</i>	264
<i>Classification of Business Services</i>	265
<i>Managerial Considerations with Service Outsourcing</i>	266
Summary	268
Service Benchmark: Citizens Come First in Lynchburg	269
Key Terms and Definitions	269
Topics for Discussion	269
Interactive Exercise	270
CASE 9.1: Boomer Consulting, Inc.	270
CASE 9.2: Evolution of B2C E-Commerce in Japan	272
CASE 9.3: Mortgage Service Game	274
Selected Bibliography	276
Endnotes	276

Chapter 10

Globalization of Services 279

Learning Objectives	279
Chapter Preview	280
Domestic Growth and Expansion Strategies	280
<i>Focused Service</i>	280
<i>Focused Network</i>	281
<i>Clustered Service</i>	281
<i>Diversified Network</i>	282
Franchising	282
<i>The Nature of Franchising</i>	283
<i>Benefits to the Franchisee</i>	283
<i>Issues for the Franchiser</i>	284
Globalization of Services	285
<i>Generic International Strategies</i>	285
<i>The Nature of the Borderless World</i>	287
<i>Planning Transnational Operations</i>	288
Global Service Strategies	290
<i>Multicountry Expansion</i>	291
<i>Importing Customers</i>	292
<i>Following Your Customers</i>	292
<i>Service Offshoring</i>	293
<i>Beating the Clock</i>	293
Service Benchmark: Small World and Other Myths	294
Summary	294
Key Terms and Definitions	295
Topics for Discussion	295
Interactive Exercise	295
CASE 10.1: Goodwill Industries of Central Texas	295
CASE 10.2: FedEx: Tiger International Acquisition	297
Selected Bibliography	300
Endnotes	300

Chapter 11

Managing Capacity and Demand 301

Learning Objectives	301
Chapter Preview	301
Generic Strategies of Level Capacity or Chase Demand	302
Strategies for Managing Demand	302
<i>Customer-Induced Variability</i>	302
<i>Segmenting Demand</i>	303
<i>Offering Price Incentives</i>	304
<i>Promoting Off-Peak Demand</i>	305
<i>Developing Complementary Services</i>	306
<i>Reservation Systems and Overbooking</i>	306
Strategies for Managing Capacity	308
<i>Defining Service Capacity</i>	308
<i>Daily Workshift Scheduling</i>	309
<i>Weekly Workshift Scheduling with Days-Off Constraint</i>	311
<i>Increasing Customer Participation</i>	312
<i>Creating Adjustable Capacity</i>	313
<i>Sharing Capacity</i>	313

<i>Cross-Training Employees</i>	313
<i>Using Part-Time Employees</i>	313
Yield Management	315
<i>Yield Management Applications</i>	319
Service Benchmark: Pay Up Front and Take Your Chances	320
Summary	320
Key Terms and Definitions	321
Topics for Discussion	321
Interactive Exercise	321
Solved Problems	321
Exercises	323
CASE 11.1: River City National Bank	325
CASE 11.2: Gateway International Airport	327
CASE 11.3: The Yield Management Analyst	328
CASE 11.4: Sequoia Airlines	331
Selected Bibliography	332
Endnotes	333

Chapter 12

Managing Waiting Lines 335

Learning Objectives	335
Chapter Preview	335
The Economics of Waiting	336
Queuing Systems	336
Strategies for Managing Customer Waiting	337
<i>The Psychology of Waiting</i>	337
<i>That Old Empty Feeling</i>	338
<i>A Foot in the Door</i>	338
<i>The Light at the End of the Tunnel</i>	339
<i>Excuse Me, but I Was Next</i>	340
Essential Features of Queuing Systems	340
<i>Calling Population</i>	341
<i>Arrival Process</i>	342
<i>Queue Configuration</i>	345
<i>Queue Discipline</i>	346
<i>Service Process</i>	349
Summary	350
Service Benchmark: The Magic of Disney Makes Queues Disappear	351
Key Terms and Definitions	351
Topics for Discussion	351
Interactive Exercise	351
Solved Problem	351
Exercises	352
CASE 12.1: Thrifty Car Rental	352
CASE 12.2: Eye'll Be Seeing You	353
CASE 12.3: Field Study	354
Selected Bibliography	354
Endnotes	355

Chapter 13

Capacity Planning and Queuing Models 357

Learning Objectives	357
Chapter Preview	358

Capacity Planning	358
<i>Strategic Role of Capacity Decisions</i>	359
Analytical Queuing Models	360
<i>Relationships among System Characteristics</i>	362
<i>Standard M/M/1 Model</i>	362
<i>Standard M/M/c Model</i>	364
<i>M/G/1 Model</i>	367
<i>General Self-Service M/G/∞ Model</i>	368
<i>Finite-Queue M/M/1 Model</i>	368
<i>Finite-Queue M/M/c Model</i>	369
Capacity Planning Criteria	370
<i>Average Customer Waiting Time</i>	370
<i>Probability of Excessive Waiting</i>	371
<i>Minimizing the Sum of Customer Waiting Costs and Service Costs</i>	372
<i>Probability of Sales Lost Because of Inadequate Waiting Area</i>	373
Service Benchmark: Don't Guesstimate, Simulate!	374
Summary	375
Key Terms and Definitions	375
Topics for Discussion	375
Interactive Exercise	375
Solved Problems	375
Exercises	377
CASE 13.1: Houston Port Authority	380
CASE 13.2: Freedom Express	380
CASE 13.3: Renaissance Clinic (A)	381
Chapter 13 Supplement: Computer Simulation 382	
Systems Simulation	382
<i>Simulation Methodology</i>	383
<i>Monte Carlo Simulation</i>	384
<i>Generating Random Variables</i>	384
<i>Discrete Random Variable</i>	385
<i>Continuous Random Variable</i>	386
<i>Discrete-Event Simulation</i>	387
Process Simulator by ProModel	389
Solved Problems	391
Exercises	394
CASE 13.4: Drivers License Renewal	397
CASE 13.5: Renaissance Clinic (B)	398
Selected Bibliography	398
Endnotes	399

PART FOUR

Quantitative Models for Service Management 401

Chapter 14

Forecasting Demand for Services 403

Learning Objectives	403
Chapter Preview	403
The Choice of Forecasting Method	404
Subjective Models	404
<i>Delphi Method</i>	405
<i>Cross-Impact Analysis</i>	406
<i>Historical Analogy</i>	406

Causal Models 407
Regression Models 407
Econometric Models 408
Time Series Models 408
N-Period Moving Average 408
Simple Exponential Smoothing 409
Forecast Error 411
Relationship Between α and N 412
Exponential Smoothing with Trend Adjustment 413
Exponential Smoothing with Seasonal Adjustment 414
Exponential Smoothing with Trend and Seasonal Adjustments 416
Summary of Exponential Smoothing 418
Summary 418
Service Benchmark: Googling the Future 419
Key Terms and Definitions 419
Topics for Discussion 419
Interactive Exercise 420
Solved Problems 420
Exercises 422
CASE 14.1: Oak Hollow Medical Evaluation Center 423
CASE 14.2: Gnomial Functions, Inc. 424
Selected Bibliography 425
Endnotes 426

Chapter 15

Managing Service Inventory 427

Learning Objectives 427
Chapter Preview 428
Inventory Theory 429
Role of Inventory in Services 429
Characteristics of Inventory Systems 430
Relevant Costs of an Inventory System 431
Order Quantity Models 432
Economic Order Quantity 433
Inventory Model with Quantity Discounts 435
Inventory Model with Planned Shortages 437
Inventory Management under Uncertainty 440
Inventory Control Systems 441
Continuous Review System 441
Periodic Review System 442
The ABCs of Inventory Control 444
Radio Frequency Identification 445
Single-Period Model for Perishable Goods 446
Expected Value Analysis 446
Marginal Analysis 447
Retail Discounting Model 448
Service Benchmark: Your Bag Is Tagged 450
Summary 450
Key Terms and Definitions 450
Topics for Discussion 451
Interactive Exercise 451
Solved Problems 451
Exercises 453
CASE 15.1: A.D. Small Consulting 458
CASE 15.2: Last Resort Restaurant 458

CASE 15.3: Elysian Cycles 459
Selected Bibliography 460
Endnotes 460

Chapter 16

Managing Service Projects 461

Learning Objectives 461
Chapter Preview 461
The Nature of Project Management 462
Characteristics of Projects 462
Project Management Process 462
Selecting the Project Manager 463
Building the Project Team 463
Principles of Effective Project Management 464
Techniques for Project Management 464
Gantt Project Charts 464
A Critique of Gantt Charts 466
Constructing a Project Network 466
Critical Path Method 467
Microsoft Project Analysis 470
Resource Constraints 473
Activity Crashing 473
Incorporating Uncertainty in Activity Times 478
Estimating Activity Duration Distributions 478
Project Completion Time Distribution 479
A Critique of the Project Completion Time Analysis 480
Problems with Implementing Critical Path Analysis 482
Monitoring Projects 482
Earned Value Chart 483
Project Termination 483
Project History Report 484
Service Benchmark: The House That Warren Built 484
Summary 484
Key Terms and Definitions 485
Topics for Discussion 485
Interactive Exercise 485
Solved Problems 485
Exercises 487
CASE 16.1: Info-Systems, Inc. 491
CASE 16.2: Whittier County Hospital 492
Selected Bibliography 494
Endnote 494
Appendix A: Areas of Standard Normal Distribution 495
Appendix B: Uniformly Distributed Random Numbers [0, 1] 496
Appendix C: Values of L_q for the $M/M/c$ Queuing Model 497
Appendix D: Equations for Selected Queuing Models 499
Name Index 505
Subject Index 509

Understanding Services

We begin our study of service management in Chapter 1, The Service Economy, with an appreciation of the central role that services play in the economies of nations and in world commerce. No economy can function without the infrastructure that services provide in the form of transportation and communications and without government services such as education and health care. As an economy develops, however, services become even more important, and soon the vast majority of the population is employed in service activities.

However, services have distinctive features that present unique challenges for management. Perhaps the most important characteristic of service operations is the presence of the customer in the service delivery system. Focusing on the customer and serving his or her needs is the basis for a service-dominant logic that is an alternative to the traditional goods-centered paradigm.

An effective competitive strategy is particularly important for service firms because they compete in an environment that has relatively low barriers to entry. We begin Chapter 2, Service Strategy, with a discussion of the strategic service vision, a framework in the form of questions about the purpose and place of a service firm in its market. The well-known generic competitive strategies—overall cost leadership, differentiation, and focus—are applied to services. Porter’s five forces and SWOT analysis are applied to service firms. The topics of sustainability and economics of scalability are discussed in the context of growing a service firm. The competitive role of information in services is highlighted throughout.

Chapter 1

The Service Economy

Learning Objectives

After completing this chapter, you should be able to:

1. Describe the central role of services in an economy.
2. Identify and differentiate the five stages of economic activity.
3. Describe the features of preindustrial, industrial, and postindustrial societies.
4. Describe the features of the experience economy contrasting the consumer (B2C) with the business (B2B) service experience.
5. Explain the essential features of the service-dominant logic.
6. Identify and critique the six distinctive characteristics of a service operation, and explain the implications for managers.
7. Describe a service using the five dimensions of the service package.
8. Use the service process matrix to classify a service.

We are witnessing the greatest labor migration since the industrial revolution. This migration from agriculture and manufacturing to services is both invisible and largely global in scope. The migration is driven by global communications, business and technology growth, urbanization, and low-cost labor. Service industries are leaders in every industrialized nation, they create new jobs that dominate national economies, and have the potential to enhance the quality of life of everyone. Many of these jobs are for high-skilled knowledge-workers in professional and business services, health care, and education. As shown in Table 1.1, the extent of this movement to services is significant in the industrialized nations (European Union, United States, and Japan) but also represents a proportion of the labor force larger than that employed in goods production for the developing BRIC economies (Brazil, Russia, India, and China).

TABLE 1.1
Sector Employment in Top Ten Nations by 2015 Labor Force Size

Source: <https://www.cia.gov/library/publications/resources/the-world-factbook/rankorder/2095rank.html>

Nation	% of World Labor	% Agri	% Goods	% Services
China	21.2	33.6	30.3	36.1
India	13.9	49.0	20.0	31.0
European Union	6.4	5.0	21.9	73.1
United States	4.3	0.7	20.3	79.0
Indonesia	3.4	38.9	13.2	47.9
Brazil	3.0	15.7	13.3	71.0
Bangladesh	2.3	47.0	13.0	40.0
Russia	2.1	9.4	27.6	63.0
Japan	1.8	2.9	26.2	70.9
Pakistan	1.7	43.7	22.4	33.9

Chapter Preview

In a discussion of economic development, we learn that modern industrialized economies are dominated by employment in the service sector industries. This represents a natural evolution of economies from preindustrial to industrial and finally to postindustrial societies. The nature of the service economy is explored in terms of employment opportunities and the transition to experienced-based relationships for both consumers and businesses.

The distinctive characteristics of service operations suggest that the service environment is sufficiently unique to question the direct application of traditional manufacturing-based management techniques. In particular, the service manager operates in a system in which the customer is present and a co-creator of value. The concept of a service package to describe a service from an operations point of view is the foundation for an open-systems view of service management challenges. We begin with a selection of service definitions.

Service Definitions

Many definitions of service are available but all contain a common theme of intangibility and simultaneous consumption. The following represent a sample of service definitions:

Services are deeds, processes, and performances. (Source: Valarie A. Zeithaml, Mary Jo Bitner, and Dwayne D. Gremler, *Services Marketing*, 4th ed., New York: McGraw-Hill, 2006, p. 4.)

Services are economic activities offered by one party to another, most commonly employing time-based performances to bring about desired results in recipients themselves or in objects or other assets for which purchasers have responsibility. In exchange for their money, time, and effort, service customers expect to obtain value from access to goods, labor, professional skills, facilities, networks, and systems; but they do not normally take ownership of any of the physical elements involved. (Source: Christopher Lovelock and Lauren Wright, *Services Marketing: People, Technology, Strategy*, 6th ed., Upper Saddle River, NJ: Prentice-Hall, 2007, p. 6.)

A service system is a value-coproduction configuration of people, technology, other internal and external service systems, and shared information (such as language, processes, metrics, prices, policies, and laws). (Source: Jim Spohrer, Paul Maglio, John Bailey, and Daniel Gruhl, *Computer*, January 2007, p. 72.)

Facilitating Role of Services in an Economy

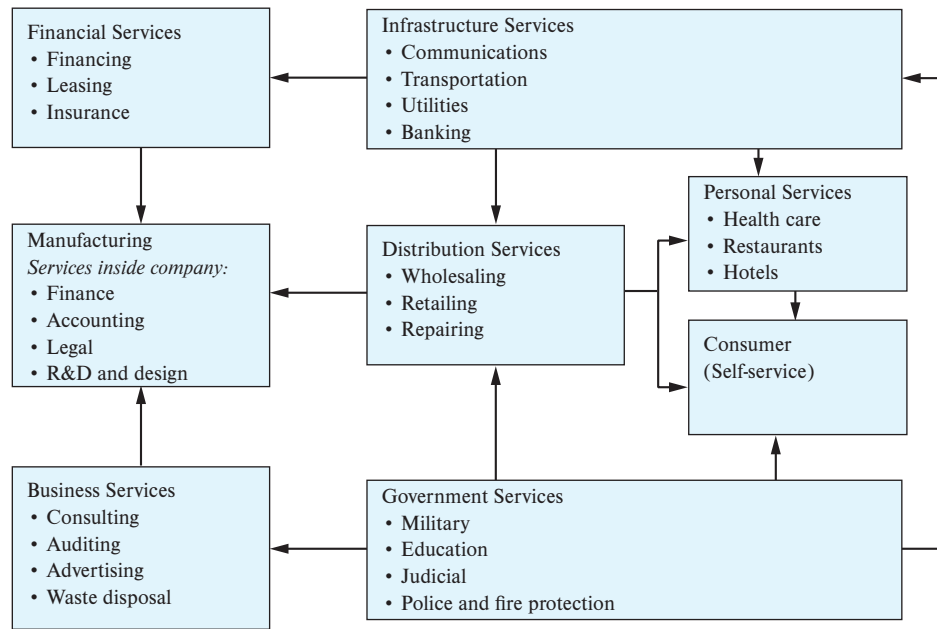
As shown in Figure 1.1, services are central to the economic activity in any society. Infrastructure services, such as transportation and communications, are the essential foundation of an economy. Both infrastructure and distribution services function as economic intermediaries and as the channel of distribution to the final consumer. Infrastructure and distribution services are a prerequisite for an economy to become industrialized; therefore, no advanced society can be without these services.

In an industrialized economy, specialized firms can supply business services to manufacturing firms more cheaply and efficiently than manufacturing firms can supply these services for themselves. Thus, we find advertising, consulting, and other business services being provided for the manufacturing sector by service firms.

Except for basic subsistence living, where individual households are self-sufficient, service activities are absolutely necessary for the economy to function and to enhance the quality of life. Consider, for example, the importance of a banking industry to transfer funds and a transportation industry to move food products to areas that cannot produce them. Moreover, a wide variety of personal services, such as restaurants, lodging, and child care, have been created to move former household functions into the economy. In fact, the consumer performing self-service activities is a service contributor often using technology (e.g., boarding kiosk) to eliminate non-value-adding tasks or affording personalization and control (e.g., online brokerage).

FIGURE 1.1
Role of Services in an Economy

Source: Bruce R. Guile and James Brian Quinn, eds., *Technology in Services: Policies for Growth, Trade, and Employment*, Washington, D.C.: National Academy Press, 1988, p. 214.



Government services play a critical role in providing a stable environment for investment and economic growth. Services such as public education, health care, well-maintained roads, safe drinking water, clean air, and public safety are necessary for any nation's economy to survive and people to prosper.

Increasingly, the profitability of manufacturers depends on exploiting value-added services. For example, automobile manufacturers have discovered that financing and/or leasing automobiles can achieve significant profits. Otis Elevator long ago found that revenues from after-sales maintenance contracts far exceed the profits from elevator equipment sales. This revenue enhancement strategy by manufacturers of deliberately coupling a service with their product is referred to as *servitization*. Almost every product today has a service component.

Thus, it is imperative to recognize that services are not peripheral activities but rather integral parts of society. They are central to a functioning and healthy economy and lie at the heart of that economy. Finally, the service sector not only facilitates but also makes possible the goods-producing activities of the manufacturing sectors. Services are the crucial ingredient for today's global economy.

Economic Evolution

In the early 1900s, only 3 of every 10 workers in the United States were employed in the services sector. The remaining workers were active in agriculture and industry. By 1950, employment in services accounted for 50 percent of the workforce. Today, services employ about 8 out of every 10 workers. Since WWII, we have witnessed a major evolution in sector employment from being predominantly manufacturing and agriculture to being predominantly services. This change in employment opportunities has made a significant impact on culture, demographics, and education.

Economists studying economic growth are not surprised by these events. Colin Clark argues that as nations become industrialized, there is an inevitable shift of employment from one sector of the economy to another.¹ As productivity (output/labor-hour) increases in one sector, the labor force moves into another. This observation, known as the *Clark-Fisher hypothesis*, leads to a classification of economies by noting the activity of the majority of the workforce.

FIGURE 1.2
Stages of Economic
Activity

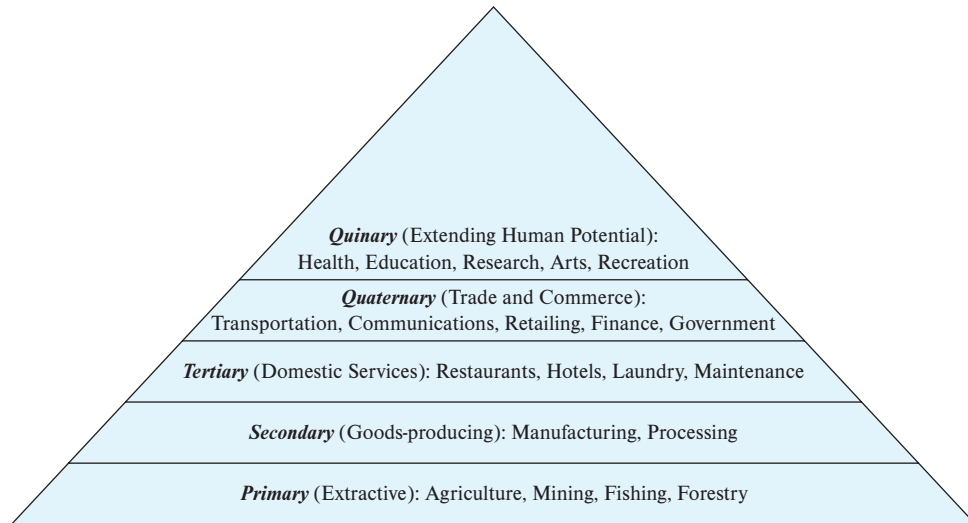


Figure 1.2 describes a hierarchy of economic activity. Many economists, including Clark, limited their analyses to only three stages, of which the tertiary stage was simply services. We have subdivided the service stage to create a total of five stages.

Today, an overwhelming number of countries still are in a primary stage of development. These economies are based on extracting natural resources from the land. Their productivity is low, and income is subject to fluctuations based on the prices of commodities such as sugar and copper. In much of Africa and parts of Asia, more than 70 percent of the labor force is engaged in extractive activities.

Figure 1.3 shows the rapid increase in service employment in the United States and illustrates the almost mirror image decline in agriculture employment. This sector employment trajectory is repeated for all of the nations represented in Table 1.1. We can observe that migration to services is a predictable evolution in the workforce of all nations, and successful industrial economies are built on a strong service sector. Furthermore, competition in services is global. Consider the growth of Indian call centers and British financial services. Trade in services remains a challenge, however, because many countries erect barriers to protect domestic firms. India and Mexico, for example, prohibit the sale of insurance by foreign companies.

Stages of Economic Development

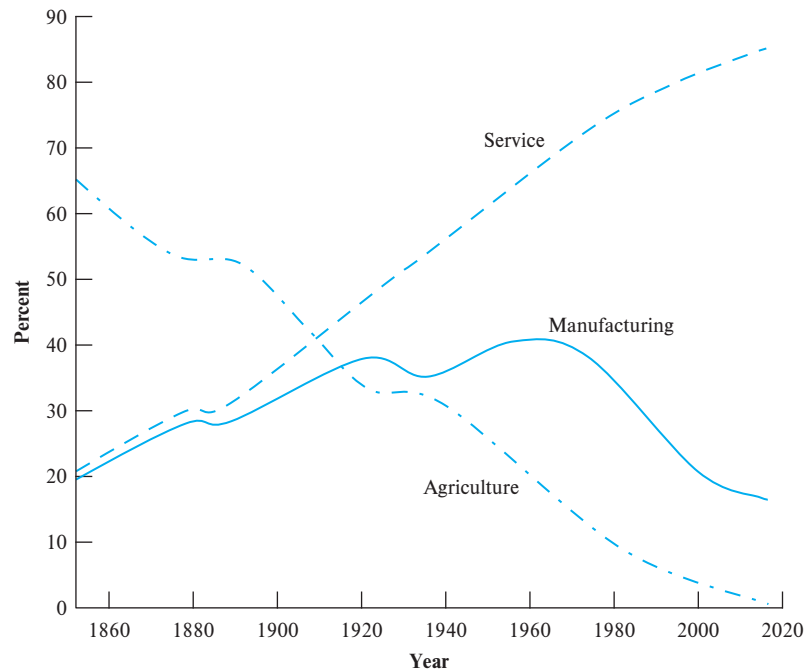
Describing where our society has been, its current condition, and its most likely future is the task of social historians. Daniel Bell, a professor of sociology at Harvard University, has written extensively on this topic, and the material that follows is based on his work.² To place the concept of a postindustrial society in perspective, we must compare its features with those of preindustrial and industrial societies.

Preindustrial Society

The condition of most of the world's population today is one of subsistence, or a *preindustrial society*. Life is characterized as a game against nature. Working with muscle power and tradition, the labor force is engaged in agriculture, mining, and fishing. Life is conditioned by the elements, such as the weather, the quality of the soil, and the availability of water. The rhythm of life is shaped by nature, and the pace of work varies with the seasons. Productivity is low and bears little evidence of technology. Social life revolves around the extended household, and this combination of low productivity and large population results in high rates of underemployment (workers not fully utilized). Many seek positions in services, but of the personal or household variety. Preindustrial societies are agrarian and structured around tradition, routine, and authority.

FIGURE 1.3
Trends in U.S.
Employment by Sector,
1850–2015

Source: http://www.census.gov/library/publications/1975/compendia/hist_stats_colonial-1970.html;
<http://www.census.gov/library/publications/2011/compendia/statab/131ed.html>; http://www.bls.gov/emp/ep_table_101.htm.



Industrial Society

The predominant activity in an *industrial society* is the production of goods. Energy and machines multiply the output per labor-hour and structure the nature of work. Division of labor is the operational “law” that creates routine tasks and the notion of the semiskilled worker. Work is accomplished in the artificial environment of the factory, and people tend the machines. Life becomes a game that is played against a fabricated nature—a world of cities, factories, and tenements. The rhythm of life is machine-paced and dominated by rigid working hours and time clocks. Of course, the unrelenting pressure of industrial life is ameliorated by the countervailing force of labor unions.

An industrial society is a world of schedules and acute awareness of the value of time. The standard of living becomes measured by the quantity of goods, but note that the complexity of coordinating the production and distribution of goods results in the creation of large bureaucratic and hierarchic organizations. These organizations are designed with certain roles for their members, and their operation tends to be impersonal, with persons treated as interchangeable. The individual is the unit of social life in a society that is considered to be the sum total of all the individual decisions being made in the marketplace.

Postindustrial Society

While an industrial society defines the standard of living by the quantity of goods, the *postindustrial society* is concerned with the quality of life, as measured by services such as health, education, and recreation. The central figure is the professional person, because rather than energy or physical strength, information is the key resource. Life now is a game played among persons. Social life becomes more difficult because political claims and social rights multiply. Society becomes aware that the independent actions of individuals and organizations can combine to create havoc for everyone, as evidenced by environmental pollution and traffic congestion. The community rather than the individual becomes the social unit.

Bell suggests that the transformation from an industrial to a postindustrial society occurs in many ways. First, there is a natural development of services, such as transportation and utilities, to support industrial development. As laborsaving devices are introduced into the production process, more workers engage in nonmanufacturing activities, such as maintenance and repair. Second, growth of the population and mass consumption of goods increase wholesale and retail trade, along with banking, real

TABLE 1.2
Comparison of Societies

Features							
Society	Game	Predominant Activity	Use of Human Labor	Unit of Social Life	Standard of Living Measure	Structure	Technology
Preindustrial	Against nature	Agriculture Mining	Raw muscle power	Extended household	Subsistence	Routine Traditional Authoritative	Simple hand tools
Industrial	Against fabricated nature	Goods-production	Machine-tending	Individual	Quantity of goods	Bureaucratic Hierarchical	Machines
Postindustrial	Among persons	Services	Artistic Creative Intellectual	Community	Quality of life in terms of health, education, recreation	Inter-dependent Global	Information

estate, and insurance. Third, as income increases, the proportion spent on the necessities of food and home decreases, and the remainder creates a demand for durables and then for services.

Ernst Engel, a Prussian statistician of the 19th century, observed that as family incomes increase, the percentage spent on food and durables drops while consumption of services that reflect a desire for a more enriched life increases correspondingly. This phenomenon is analogous to the Maslow hierarchy of needs, which says that once the basic requirements of food and shelter are satisfied, people seek physical goods and, finally, personal development. However, a necessary condition for the “good life” is health and education. In our attempts to eliminate disease and increase the span of life, health services become a critical feature of modern society.

Higher education becomes the condition for entry into a postindustrial society, which requires professional and technical skills of its population. Also, claims for more services and social justice lead to a growth in government. Concerns for environmental protection require government intervention and illustrate the interdependent and even global character of postindustrial problems. Table 1.2 summarizes the features that characterize the preindustrial, industrial, and postindustrial stages of economic development.

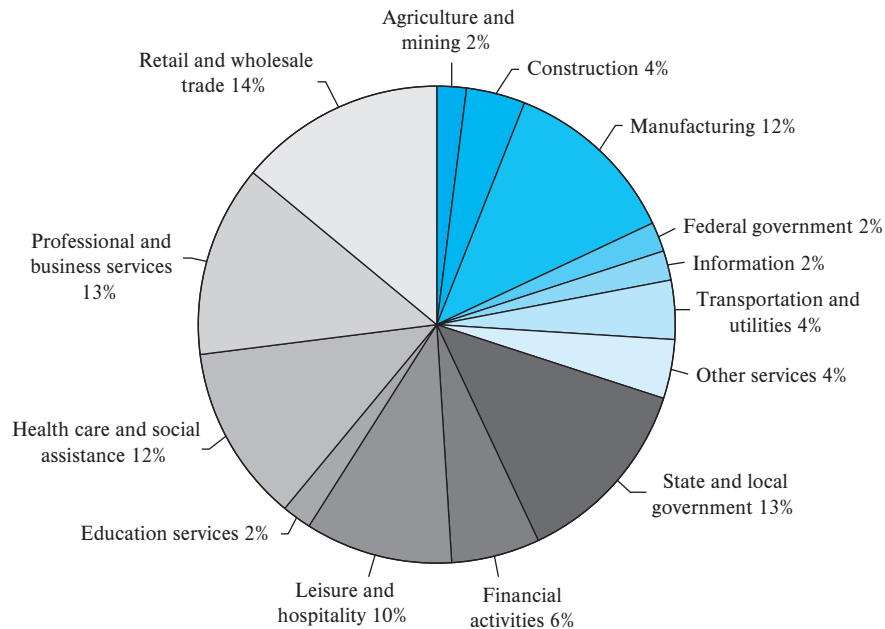
Nature of the Service Sector

For many people, *service* is synonymous with *servitude* and brings to mind workers flipping hamburgers and waiting on tables. However, the service sector that has grown significantly over the past century cannot be described accurately as composed only of low-wage or low-skill jobs in hotels and fast-food restaurants. Instead, as Figure 1.4 shows, approximately 27 percent of the total employment in 2014 occurred in high-skill service categories such as professional and business services, health care and social assistance, and educational services.

Changes in the pattern of employment will have implications on where and how people live, on educational requirements, and, consequently, on the kinds of organizations that will be important to that society. Industrialization created the need for the semiskilled worker who could be trained in a few days to perform the routine machine-tending tasks. The subsequent growth in the service sector has caused a shift to white-collar occupations. In the United States, the year 1956 was a turning point. For the first time in the history of industrial society, the number of white-collar workers exceeded the number of blue-collar workers, and the gap has been widening since then. The most interesting growth has been in the managerial and professional–technical fields, which are jobs that require a college education.

FIGURE 1.4
Distribution of U.S.
Employment by Industry,
2014.

Source: http://www.bls.gov/emp/ep_table_201.htm.



Today, service industries are the source of economic leadership. During the past 30 years, more than 44 million new jobs have been created in the service sector to absorb the influx of women into the workforce and to provide an alternative to the lack of job opportunities in manufacturing. The service industries now account for approximately 70 percent of the national income in the United States. Given that there is a limit to how many cars a consumer can use and how much one can eat and drink, this should not be surprising. The appetite for services, however, especially innovative ones, is insatiable. Among the services presently in demand are those that reflect an aging population, such as geriatric health care, and others that reflect a two-income family, such as day care.

During the past four recessions in the United States (the exception being the 2008 bank crash), employment by service industries fell much less than the loss of jobs in manufacturing. This suggests that consumers are willing to postpone the purchase of products but will not sacrifice essential services like education, telephone, banking, health care, and public services such as fire and police protection.

Several reasons can explain the recession-resistant nature of services. First, by their nature, services cannot be inventoried, as is the case for products. Because consumption and production occur simultaneously for services, the demand for them is more stable than that for manufactured goods. When the economy falters, many services continue to survive. Hospitals keep busy as usual, and, while commissions may drop in real estate and insurance, employees often need not be laid off.

Second, during a recession, both consumers and business firms defer capital expenditures and instead fix up and make do with existing equipment. Thus, service jobs in maintenance and repair are created.

The Experience Economy

The nature of the service economy has moved past the transactional nature of services to one of experience-based relationships. Consider how Starbucks and Disney World have defined their respective services as an experience. Table 1.3 describes the features of different economies in the historical evolution from agrarian to experience. To appreciate the subtle differences, pay particular attention to the words used to describe each economy. Note that the *experience economy* is further divided into consumer services and business services.