

PART ONE

Chapter 1

STRATEGIC CHOICES 29

Chapter 2

Operations Strategy **29**

Supplement A

Decision Making **67**

PART TWO

PROCESS 91

Chapter 3

Process Management **91**

Chapter 4

Managing Project Processes **139**

Chapter 5

Managing Technology **189**

Supplement B

Computer-Integrated Manufacturing **231**

PART THREE

QUALITY 241

Chapter 6

Total Quality Management **241**

Chapter 7

Statistical Process Control **281**

PART FOUR

CAPACITY, LOCATION, AND LAYOUT 323

Chapter 8

Capacity **232**

Supplement C

Waiting Lines **359**

Supplement D

Simulation **381**

Chapter 9

Location **399**

Chapter 10

Layout **443**

PART FIVE

OPERATING DECISIONS 497

Chapter 11

Supply-Chain Management **497**

Chapter 12

Forecasting **539**

Chapter 13

Inventory Management **593**

Supplement E

Special Inventory Models **635**

Chapter 14

Aggregate Planning **651**

Supplement F

Linear Programming **693**

Chapter 15

Resource Planning **731**

Supplement G

Master Production Scheduling **783**

Chapter 16

Lean Systems **797**

Chapter 17

Scheduling **825**

Appendix 1

Normal Distribution **863**

Appendix 2

Table of Random Numbers **864**

Name Index **865**

Subject Index **869**

Photo Credits **883**

CD-ROM SUPPLEMENTS

Supplement H

Learning Curve Analysis **H.1**

Supplement I

Measuring Output Rates **I.1**

Supplement J

Acceptance Sampling Plans **J.1**

Supplement K

Financial Analysis **K.1**

MANAGERIAL PRACTICE 9.3

MARBLE BATHS VS. BARBECUE FOR CASINO

LOCATIONS 411

Locating a Single Facility **412**

Selecting On-Site Expansion, New Location, or Relocation **413**

Comparing Several Sites **413**

Applying the Load-Distance Method **414**

Using Break-Even Analysis **420**

Locating a Facility Within a Network of Facilities **421**

The Transportation Method **422**

Other Methods of Location Analysis **425**

Managing Location Across the Organization **426**

Discussion Questions **431**

Problems **431**

CASE: Imaginative Toys **439**

Chapter 10 Layout 443

What Is Layout Planning? **445**

Strategic Issues **446**

Layout Types **446**

MANAGERIAL PRACTICE 10.1

RETAILERS MATCH LAYOUTS TO STRATEGIES 447

Performance Criteria **450**

Creating Hybrid Layouts **452**

One Worker, Multiple Machines **452**

Group Technology **453**

Designing Process Layouts **455**

Step 1: Gather Information **455**

Step 2: Develop a Block Plan **457**

Step 3: Design a Detailed Layout **460**

Aids for Process Layout Decisions **460**

Warehouse Layouts **461**

MANAGERIAL PRACTICE 10.2

WAREHOUSE LAYOUTS AND E-COMMERCE 462

Office Layouts **465**

MANAGERIAL PRACTICE 10.3

TELECOMMUTING AT PACIFIC BELL 467

Designing Product Layouts **468**

Line Balancing **468**

Other Considerations **474**

Managing Layout Across the Organization **476**

Discussion Questions **481**

Problems **481**

CASE: Hightec, Inc. **491**

CASE: The Pizza Connection **493**

PART FIVE OPERATING DECISIONS 497

Chapter 11 Supply-Chain Management 497

Overview of Supply-Chain Management **499**

Supply Chains **500**

Supply Chains for Service Providers **502**

Developing Integrated Supply Chains **502**

MANAGERIAL PRACTICE 11.1

SUPPLY-CHAIN MANAGEMENT AT ARIZONA PUBLIC SERVICE 503

Managing the Customer Interface **506**

Order-Placement Process **506**

Order-Fulfillment Process **507**

MANAGERIAL PRACTICE 11.2

BEHAVIORAL CONSIDERATIONS IN DESIGNING THE ORDER-PLACEMENT PROCESS AT MERCURY MARINE 508

MANAGERIAL PRACTICE 11.3

CONTINUOUS REPLENISHMENT AT THE CAMPBELL SOUP COMPANY 509

Managing the Supplier Interface **510**

E-Purchasing **510**

MANAGERIAL PRACTICE 11.4

E-PURCHASING AT SAIRGROUP 512

Supplier Selection and Certification **513**

Supplier Relations **514**

Outsourcing **515**

Centralized Versus Localized Buying **516**

Value Analysis **516**

Measures of Supply-Chain Performance **517**

Inventory Measures **517**

Process Measures **519**

Links to Financial Measures **519**

Supply-Chain Links to Operations

Strategy **521**

Efficient Versus Responsive Supply Chains **521**

The Design of Efficient and Responsive Supply Chains **522**

MANAGERIAL PRACTICE 11.5

IMPROVING EFFICIENT SUPPLY CHAINS THROUGH MODULARIZATION 523

Supply-Chain Dynamics **524**

External Supply-Chain Causes **524**

Internal Supply-Chain Causes **525**

Supply-Chain Software **526**

Supply-Chain Management Across the Organization **527**

Discussion Questions **530**

Problems **531**

SIMULATION EXERCISES 533

CASE: Wolf Motors 534

EXPERIENTIAL LEARNING: Sonic

Distributors **535**

Chapter 12 Forecasting 539

Demand Characteristics **541**

Patterns of Demand **541**

Factors Affecting Demand **542**

Designing the Forecasting System **544**

Deciding What to Forecast **544**

*Choosing the Type of Forecasting
Technique* **545**

Forecasting with Computers **546**

MANAGERIAL PRACTICE 12.1

**WAL-MART USES THE INTERNET TO IMPROVE
FORECAST PERFORMANCE 547**

Judgment Methods **548**

Sales-Force Estimates **548**

Executive Opinion **548**

Market Research **549**

Delphi Method **549**

Guidelines for Using Judgment Forecasts **550**

Causal Methods: Linear Regression **550**

Time-Series Methods **554**

Naive Forecast **554**

Estimating the Average **555**

Including a Trend **559**

Seasonal Patterns **562**

Choosing a Time-Series Method **566**

Forecast Error **566**

Criteria for Selecting Time-Series Methods **570**

Using Multiple Techniques **573**

Combination Forecasts **573**

Focus Forecasting **573**

Forecasting Across the Organization **574**

Discussion Questions **582**

Problems **583**

CASE: Yankee Fork and Hoe Company 589

Chapter 13 Inventory Management 593

Inventory Concepts **595**

Pressures for Low Inventories **595**

Pressures for High Inventories **596**

Types of Inventory **597**

MANAGERIAL PRACTICE 13.1

**IMPROVING CUSTOMER SERVICE THROUGH INVENTORY
MANAGEMENT AT AMAZON.COM 598**

Inventory Reduction Tactics **600**

Placement of Manufacturing Inventories **601**

*Identifying Critical Inventory Items with ABC
Analysis* **601**

Economic Order Quantity **602**

Calculating the EOQ **603**

Understanding the Effect of Changes **607**

Inventory Control Systems **608**

Continuous Review (Q) System **608**

Periodic Review (P) System **615**

MANAGERIAL PRACTICE 13.2

IMPLEMENTING A PERIODIC REVIEW INVENTORY SYSTEM AT HEWLETT-PACKARD **618**

Comparative Advantages of the Q and P Systems **619**

Hybrid Systems **619**

Inventory Record Accuracy **620**

Inventory Management Across the Organization **620**

Discussion Questions **627**

Problems **627**

SIMULATION EXERCISES **632**

CASE: Parts Emporium **633**

Supplement E: Special Inventory Models **635**

Noninstantaneous Replenishment **636**

Quantity Discounts **638**

One-Period Decisions **641**

Problems **648**

SIMULATION EXERCISE **650**

Chapter 14 Aggregate Planning **651**

The Purpose of Aggregate Plans **653**

Aggregation **653**

MANAGERIAL PRACTICE 14.1

TYPICAL AGGREGATE PLANNING PROBLEMS **654**

Relationship to Other Plans **655**

Managerial Importance of Aggregate Plans **656**

Managerial Inputs **656**

Typical Objectives **656**

Reactive Alternatives **657**

Aggressive Alternatives **660**

Planning Strategies **660**

MANAGERIAL PRACTICE 14.2

HALLMARK'S LEVEL STRATEGY **662**

The Planning Process **663**

Determining Demand Requirements **663**

Identifying Alternatives, Constraints, and Costs **664**

Preparing an Acceptable Plan **664**

Implementing and Updating the Plan **665**

Aggregate Planning with Spreadsheets **665**

Level Strategy with Overtime and Undertime **665**

Chase Strategy with Hiring and Layoffs **668**

Mixed Strategies **669**

Aggregate Planning with Mathematical Methods **671**

Transportation Method of Production Planning **672**

Linear Programming for Production

Planning **677**

Managerial Considerations **678**

Aggregate Planning Across the Organization **678**

Discussion Questions **684**

Problems **684**

CASE: Memorial Hospital **689**

Supplement F: Linear Programming **693**

Basic Concepts **693**

Formulating a Problem **695**

Graphic Analysis **697**

Plot the Constraints **697**

Identify the Feasible Region **699**

Plot an Objective Function Line **701**

Find the Visual Solution **701**

Find the Algebraic Solution **703**

Slack and Surplus Variables **704**

Sensitivity Analysis **704**

Objective Function Coefficients **705**

Right-Hand-Side Parameters **708**

Computer Solution **711**

Simplex Method **711**

Computer Output **712**

Applications **715**

Discussion Questions **721**

Problems **722**

Chapter 15 Resource Planning **731**

Overview of Material Requirements Planning **733**

Dependent Demand **733**

*Benefits of Material Requirements
Planning* **734**

Inputs to Material Requirements Planning **735**

Bill of Materials **735**

Master Production Schedule **737**

Inventory Record **738**

Planning Factors **742**

Planning Lead Time **742**

Lot-Sizing Rules **742**

Safety Stock **745**

Outputs from Material Requirements Planning **746**

Material Requirements Planning Explosion **746**

Action Notices **749**

Capacity Reports **751**

Implementation Issues **754**

Links to Functional Areas **755**

MRP and the Environment **756**

MANAGERIAL PRACTICE 15.1

**IBM'S ROCHESTER PLANT USES MRP TO EXECUTE
ITS FAST TURN-AROUND STRATEGY** **757**

<i>Distribution Requirements Planning</i>	758
Service Resource Planning	759
<i>Dependent Demand</i>	759
<i>Bill of Resources</i>	760
MANAGERIAL PRACTICE 15.2	
RESOURCE PLANNING AT STARWOOD HOTELS & RESORTS WORLDWIDE	761
Resource Planning Across the Organization	763
<i>Discussion Questions</i>	767
<i>Problems</i>	767
CASE: Flashy Flashers, Inc.	777
Supplement G: Master Production Scheduling	783
Master Production Scheduling Process	783
Functional Interfaces	784
Developing a Master Production Schedule	784
Available-to-Promise Quantities	787
Freezing the MPS	788
<i>Discussion Questions</i>	792
<i>Problems</i>	792
Chapter 16 Lean Systems	797
Characteristics of Just-in-Time Operations	799
<i>Pull Method of Materials Flow</i>	799
<i>Consistently High Quality</i>	800
<i>Small Lot Sizes</i>	801
<i>Uniform Workstation Loads</i>	802
<i>Standardized Components and Work Methods</i>	803
<i>Close Supplier Ties</i>	803
<i>Flexible Workforce</i>	804
<i>Line Flows</i>	804
<i>Automated Production</i>	804
<i>Preventive Maintenance</i>	805
Continuous Improvement	805
The Kanban System	807
<i>General Operating Rules</i>	808
<i>Determining the Number of Containers</i>	808
<i>Other Kanban Signals</i>	810
JIT II	810
Lean Systems in Services	811
MANAGERIAL PRACTICE 16.1	
INTERNET GROCER WEBVAN USES JIT FOR ITS ORDER-FULFILLMENT PROCESS	812
Strategic Implications of Lean Systems	813
<i>Competitive Priorities</i>	813
<i>Flows</i>	813
<i>Operational Benefits</i>	814
Implementation Issues	814
<i>Organizational Considerations</i>	814
<i>Process Considerations</i>	815

Inventory and Scheduling **816**
Lean Systems Across the Organization **816**

MANAGERIAL PRACTICE 16.2

**IMPLEMENTING LEAN MANUFACTURING PRINCIPLES
AT CESSNA 817**

Discussion Questions **820**

Problems **820**

SIMULATION EXERCISE 822

CASE: Copper Kettle Catering 822

Chapter 17 Scheduling 825

Scheduling in Manufacturing **827**

Gantt Charts **828**

Performance Measures **829**

Job Shop Dispatching **830**

Sequencing Operations for One Machine **831**

Multiple-Workstation Scheduling **836**

*Sequencing Operations for a Two-Station Flow
Shop* **839**

Labor-Limited Environments **841**

*Linking Manufacturing Scheduling to the Supply
Chain* **841**

MANAGERIAL PRACTICE 17.1

**REAL-TIME SCHEDULING IN CHRYSLER'S APS
SYSTEM 842**

Scheduling in Services **843**

Scheduling Customer Demand **843**

Scheduling the Workforce **844**

MANAGERIAL PRACTICE 17.2

**COURSE SCHEDULING AT THE UNIVERSITY OF
CALIFORNIA, LOS ANGELES 848**

Scheduling Across the Organization **848**

Discussion Questions **856**

Problems **856**

SIMULATION EXERCISES 860

CASE: Food King 861

Appendix 1 Normal Distribution **863**

Appendix 2 Table of Random Numbers **864**

Name Index **865**

Subject Index **869**

Photo Credits **883**

CD-ROM SUPPLEMENTS

Supplement H: Learning Curve Analysis **H.1**

Supplement I: Measuring Output Rates **I.1**

Supplement J: Acceptance Sampling Plans **J.1**

Supplement K: Financial Analysis **K.1**