

Thirteenth Edition

OPERATIONS MANAGEMENT

Sustainability and Supply Chain Management



Jay Heizer Barry Render Chuck Munson

To Kay Heizer, always at my side

J.H.

To Horace Dawson and David Greenberg

B.R.

**To Kim, Christopher, and Mark Munson for their unwavering support,
and to Bentonville High School teachers Velma Reed and Cheryl Gregory,
who instilled in me the importance of detail and a love of learning**

C.M.

Brief Table of Contents

PART ONE	Introduction to Operations Management	1
Chapter 1	Operations and Productivity	1
Chapter 2	Operations Strategy in a Global Environment	29
Chapter 3	Project Management	59
Chapter 4	Forecasting	105
PART TWO	Designing Operations	159
Chapter 5	Design of Goods and Services	159
◆	Supplement 5 Sustainability in the Supply Chain	193
Chapter 6	Managing Quality	213
◆	Supplement 6 Statistical Process Control	245
Chapter 7	Process Strategies	279
◆	Supplement 7 Capacity and Constraint Management	307
Chapter 8	Location Strategies	337
Chapter 9	Layout Strategies	367
Chapter 10	Human Resources, Job Design, and Work Measurement	407
PART THREE	Managing Operations	441
Chapter 11	Supply Chain Management	441
◆	Supplement 11 Supply Chain Management Analytics	471
Chapter 12	Inventory Management	487
Chapter 13	Aggregate Planning and S&OP	531
Chapter 14	Material Requirements Planning (MRP) and ERP	565
Chapter 15	Short-Term Scheduling	603
Chapter 16	Lean Operations	641
Chapter 17	Maintenance and Reliability	665
PART FOUR	Business Analytics Modules	683
Module A	Decision-Making Tools	683
Module B	Linear Programming	703
Module C	Transportation Models	733
Module D	Waiting-Line Models	751
Module E	Learning Curves	779
Module F	Simulation	795
Module G	Applying Analytics to Big Data in Operations Management	813
APPENDIXES		
Appendix I	Normal Curve Areas	A2
Appendix II	Using Excel OM and POM for Windows	A4
Appendix III	Solutions to Even-Numbered Problems	A8

ONLINE TUTORIALS (located at [MyLab Operations Management](#))

- 1. Statistical Tools for Managers T1-1**
- 2. Acceptance Sampling T2-1**
- 3. The Simplex Method of Linear Programming T3-1**
- 4. The MODI and VAM Methods of Solving Transportation Problems T4-1**
- 5. Vehicle Routing and Scheduling T5-1**

Table of Contents

Preface	xix
About the Authors	xxvi

PART ONE Introduction to Operations Management

1

Chapter 1 Operations and Productivity 1

GLOBAL COMPANY PROFILE: <i>Hard Rock Cafe: Operations Management at Hard Rock Cafe</i>	2
What Is Operations Management?	4
Organizing to Produce Goods and Services	4
The Supply Chain	6
Why Study OM?	6
What Operations Managers Do	7
The Heritage of Operations Management	8
Operations for Goods and Services	11
<i>Growth of Services</i>	11
<i>Service Pay</i>	12
The Productivity Challenge	13
OM in Action: <i>Improving Productivity at Starbucks</i>	14
<i>Productivity Measurement</i>	14
<i>Productivity Variables</i>	15
<i>Productivity and the Service Sector</i>	17
OM in Action: <i>Taco Bell Improves Productivity and Goes Green to Lower Costs</i>	18
Current Challenges in Operations Management	18
Ethics, Social Responsibility, and Sustainability	19
Summary	20
Key Terms	20
Ethical Dilemma	20
Discussion Questions	20
Using Software for Productivity Analysis	21
Solved Problems	21
Problems	22
CASE STUDY	24
<i>Uber Technologies, Inc.</i>	24
VIDEO CASE STUDIES	24
<i>Frito-Lay: Operations Management in Manufacturing</i>	24
<i>Hard Rock Cafe: Operations Management in Services</i>	25
<i>Celebrity Cruises: Operations Management at Sea</i>	26
Endnotes	26
Bibliography	26
Chapter 1 Rapid Review	27
Self Test	28

Chapter 2 Operations Strategy in a Global Environment 29

GLOBAL COMPANY PROFILE: <i>Boeing: Boeing's Global Supply-Chain Strategy Yields Competitive Advantage</i>	30
A Global View of Operations and Supply Chains	32
<i>Cultural and Ethical Issues</i>	35
Determining Missions and Strategies	35
<i>Mission</i>	35
<i>Strategy</i>	35
Achieving Competitive Advantage Through Operations	36
<i>Competing on Differentiation</i>	36
<i>Competing on Cost</i>	38
<i>Competing on Response</i>	38
Issues in Operations Strategy	40
Strategy Development and Implementation	41
OM in Action: <i>Amazon Updates Sears' Strategy</i>	41
<i>Key Success Factors and Core Competencies</i>	42
<i>Integrating OM with Other Activities</i>	43
<i>Building and Staffing the Organization</i>	43
<i>Implementing the 10 Strategic OM Decisions</i>	44
Strategic Planning, Core Competencies, and Outsourcing	44
<i>The Theory of Comparative Advantage</i>	46
<i>Risks of Outsourcing</i>	46
OM in Action: <i>China Outsources, too—to Ethiopia</i>	46
<i>Rating Outsource Providers</i>	47
Global Operations Strategy Options	48
Summary	50
Key Terms	50
Ethical Dilemma	50
Discussion Questions	50
Using Software to Solve Outsourcing Problems	51
Solved Problems	52
Problems	53

CASE STUDY 54*Rapid-Lube 54***VIDEO CASE STUDIES 55***Strategy at Regal Marine 55**Hard Rock Cafe's Global Strategy 55**Outsourcing Offshore at Darden 56*

Endnotes 56

Bibliography 56

Chapter 2 Rapid Review 57

Self Test 58

Chapter 3 Project Management 59**GLOBAL COMPANY PROFILE: Bechtel Group: Project Management Provides a Competitive Advantage for Bechtel 60**

The Importance of Project Management 62

Project Planning 62

*The Project Manager 63**Work Breakdown Structure 64*

Project Scheduling 65

OM in Action: Delta's Ground Crew Orchestrates a Smooth Takeoff 66

Project Controlling 66

Project Management Techniques: PERT and CPM 67

*The Framework of PERT and CPM 67**Network Diagrams and Approaches 68**Activity-on-Node Example 69**Activity-on-Arrow Example 71*

Determining the Project Schedule 71

*Forward Pass 72**Backward Pass 74**Calculating Slack Time and Identifying the Critical Path(s) 75*

Variability in Activity Times 77

*Three Time Estimates in PERT 77**Probability of Project Completion 79*

Cost-Time Trade-Offs and Project Crashing 82

A Critique of PERT and CPM 85

OM in Action: Behind the Tour de France 85

Using Microsoft Project to Manage Projects 86

Summary 88

Key Terms 89

Ethical Dilemma 89

Discussion Questions 89

Using Software to Solve Project Management Problems 90

Solved Problems 91

Problems 94

VIDEO CASE STUDIES 100*Project Management at Arnold Palmer Hospital 100**Managing Hard Rock's Rockfest 101*

Endnotes 102

Bibliography 102

Chapter 3 Rapid Review 103

Self Test 104

Chapter 4 Forecasting 105**GLOBAL COMPANY PROFILE: Walt Disney Parks & Resorts: Forecasting Provides a Competitive Advantage for Disney 106**

What Is Forecasting? 108

*Forecasting Time Horizons 108**Types of Forecasts 109*

The Strategic Importance of Forecasting 109

*Supply Chain Management 109**Human Resources 110**Capacity 110*

Seven Steps in the Forecasting System 110

Forecasting Approaches 111

*Overview of Qualitative Methods 111**Overview of Quantitative Methods 112*

Time-Series Forecasting 112

*Decomposition of a Time Series 112**OM in Action: Forecasting at Olive Garden 113**Naive Approach 113**Moving Averages 114**Exponential Smoothing 116**Measuring Forecast Error 117**Exponential Smoothing with Trend Adjustment 120**Trend Projections 124**Seasonal Variations in Data 126**Cyclical Variations in Data 131*

Associative Forecasting Methods: Regression and Correlation Analysis 131

*Using Regression Analysis for Forecasting 131**Standard Error of the Estimate 133**Correlation Coefficients for Regression Lines 134**Multiple Regression Analysis 136**OM in Action: NYC's Potholes and Regression Analysis 137*

Monitoring and Controlling Forecasts 138

*Adaptive Smoothing 139**Focus Forecasting 139*

Forecasting in the Service Sector 140

Summary 141

Key Terms 141

Ethical Dilemma 141

Discussion Questions 142

Using Software in Forecasting 142

Solved Problems 144

Problems 146

CASE STUDY	153
<i>Southwestern University: (B)</i>	153
VIDEO CASE STUDIES	154
<i>Forecasting Ticket Revenue for Orlando Magic Basketball Games</i>	154
<i>Forecasting at Hard Rock Cafe</i>	155

Endnotes	156
Bibliography	156
Chapter 4 Rapid Review	157
Self Test	158

PART TWO Designing Operations

159

Chapter 5 Design of Goods and Services 159

GLOBAL COMPANY PROFILE: <i>Regal Marine: Product Strategy Provides Competitive Advantage at Regal Marine</i>	160
Goods and Services Selection	162
<i>Product Strategy Options Support Competitive Advantage</i>	163
<i>Product Life Cycles</i>	164
<i>Life Cycle and Strategy</i>	164
<i>Product-by-Value Analysis</i>	165
Generating New Products	165
Product Development	166
<i>Product Development System</i>	166
<i>Quality Function Deployment (QFD)</i>	166
<i>Organizing for Product Development</i>	169
<i>Manufacturability and Value Engineering</i>	170
Issues for Product Design	170
<i>Robust Design</i>	170
<i>Modular Design</i>	171
<i>Computer-Aided Design (CAD) and Computer-Aided Manufacturing (CAM)</i>	171
<i>Virtual Reality Technology</i>	172
<i>Value Analysis</i>	173
<i>Sustainability and Life Cycle Assessment (LCA)</i>	173
Product Development Continuum	173
<i>OM in Action: Product Design at McDonald's</i>	174
<i>Purchasing Technology by Acquiring a Firm</i>	175
<i>Joint Ventures</i>	175
<i>Alliances</i>	175
Defining a Product	175
<i>Make-or-Buy Decisions</i>	176
<i>Group Technology</i>	177
Documents for Production	178
<i>Product Life-Cycle Management (PLM)</i>	178
Service Design	179
<i>Designing More Efficient Services</i>	180
<i>OM in Action: Amazon Pushes Product Design</i>	180
<i>Documents for Services</i>	181
Application of Decision Trees to Product Design	182
Transition to Production	183
Summary	184
Key Terms	184

Ethical Dilemma	185
Discussion Questions	185
Solved Problem	185
Problems	186
CASE STUDY	188
<i>De Mar's Product Strategy</i>	188
VIDEO CASE STUDIES	189
<i>Product Design at Regal Marine</i>	189
<i>Celebrity Cruises Designs a New Ship</i>	189
Endnotes	190
Bibliography	190
Chapter 5 Rapid Review	191
Self Test	192
Supplement 5 Sustainability in the Supply Chain 193	
Corporate Social Responsibility	194
Sustainability	194
<i>Systems View</i>	194
<i>Commons</i>	194
<i>Triple Bottom Line</i>	195
<i>OM in Action: Blue Jeans and Sustainability</i>	196
Design and Production for Sustainability	197
<i>Product Design</i>	197
<i>Production Process</i>	200
<i>Logistics</i>	200
<i>End-of-Life Phase</i>	202
Regulations and Industry Standards	202
<i>OM in Action: Designing for End of Life</i>	203
<i>International Environmental Policies and Standards</i>	203
<i>OM in Action: Subaru's Clean, Green Set of Wheels with ISO 14001 and ISO 50001</i>	204
Summary	205
Key Terms	205
Discussion Questions	205
Solved Problems	205
Problems	206
VIDEO CASE STUDIES	208
<i>Building Sustainability at the Orlando Magic's Amway Center</i>	208
<i>Green Manufacturing and Sustainability at Frito-Lay</i>	209
<i>"Saving the Waves" at Celebrity Cruises</i>	209

Endnotes 210
 Bibliography 210
 Supplement 5 Rapid Review 211
 Self Test 212

Chapter 6 Managing Quality 213

GLOBAL COMPANY PROFILE: Arnold Palmer Hospital: Managing Quality Provides a Competitive Advantage at Arnold Palmer Hospital 214

Quality and Strategy 216
 Defining Quality 217
 Implications of Quality 217
 Malcolm Baldrige National Quality Award 218
 ISO 9000 International Quality Standards 218
 Cost of Quality (COQ) 218
 Ethics and Quality Management 219
 Total Quality Management 219
 Continuous Improvement 220
 Six Sigma 220
 Employee Empowerment 221
 Benchmarking 222
 Just-in-Time (JIT) 223
 Taguchi Concepts 223
 OM in Action: A Hospital Benchmarks against the Ferrari Racing Team? 223
 Knowledge of TQM Tools 224
 Tools of TQM 225
 Check Sheets 225
 Scatter Diagrams 226
 Cause-and-Effect Diagrams 226
 Pareto Charts 226
 Flowcharts 227
 Histograms 228
 Statistical Process Control (SPC) 228

The Role of Inspection 229
 When and Where to Inspect 229
 OM in Action: OM in Action: Inspecting the Boeing 787 230
 Source Inspection 231
 Service Industry Inspection 231
 Inspection of Attributes versus Variables 231
 OM in Action: Safe Patients, Smart Hospitals 231

TQM in Services 232
 OM in Action: Richey International's Spies 234
 Summary 234
 Key Terms 234
 Ethical Dilemma 235
 Discussion Questions 235
 Solved Problems 235
 Problems 236

CASE STUDY 238
 Southwestern University: (C) 238
VIDEO CASE STUDIES 239
 The Culture of Quality at Arnold Palmer Hospital 239
 Quality Counts at Alaska Airlines 239
 Celebrity Cruises: A Premium Experience 241
 Endnote 242
 Bibliography 242
 Chapter 6 Rapid Review 243
 Self Test 244

Supplement 6 Statistical Process Control 245

Statistical Process Control (SPC) 246
 Control Charts for Variables 247
 The Central Limit Theorem 247
 Setting Mean Chart Limits (\bar{x} -Charts) 249
 Setting Range Chart Limits (R-Charts) 252
 Using Mean and Range Charts 253
 Control Charts for Attributes 255
 OM in Action: Trying to Land a Seat with Frequent Flyer Miles 257
 Managerial Issues and Control Charts 258
 Process Capability 259
 Process Capability Ratio (C_p) 259
 Process Capability Index (C_{pk}) 260
 Acceptance Sampling 261
 Operating Characteristic Curve 262
 Average Outgoing Quality 263
 Summary 264
 Key Terms 264
 Discussion Questions 264
 Using Software for SPC 265
 Solved Problems 266
 Problems 267
CASE STUDY 273
 Bayfield Mud Company 273
VIDEO CASE STUDIES 274
 Frito-Lay's Quality-Controlled Potato Chips 274
 Farm to Fork: Quality at Darden Restaurants 275
 Endnotes 275
 Bibliography 276
 Supplement 6 Rapid Review 277
 Self Test 278

Chapter 7 Process Strategies 279

GLOBAL COMPANY PROFILE: Harley-Davidson: Repetitive Manufacturing Works at Harley-Davidson 280
 Four Process Strategies 282
 Process Focus 282
 Repetitive Focus 283
 Product Focus 284
 Mass Customization Focus 284

OM in Action: Mass Customization for Straight Teeth 285
Process Comparison 286
 Selection of Equipment 288
 Process Analysis and Design 289
 Flowchart 289
 Time-Function Mapping 289
 Process Charts 290
 Value-Stream Mapping 290
 Service Blueprinting 292
 Special Considerations for Service Process Strategies 293
 Production Technology 294
 Machine Technology 294
 Automatic Identification Systems (AISs) and RFID 295
 Process Control 295
 OM in Action: 500,000 Tons of Steel; 14 Jobs 296
 Vision Systems 296
 Robots 296
 Automated Storage and Retrieval Systems (ASRSs) 296
 Automated Guided Vehicles (AGVs) 296
 Flexible Manufacturing Systems (FMSs) 297
 Computer-Integrated Manufacturing (CIM) 297
 OM in Action: Technology Changes the Hotel Industry 298
 Technology in Services 298
 Process Redesign 298
 Summary 299
 Key Terms 299
 Ethical Dilemma 300
 Discussion Questions 300
 Solved Problem 300
 Problems 301
CASE STUDY 302
 Rochester Manufacturing's Process Decision 302
VIDEO CASE STUDIES 302
 Process Strategy at Wheeled Coach 302
 Alaska Airlines: 20-Minute Baggage Process—Guaranteed! 303
 Process Analysis at Arnold Palmer Hospital 303
 Endnotes 304
 Bibliography 304
 Chapter 7 Rapid Review 305
 Self Test 306

Supplement 7 Capacity and Constraint Management 307

Capacity 308
 Design and Effective Capacity 308
 Capacity and Strategy 310
 Capacity Considerations 311
 Managing Demand 311

OM in Action: Matching Airline Capacity to Demand 312
Service-Sector Demand and Capacity Management 313
 Bottleneck Analysis and the Theory of Constraints 313
 Theory of Constraints 316
 Bottleneck Management 317
 Break-Even Analysis 317
 Single-Product Case 318
 Multiproduct Case 319
 Reducing Risk with Incremental Changes 321
 Applying Expected Monetary Value (EMV) to Capacity Decisions 322
 Applying Investment Analysis to Strategy-Driven Investments 323
 Investment, Variable Cost, and Cash Flow 323
 Net Present Value 323
 Summary 325
 Key Terms 326
 Discussion Questions 326
 Using Software for Break-Even Analysis 326
 Solved Problems 327
 Problems 329
VIDEO CASE STUDY 333
 Capacity Planning at Arnold Palmer Hospital 333
 Bibliography 334
 Supplement 7 Rapid Review 335
 Self Test 336

Chapter 8 Location Strategies 337

GLOBAL COMPANY PROFILE: FedEx: Location Provides Competitive Advantage for FedEx 338
 The Strategic Importance of Location 340
 Factors That Affect Location Decisions 341
 Labor Productivity 342
 Exchange Rates and Currency Risk 342
 Costs 342
 OM in Action: Iowa—Home of Corn and Facebook 343
 Political Risk, Values, and Culture 343
 Proximity to Markets 343
 Proximity to Suppliers 344
 Proximity to Competitors (Clustering) 344
 Methods of Evaluating Location Alternatives 344
 OM in Action: Denmark's Meat Cluster 345
 The Factor-Rating Method 345
 Locational Cost-Volume Analysis 346
 Center-of-Gravity Method 348
 Transportation Model 349
 Service Location Strategy 350
 OM in Action: How La Quinta Selects Profitable Hotel Sites 351
 Geographic Information Systems 351
 Summary 353

Key Terms 353
Ethical Dilemma 354
Discussion Questions 354
Using Software to Solve Location Problems 354
Solved Problems 355
Problems 357
CASE STUDY 362
Southern Recreational Vehicle Company 362
VIDEO CASE STUDIES 363
Locating the Next Red Lobster Restaurant 363
Where to Place the Hard Rock Cafe 363
Endnote 364
Bibliography 364
Chapter 8 Rapid Review 365
Self Test 366

Chapter 9 Layout Strategies 367

GLOBAL COMPANY PROFILE: McDonald's: McDonald's Looks for Competitive Advantage through Layout 368
The Strategic Importance of Layout Decisions 370
Types of Layout 370
Office Layout 371
Retail Layout 372
Servicescapes 375
Warehouse and Storage Layouts 375
OM in Action: Amazon Warehouses Are Full of Robots 376
Cross-Docking 376
Random Stocking 377
Customizing 377
Fixed-Position Layout 377
Process-Oriented Layout 378
Computer Software for Process-Oriented Layouts 382
Focused Facilities 383
Work Cells 383
Focused Work Center 385
Focused Factory 385
Repetitive and Product-Oriented Layout 385
Assembly-Line Balancing 386
Summary 391
Key Terms 391
Ethical Dilemma 391
Discussion Questions 391
Using Software to Solve Layout Problems 392
Solved Problems 393
Problems 395
CASE STUDY 401
State Automobile License Renewals 401
VIDEO CASE STUDIES 402
Laying Out Arnold Palmer Hospital's New Facility 402
Facility Layout at Wheeled Coach 403

Bibliography 404
Chapter 9 Rapid Review 405
Self Test 406

Chapter 10 Human Resources, Job Design, and Work Measurement 407

GLOBAL COMPANY PROFILE: NASCAR's Racing Teams: High-Performance Teamwork Makes the Difference between Winning and Losing 408
Human Resource Strategy for Competitive Advantage 410
Constraints on Human Resource Strategy 410
Labor Planning 411
Employment-Stability Policies 411
Work Schedules 411
Job Classifications and Work Rules 412
Job Design 412
Labor Specialization 412
Job Expansion 413
Psychological Components of Job Design 413
Self-Directed Teams 414
OM in Action: Using Incentives to Unsnarl Traffic Jams in the OR 415
Motivation and Incentive Systems 415
Ergonomics and the Work Environment 415
OM in Action: The Missing Perfect Chair 416
Methods Analysis 417
The Visual Workplace 420
Labor Standards 420
Historical Experience 421
Time Studies 421
Predetermined Time Standards 425
OM in Action: UPS: The Tightest Ship in the Shipping Business 426
Work Sampling 427
Ethics 430
Summary 430
Key Terms 430
Ethical Dilemma 431
Discussion Questions 431
Solved Problems 432
Problems 434
CASE STUDY 437
Jackson Manufacturing Company 437
VIDEO CASE STUDIES 437
The "People" Focus: Human Resources at Alaska Airlines 437
Hard Rock's Human Resource Strategy 438
Bibliography 438
Chapter 10 Rapid Review 439
Self Test 440

PART THREE Managing Operations**441****Chapter 11 Supply Chain Management 441**

GLOBAL COMPANY PROFILE: Red Lobster: Red Lobster's Supply Chain Yields a Competitive Advantage 442

The Supply Chain's Strategic Importance 444

OM in Action: A Rose Is a Rose, But Only If It Is Fresh 446

Sourcing Issues: Make-or-Buy and Outsourcing 446

Make-or-Buy Decisions 447

Outsourcing 447

Six Sourcing Strategies 447

Many Suppliers 447

Few Suppliers 447

OM in Action: The Complex Supply Chain for Apple and Samsung 448

Vertical Integration 448

Joint Ventures 449

Keiretsu Networks 449

Virtual Companies 449

Supply Chain Risk 449

Risks and Mitigation Tactics 450

Security and JIT 451

Managing the Integrated Supply Chain 451

Issues in Managing the Integrated Supply Chain 451

Opportunities in Managing the Integrated Supply Chain 452

Building the Supply Base 453

Supplier Evaluation 454

Supplier Development 454

Negotiations 454

Contracting 455

Centralized Purchasing 455

E-Procurement 455

Logistics Management 456

Shipping Systems 456

Warehousing 457

Third-Party Logistics (3PL) 457

OM in Action: DHL's Role in the Supply Chain 458

Distribution Management 458

Ethics and Sustainable Supply Chain Management 459

Supply Chain Management Ethics 459

Establishing Sustainability in Supply Chains 460

Measuring Supply Chain Performance 460

Assets Committed to Inventory 460

Benchmarking the Supply Chain 462

The SCOR Model 463

Summary 464

Key Terms 464

Ethical Dilemma 464

Discussion Questions 464

Solved Problem 465

Problems 465

VIDEO CASE STUDIES 467

Darden's Global Supply Chains 467

Supply Chain Management at Regal Marine 467

Arnold Palmer Hospital's Supply Chain 468

Bibliography 468

Chapter 11 Rapid Review 469

Self Test 470

Supplement 11 Supply Chain Management Analytics 471

Techniques for Evaluating Supply Chains 472

Evaluating Disaster Risk in the Supply Chain 472

Managing the Bullwhip Effect 473

A Bullwhip Effect Measure 474

OM in Action: RFID Helps Control the Bullwhip 475

Supplier Selection Analysis 476

Transportation Mode Analysis 477

Warehouse Storage 477

Summary 479

Discussion Questions 479

Solved Problems 479

Problems 481

Bibliography 484

Supplement 11 Rapid Review 485

Self Test 486

Chapter 12 Inventory Management 487

GLOBAL COMPANY PROFILE: Amazon.com: Inventory Management Provides Competitive Advantage at Amazon.com 488

The Importance of Inventory 490

Functions of Inventory 490

Types of Inventory 490

Managing Inventory 491

ABC Analysis 491

OM in Action: Inventory Accuracy at Milton Bradley 493

Record Accuracy 493

Cycle Counting 493

Control of Service Inventories 494

OM in Action: Retail's Last 10 Yards 495

Inventory Models 495

Independent vs. Dependent Demand 495

Holding, Ordering, and Setup Costs 495

Inventory Models for Independent Demand 496
The Basic Economic Order Quantity (EOQ) Model 496
Minimizing Costs 497
Reorder Points 501
Production Order Quantity Model 502
Quantity Discount Models 505
 Probabilistic Models and Safety Stock 508
Other Probabilistic Models 511
 Single-Period Model 513
 Fixed-Period (*P*) Systems 514
 Summary 515
 Key Terms 515
 Ethical Dilemma 515
 Discussion Questions 515
 Using Software to Solve Inventory Problems 516
 Solved Problems 517
 Problems 520
CASE STUDY 525
Zhou Bicycle Company 525
VIDEO CASE STUDIES 526
Managing Inventory at Frito-Lay 526
Inventory Management at Celebrity Cruises 526
Inventory Control at Wheeled Coach 527
 Endnotes 528
 Bibliography 528
 Chapter 12 Rapid Review 529
 Self Test 530

Chapter 13 Aggregate Planning and S&OP 531

GLOBAL COMPANY PROFILE: Frito-Lay: Aggregate Planning Provides a Competitive Advantage at Frito-Lay 532
 The Planning Process 534
 Sales and Operations Planning 535
 The Nature of Aggregate Planning 536
OM in Action: Building the Plan at Snapper 537
 Aggregate Planning Strategies 537
Capacity Options 537
Demand Options 538
Mixing Options to Develop a Plan 539
 Methods for Aggregate Planning 540
Graphical Methods 540
Mathematical Approaches 545
 Aggregate Planning in Services 547
Restaurants 548
Hospitals 548
National Chains of Small Service Firms 548
Miscellaneous Services 548
Airline Industry 549
 Revenue Management 549
OM in Action: Revenue Management Makes Disney the “King” of the Broadway Jungle 550

Summary 552
 Key Terms 552
 Ethical Dilemma 553
 Discussion Questions 553
 Using Software for Aggregate Planning 554
 Solved Problems 556
 Problems 557
CASE STUDY 561
Andrew-Carter, Inc. 561
VIDEO CASE STUDY 562
Using Revenue Management to Set Orlando Magic Ticket Prices 562
 Bibliography 562
 Chapter 13 Rapid Review 563
 Self Test 564

Chapter 14 Material Requirements Planning (MRP) and ERP 565

GLOBAL COMPANY PROFILE: Wheeled Coach: MRP Provides a Competitive Advantage for Wheeled Coach 566
 Dependent Demand 568
 Dependent Inventory Model Requirements 568
Master Production Schedule 569
Bills of Material 570
Accurate Inventory Records 572
Purchase Orders Outstanding 572
Lead Times for Components 572
 MRP Structure 573
 MRP Management 577
MRP Dynamics 577
MRP Limitations 578
 Lot-Sizing Techniques 578
 Extensions of MRP 582
Material Requirements Planning II (MRP II) 582
Closed-Loop MRP 583
Capacity Planning 583
 MRP in Services 585
Distribution Resource Planning (DRP) 586
 Enterprise Resource Planning (ERP) 586
OM in Action: Managing Benetton with ERP Software 587
ERP in the Service Sector 589
 Summary 589
 Key Terms 589
 Ethical Dilemma 589
 Discussion Questions 590
 Using Software to Solve MRP Problems 590
 Solved Problems 591
 Problems 594

CASE STUDY 598*Hill's Automotive, Inc.* 598**VIDEO CASE STUDIES 598***When 18,500 Orlando Magic Fans Come to Dinner* 598*MRP at Wheeled Coach* 599

Endnotes 599

Bibliography 600

Chapter 14 Rapid Review 601

Self Test 602

Chapter 15 Short-Term Scheduling 603**GLOBAL COMPANY PROFILE: Alaska Airlines: Scheduling Flights When Weather Is the Enemy 604**

The Importance of Short-Term Scheduling 606

Scheduling Issues 606

Forward and Backward Scheduling 607*OM in Action: Prepping for the Orlando Magic Basketball Game* 608*Finite and Infinite Loading* 608*Scheduling Criteria* 608

Scheduling Process-Focused Facilities 609

Loading Jobs 609

Input-Output Control 610*Gantt Charts* 611*Assignment Method* 612

Sequencing Jobs 615

Priority Rules for Sequencing Jobs 615*Critical Ratio* 618*Sequencing N Jobs on Two Machines: Johnson's Rule* 619*Limitations of Rule-Based Sequencing Systems* 620

Finite Capacity Scheduling (FCS) 621

Scheduling Services 622

OM in Action: Starbucks' Controversial Scheduling Software 623*Scheduling Service Employees with Cyclical Scheduling* 623

Summary 625

Key Terms 625

Ethical Dilemma 625

Discussion Questions 625

Using Software for Short-Term Scheduling 626

Solved Problems 628

Problems 630

CASE STUDY 634*Old Oregon Wood Store* 634**VIDEO CASE STUDIES 635***From the Eagles to the Magic: Converting the Amway Center* 635*Scheduling at Hard Rock Cafe* 637

Endnotes 638

Bibliography 638

Chapter 15 Rapid Review 639

Self Test 640

Chapter 16 Lean Operations 641**GLOBAL COMPANY PROFILE: Toyota Motor Corporation: Achieving Competitive Advantage with Lean Operations at Toyota Motor Corporation 642**

Lean Operations 644

Eliminate Waste 644*OM in Action: Toyota's New Challenge* 645*Remove Variability* 646*Improve Throughput* 646

Lean and Just-in-Time 646

Supplier Partnerships 647*Lean Layout* 648*Lean Inventory* 649*Lean Scheduling* 652*Lean Quality* 655

Lean and the Toyota Production System 655

Continuous Improvement 655*Respect for People* 655*OM in Action: Dr Pepper's Move to Kaizen* 655*Processes and Standard Work Practice* 656

Lean Organizations 656

Building a Lean Organization 656*OM in Action: Lean Delivers the Medicine* 657*Lean Sustainability* 657

Lean in Services 657

Summary 658

Key Terms 658

Ethical Dilemma 659

Discussion Questions 659

Solved Problem 659

Problems 660

VIDEO CASE STUDIES 661*Lean Operations at Alaska Airlines* 661*JIT at Arnold Palmer Hospital* 661

Endnote 662

Bibliography 662

Chapter 16 Rapid Review 663

Self Test 664

Chapter 17 Maintenance and Reliability 665**GLOBAL COMPANY PROFILE: Orlando Utilities Commission: Maintenance Provides a Competitive Advantage for the Orlando Utilities Commission 666**

The Strategic Importance of Maintenance and Reliability 668

Reliability 669

System Reliability 669
 Providing Redundancy 671
 Maintenance 673
 Implementing Preventive Maintenance 673
 Increasing Repair Capabilities 676
 Autonomous Maintenance 676
 Total Productive Maintenance 677
 Summary 677
 Key Terms 677
 Ethical Dilemma 677

Discussion Questions 677
 Using Software to Solve Reliability Problems 678
 Solved Problems 678
 Problems 678
VIDEO CASE STUDY 680
 Maintenance Drives Profits at Frito-Lay 680
 Bibliography 680
 Chapter 17 Rapid Review 681
 Self Test 682

PART FOUR Business Analytics Modules

Module A Decision-Making Tools 683

The Decision Process in Operations 684
 Fundamentals of Decision Making 684
 Decision Tables 685
 Types of Decision-Making Environments 686
 Decision Making Under Uncertainty 686
 Decision Making Under Risk 687
 Decision Making Under Certainty 688
 Expected Value of Perfect Information (EVPI) 688
 Decision Trees 690
 A More Complex Decision Tree 691
 Summary 693
 Key Terms 693
 Discussion Questions 693
 Using Software for Decision Models 693
 Solved Problems 695
 Problems 696
CASE STUDY 700
 Tom Thompson's Liver Transplant 700
 Endnote 700
 Bibliography 700
 Module A Rapid Review 701
 Self Test 702

Sensitivity Analysis 709
 Sensitivity Report 710
 Changes in the Resources or Right-Hand-Side Values 710
 Changes in the Objective Function Coefficient 711
 Solving Minimization Problems 712
 OM in Action: LP at UPS 713
 Linear Programming Applications 714
 Production-Mix Example 714
 Diet Problem Example 715
 Labor Scheduling Example 716
 The Simplex Method of LP 717
 Integer and Binary Variables 717
 Creating Integer and Binary Variables 717
 Linear Programming Applications with Binary Variables 718
 A Fixed-Charge Integer Programming Problem 719
 Summary 720
 Key Terms 720
 Discussion Questions 720
 Using Software to Solve LP Problems 720
 Solved Problems 722
 Problems 724
CASE STUDY 729
 Quain Lawn and Garden, Inc. 729

VIDEO CASE STUDY 729
 Scheduling Challenges at Alaska Airlines 729
 Endnotes 730
 Bibliography 730
 Module B Rapid Review 731
 Self Test 732

Module B Linear Programming 703

Why Use Linear Programming? 704
 Requirements of a Linear Programming Problem 704
 Formulating Linear Programming Problems 704
 Glickman Electronics Example 705
 Graphical Solution to a Linear Programming Problem 706
 Graphical Representation of Constraints 706
 Iso-Profit Line Solution Method 707
 Corner-Point Solution Method 709

Module C Transportation Models 733

Transportation Modeling 734
 Developing an Initial Solution 735
 The Northwest-Corner Rule 735
 The Intuitive Lowest-Cost Method 737

The Stepping-Stone Method	738
Special Issues in Modeling	741
<i>Demand Not Equal to Supply</i>	741
<i>Degeneracy</i>	741
Summary	742
Key Terms	742
Discussion Questions	742
Using Software to Solve Transportation Problems	742
Solved Problems	744
Problems	745
CASE STUDY	747
<i>Custom Vans, Inc.</i>	747
Bibliography	748
Module C Rapid Review	749
Self Test	750
Module D Waiting-Line Models	751
Queuing Theory	752
Characteristics of a Waiting-Line System	752
<i>Arrival Characteristics</i>	752
<i>Waiting-Line Characteristics</i>	754
<i>Service Characteristics</i>	754
<i>Measuring a Queue's Performance</i>	756
<i>OM in Action: Zero Wait Time Guarantee at This Michigan Hospital's ER</i>	756
Queuing Costs	757
The Variety of Queuing Models	757
<i>Model A (M/M/1): Single-Server Queuing Model with Poisson Arrivals and Exponential Service Times</i>	758
<i>Model B (M/M/S): Multiple-Server Queuing Model</i>	760
<i>Model C (M/D/1): Constant-Service-Time Model</i>	765
<i>Little's Law</i>	766
<i>Model D (M/M/1 with Finite Source): Finite-Population Model</i>	766
Other Queuing Approaches	768
Summary	768
Key Terms	768
Discussion Questions	769
Using Software to Solve Queuing Problems	769
Solved Problems	770
Problems	771
CASE STUDY	775
<i>New England Foundry</i>	775
<i>The Winter Park Hotel</i>	776
Endnotes	776
Bibliography	776
Module D Rapid Review	777
Self Test	778
Module E Learning Curves	779
What Is a Learning Curve?	780
Learning Curves in Services and Manufacturing	781
Applying the Learning Curve	782
<i>Doubling Approach</i>	782
<i>Formula Approach</i>	782
<i>Learning-Curve Table Approach</i>	783
Strategic Implications of Learning Curves	786
Limitations of Learning Curves	787
Summary	787
Key Term	787
Discussion Questions	787
Using Software for Learning Curves	788
Solved Problems	788
Problems	789
CASE STUDY	791
<i>SMT's Negotiation with IBM</i>	791
Bibliography	792
Module E Rapid Review	793
Self Test	794
Module F Simulation	795
What Is Simulation?	796
Advantages and Disadvantages of Simulation	797
Monte Carlo Simulation	798
<i>OM in Action: Simulation Takes the Kinks out of Starbucks' Lines</i>	801
Simulation with Two Decision Variables: An Inventory Example	801
Summary	803
Key Terms	803
Discussion Questions	803
Using Software in Simulation	804
Solved Problems	805
Problems	806
CASE STUDY	809
<i>Alabama Airlines' Call Center</i>	809
Endnote	810
Bibliography	810
Module F Rapid Review	811
Self Test	812
Module G Applying Analytics to Big Data in Operations Management	813
Introduction to Big Data and Business Analytics	814
<i>OM in Action: UPS Forecasting Improves Logistics Planning Through Predictive Analysis</i>	815
Data Management	815
<i>Graphical Techniques for Cleaning Data</i>	816
<i>Excel Techniques for Cleaning Data</i>	816
<i>Using Excel's PivotTable Tool</i>	818

Data Visualization 820
Using Excel's Visualization Tools 820
 Predictive and Prescriptive Business Analytics Tools 822
Other Business Analytics Tools Not Covered in This Text 822
 Summary 823
 Key Terms 823
 Discussion Questions 823
 Solved Problems 824
 Problems 825

Endnote 825
 Bibliography 826
 Module G Rapid Review 827
 Self Test 828

Appendix I Normal Curve Areas A2
Appendix II Using Excel OM and POM for Windows A4
Appendix III Solutions to Even-Numbered Problems A8
Name Index I1
General Index I4

ONLINE TUTORIALS (located at MyLab Operations Management)

1. Statistical Tools for Managers T1-1

Discrete Probability Distributions T1-2
Expected Value of a Discrete Probability Distribution T1-3
Variance of a Discrete Probability Distribution T1-3
 Continuous Probability Distributions T1-4
The Normal Distribution T1-4
 Summary T1-7
 Key Terms T1-7
 Discussion Questions T1-7
 Problems T1-7
 Bibliography T1-7

2. Acceptance Sampling T2-1

Sampling Plans T2-2
Single Sampling T2-2
Double Sampling T2-2
Sequential Sampling T2-2
 Operating Characteristic (OC) Curves T2-2
 Producer's and Consumer's Risk T2-3
 Average Outgoing Quality T2-5
 Summary T2-6
 Key Terms T2-6
 Solved Problem T2-7
 Discussion Questions T2-7
 Problems T2-7

3. The Simplex Method of Linear Programming T3-1

Converting the Constraints to Equations T3-2
 Setting Up the First Simplex Tableau T3-2
 Simplex Solution Procedures T3-4
 Summary of Simplex Steps for Maximization Problems T3-6
 Artificial and Surplus Variables T3-7
 Solving Minimization Problems T3-7
 Summary T3-8
 Key Terms T3-8
 Solved Problem T3-8

Discussion Questions T3-8
 Problems T3-9

4. The MODI and VAM Methods of Solving Transportation Problems T4-1

MODI Method T4-2
How to Use the MODI Method T4-2
Solving the Arizona Plumbing Problem with MODI T4-2
 Vogel's Approximation Method: Another Way to Find an Initial Solution T4-4
 Discussion Questions T4-8
 Problems T4-8

5. Vehicle Routing and Scheduling T5-1

Introduction T5-2
Service Delivery Example: Meals-for-ME T5-2
 Objectives of Routing and Scheduling Problems T5-2
 Characteristics of Routing and Scheduling Problems T5-3
Classifying Routing and Scheduling Problems T5-3
Solving Routing and Scheduling Problems T5-4
 Routing Service Vehicles T5-5
The Traveling Salesman Problem T5-5
Multiple Traveling Salesman Problem T5-8
The Vehicle Routing Problem T5-9
Cluster First, Route Second Approach T5-10
 Scheduling Service Vehicles T5-11
The Concurrent Scheduler Approach T5-13
 Other Routing and Scheduling Problems T5-13
 Summary T5-14
 Key Terms T5-15
 Discussion Questions T5-15
 Problems T5-15
CASE STUDY T5-17
Routing and Scheduling of Phlebotomists T5-17
 Bibliography T5-17

New to This Edition

Operations is an exciting area of management that has a profound effect on productivity. The goal of this text and **MyLab Operations Management** is to present students a broad introduction to the field of operations in a realistic, practical, and applied manner. We want students to understand how operations work within an organization by seeing first-hand what goes on behind the scenes at a concert or major sports event; place an order through Amazon.com; board a flight on Alaska Airlines; or take a cruise with Celebrity Cruises. This text and **MyLab Operations Management** offer behind the scenes views that no other product on the market provides and one that students tell us they value because they gain a true understanding of operations.

With each edition, we work to gather feedback from instructors and students to enhance our text and MyLab. Based on that feedback, we have added the following new features and improvements.

Video Cases – Celebrity Cruise Line

With each edition, we offer in **MyLab Operations Management** integrated Video Cases as a valuable teaching tool for students. These short videos help readers see and understand operations in action within a variety of industries. With this edition, we are pleased to take you behind the scenes of Celebrity Cruises, one of the world's premier cruise lines. This fascinating organization opened its doors—and ships—for us to examine and share with you leading-edge OM in the cruise line industry.

The videos provide an inside look at:

- the 10 operations decisions at Celebrity Cruises (Chapter 1);
- how Celebrity Cruises designs a new product (Chapter 5);
- Celebrity's "Save-the-Waves" sustainability program (Supplement 5);
- how Celebrity Cruises treats quality as the heartbeat of the company (Chapter 6); and
- inventory management at Celebrity Cruises (Chapter 12).

Celebrity Cruises: Operations Management at Sea

Video Case 

On any given day, Celebrity Cruises, Inc. has tens of thousands of passengers at sea on more than a dozen spectacular ships, spanning 7 continents and 75 countries. With this level of capital investment along with the responsibility for the happiness and safety of so many passengers, excellence in operations is required. To make it all work, the 10 operations management decisions must be executed flawlessly. From product design (which encompasses the ship's layout, the food, and 300 destinations), to scheduling, supply chain, inventory, personnel, maintenance, and the processes that hold them together, OM is critical.

Cruise lines require precise scheduling of ships, with down-to-the-minute docking and departure times. In addition to ship and port scheduling, some 2,000 plus crew members must be scheduled. And there are many schedule variations. Entertainers may arrive and leave at each port, while officers may have a schedule of 10 weeks on and 10 weeks off. Other crew members have onboard commitments varying from 4 to 9 months.

With \$400 million invested in a ship and more than 5,000 lives involved in a cruise, detailed processes to ensure maintenance and reliability are vital. The modern ship is a technological marvel with hundreds of electronic monitors operating 24/7 to track everything from ship speed and location, to sea depth, to shipboard power demand and cabin temperature.

Celebrity's ship layout, destinations, and routing are adjusted to meet seasonal demands and the expectations of its premium market segment. With destinations from Alaska to Europe to Asia, crews are recruited worldwide, with as many as 70 nationalities represented. Instilling a quality culture requires an aggressive quality service orientation and, of course, meticulous cleanliness

and attention to detail. Processes for food preparation, laundry, quality, and maintenance are complete and detailed.

A cruise ship, as a moving city, requires a comprehensive and precise supply chain that replenishes everything from food to fuel to soap and water. Land-based buyers support Celebrity's annual food and beverage purchases that exceed \$110 million. Included in these expenditures are weekly shipments of 6 to 10 containers from the Miami headquarters destined for ships in European ports. An onboard staff organizes inventories to support this massive operation. The logistics effort includes hedging the weekly use of 24,000 gallons of fuel per ship with purchases 6 years into the future. Reliable global supply chains have been developed that deliver the required inventory on a tight time frame.

These crucial shipboard systems typically represent the best of operations management. Such is the case at Celebrity Cruises.

Discussion Questions*

1. Describe how the 10 OM decisions are implemented at Celebrity Cruises, Inc.
2. Identify how the 10 OM decisions at Celebrity Cruises differ from those decisions at a manufacturing firm.
3. Identify how the 10 OM decisions at Celebrity Cruises differ from those decisions at a retail store.
4. How are hotel operations on a ship different from those at a land-based hotel?

*You may wish to view the video that accompanies this case before addressing these questions.

In addition, we continue to offer our previous Video Cases that cover: Alaska Airlines, Orlando Magic basketball team, Frito-Lay, Darden/Red Lobster Restaurants, Hard Rock Cafe, Arnold Palmer Hospital, Wheeled Coach Ambulances, and Regal Marine.

We take the integration of our video case studies seriously, and for this reason, all of our videos are **created by the authors**, with the outstanding coauthorship of Beverly Amer at Northern Arizona University, to explicitly match text content and terminology.

46 Video Cases Listed by Chapter (new videos in bold)

- ◆ Frito-Lay: Operations Management in Manufacturing (Chapter 1)
- ◆ **Celebrity Cruises: Operations Management at Sea (Chapter 1)**
- ◆ Hard Rock Cafe: Operations Management in Services (Chapter 1)
- ◆ Strategy at Regal Marine (Chapter 2)
- ◆ Hard Rock Cafe’s Global Strategy (Chapter 2)
- ◆ Outsourcing Offshore at Darden (Chapter 2)
- ◆ Project Management at Arnold Palmer Hospital (Chapter 3)
- ◆ Managing Hard Rock’s Rockfest (Chapter 3)
- ◆ Forecasting Ticket Revenue for Orlando Magic Basketball Games (Chapter 4)
- ◆ Forecasting at Hard Rock Cafe (Chapter 4)
- ◆ **Celebrity Cruises Designs a New Ship (Chapter 5)**
- ◆ Product Design at Regal Marine (Chapter 5)
- ◆ Building Sustainability at the Orlando Magic’s Amway Center (Supplement 5)
- ◆ **“Saving the Waves” at Celebrity Cruises (Supplement 5)**
- ◆ Green Manufacturing and Sustainability at Frito-Lay (Supplement 5)
- ◆ Quality Counts at Alaska Airlines (Chapter 6)
- ◆ The Culture of Quality at Arnold Palmer Hospital (Chapter 6)
- ◆ **Celebrity Cruises: A Premium Experience (Chapter 6)**
- ◆ Quality at the Ritz-Carlton Hotel Company (Chapter 6)
- ◆ Frito-Lay’s Quality-Controlled Potato Chips (Supplement 6)
- ◆ Farm to Fork: Quality at Darden Restaurants (Supplement 6)
- ◆ Alaska Airlines: 20-Minute Baggage Process—Guaranteed! (Chapter 7)
- ◆ Process Strategy at Wheeled Coach (Chapter 7)
- ◆ Process Analysis at Arnold Palmer Hospital (Chapter 7)
- ◆ Capacity Planning at Arnold Palmer Hospital (Supplement 7)
- ◆ Locating the Next Red Lobster Restaurant (Chapter 8)
- ◆ Where to Place the Hard Rock Cafe (Chapter 8)
- ◆ Facility Layout at Wheeled Coach (Chapter 9)
- ◆ Laying Out Arnold Palmer Hospital’s New Facility (Chapter 9)
- ◆ The “People” Focus: Human Resources at Alaska Airlines (Chapter 10)
- ◆ Hard Rock’s Human Resource Strategy (Chapter 10)
- ◆ Darden’s Global Supply Chains (Chapter 11)
- ◆ Supply Chain Management at Regal Marine (Chapter 11)
- ◆ Arnold Palmer Hospital’s Supply Chain (Chapter 11)
- ◆ **Inventory Management at Celebrity Cruises (Chapter 12)**
- ◆ Managing Inventory at Frito-Lay (Chapter 12)
- ◆ Inventory Control at Wheeled Coach (Chapter 12)
- ◆ Using Revenue Management to Set Orlando Magic Ticket Prices (Chapter 13)
- ◆ When 18,500 Orlando Magic Fans Come to Dinner (Chapter 14)
- ◆ MRP at Wheeled Coach (Chapter 14)
- ◆ From the Eagles to the Magic: Converting the Amway Center (Chapter 15)
- ◆ Scheduling at Hard Rock Cafe (Chapter 15)
- ◆ Lean Operations at Alaska Airlines (Chapter 16)
- ◆ JIT at Arnold Palmer Hospital (Chapter 16)
- ◆ Maintenance Drives Profits at Frito-Lay (Chapter 17)
- ◆ Scheduling Challenges at Alaska Airlines (Module B)

Videos from Recent Graduates for Students

Located in [MyLab Operations Management](#) are brief videos of many recent grads who now work in some aspect of operations management. These 2- to 4-minute video clips feature young professionals talking about their jobs in the gamut of OM functions—each tied to a specific chapter and accompanied by multiple-choice quizzes that may be assigned. Each recent grad also talks about tips for success in the job market. This is sure to be a popular feature to engage students!



Kimberly Gersh, Project Manager, Little Green River Software

More Homework Problems—Quantity, Algorithmic, and Conceptual

We know that a vast selection of quality homework problems, ranging from easy to challenging (denoted by one to four dots), is critical for both instructors and students. Instructors need a broad selection of problems to choose from for homework, quizzes, and exams—without reusing the same set from semester to semester. We take pride in having more problems—by far, with 818—than any other OM text.

For this edition, we have added several **HUNDRED new algorithmic problems and concept questions in [MyLab Operations Management](#)!**

New Module Called “Applying Analytics to Big Data in Operations Management”

The marriage of business analytics, big data, and operations/supply chain management is a revolutionary change in our field. We are the first text to include a chapter (Module G) on this subject, which includes sections on data management, data visualization, and predictive and prescriptive business analytics tools. The topics include heat maps, conditional formatting for cleaning data, and pivot tables. The module includes numerous exercises that will use students’ Excel skills and show them the power of Excel in Big Data.

Detailed Chapter-by-Chapter Changes

Chapter 1: Operations and Productivity

We introduced two new learning objectives for the chapter: “*Identify* the 10 strategic decisions of operations management” and “*Identify* career opportunities in operations management.” Our first new video case study is called “Celebrity Cruises: Operations Management at Sea.” We updated several entries for the Globalization Era in Figure 1.4. We updated Table 1.4 to reflect employment in various sectors. Finally, we added a new discussion question.

Chapter 2: Operations Strategy in a Global Environment

We updated Figure 2.1 on the growth of world trade and added several key historical events to the graph. We added the new key term *operational hedging*. There are two new OM in Action boxes in this chapter: “Amazon Updates Sears’ Strategy” and “China Outsources Too—to Ethiopia.” Finally, we updated Figure 2.5 to reflect product life cycle changes.

Chapter 3: Project Management

The Bechtel Global Profile has been rewritten and we have added four new homework problems.

Chapter 4: Forecasting

There are eight new homework problems in this chapter.

Chapter 5: Design of Goods and Services

We modified Figure 5.2 to present the cash flows more clearly. We introduced a discussion of *additive manufacturing* as a new key term to subsume 3-D printing. We added a new discussion of *augmented reality*. There are two new OM in Action boxes: “Product Design at McDonald’s” and “Amazon Pushes Product Design.” Our second new video case study is called “Celebrity

Cruises Designs a New Ship.” We replaced the section on PCN Analysis with a new discussion on service design. We added two discussion questions and have seven new homework problems in this chapter.

Supplement 5: Sustainability in the Supply Chain

There is a new video case study called “Saving the Waves at Celebrity Cruises.” We’ve also added new material on the circular economy and on ISO 50001. There is also a new OM in Action box called “Designing for the End of Life.”

Chapter 6: Managing Quality

Our new video case study is called “Celebrity Cruises: A Premium Experience.” There is also a new OM in Action box called “Inspecting the Boeing 787,” new material on testing Samsung smart phones, and four new homework problems.

Supplement 6: Statistical Process Control

We have added 14 new homework problems and updated the OM in Action box called “Landing a Seat with Frequent Flyer Miles.”

Chapter 7: Process Strategies

We updated Figure 7.8 to simplify the presentation of degree of customization and labor for services. We added an OM in Action box called “500,000 Tons of Steel; 14 Jobs.” Finally, we updated Table 7.4 to provide more examples of technology’s impact on services.

Supplement 7: Capacity and Constraint Management

We modified the numbers used to compute actual output in Table S7.1. We modified Figure S7.6 to improve the exposition for the four approaches to capacity expansion. We added 10 new homework problems for this supplement. Finally, we updated the birth rates in Table S7.4 for the Arnold Palmer Hospital case.

Chapter 8: Location Strategies

We have added seven new homework problems to this chapter.

Chapter 9: Layout Strategies

There is a new OM in Action box called “Amazon Warehouses are Full of Robots,” and we have made major revisions to our coverage of Work Cells, Focused Facilities, Focused Work Centers, and Focused Factories. There are also four new homework problems.

Chapter 10: Human Resources, Job Design, and Work Measurement

We have added five new homework problems to this chapter.

Chapter 11: Supply Chain Management

We begin the chapter with a new Global Company Profile featuring Red Lobster. We’ve added a new section on blockchain, a new OM in Action box called “Samsung and Apple’s Complex Supply Chain,” and updated our treatment of SCOR. We also added three new homework problems.

Supplement 11: Supply Chain Management Analytics

There is a new discussion question and three new homework problems.

Chapter 12: Inventory Management

There is a new video case study called “Inventory Management at Celebrity Cruises.” We have also revised the Amazon Global Company Profile and expanded coverage of the single period model. In addition, there are 13 new homework problems.

Chapter 13: Aggregate Planning and S&OP

We’ve added three new homework problems to this chapter.

Chapter 14: Material Requirements Planning (MRP) and ERP

We deleted Figure 14.6 and moved the presentation of *allocated items* into Example 3. Under *MRP Management*, we introduced a new section and key term for *demand-driven MRP*, along with a new associated Figure 14.6. A discussion of *blockchains* is introduced in the *Enterprise Resource Planning (ERP)* section. Finally, five new homework problems were added for this chapter.

Chapter 15: Short-Term Scheduling

There are six new homework problems to this chapter.

Chapter 16: Lean Operations

There is a new OM in Action box, “Dr. Pepper’s Move to Kaizen,” and two new homework problems.

Chapter 17: Maintenance and Reliability

There is new coverage of predictive maintenance, and there are three new homework problems.

Module A: Decision Making Tools

There is a new case study, “Tom Thompson’s Liver Transplant,” and seven new homework problems.

Module B: Linear Programming

We have added seven new homework problems to this module.

Module C: Transportation Models

We have added one new homework problem to this module.

Module D: Waiting-Line Models

There are five new homework problems in this module.

Module E: Learning Curves

We have revised Figure E.1, which deals with exponential and log-log learning graphs.

Module F: Simulation

There are three new homework problems in this module.

Module G: Applying Analytics to Big Data in Operations Management

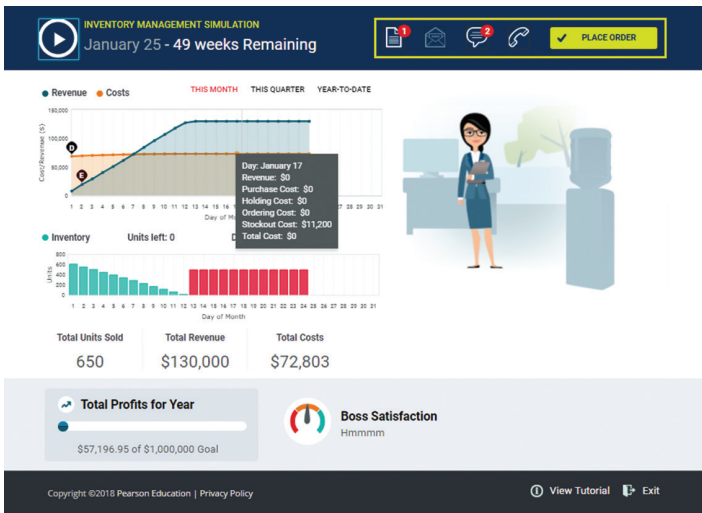
This new module includes sections on big data and business analytics, data management, data visualization, and predictive and prescriptive business analytics tools. There are 10 homework problems, two solved problems, and eight discussion questions.

Solving Teaching and Learning Challenges

Now in its 13th edition, the text and [MyLab Operations Management](#) provide an extremely comprehensive learning package. This robust program addresses teaching and learning challenges and affords the student with opportunities to learn and practice employable skills. Here are just a few of the key elements offered with this textbook and [MyLab Operations Management](#).

MyLab Operations Management

MyLab Operations Management is the teaching and learning platform that empowers *every* student. When combined with educational content written by the authors, **MyLab Operations Management** helps deliver the learning outcomes to which students and instructors aspire.



Operations Management Simulations

Five operations management simulations give students hands-on experience in real-world roles, helping them make decisions, think critically, and link course concepts to on-the-job application.

By receiving real-time, dynamic feedback from stakeholders, students see the impact of their choices and can gauge their performance against individual, peer, and system metrics. Results of these simulations are recorded in the MyLab Gradebook.

The five simulations are:

- ◆ Project Management (Chapter 3)
- ◆ Forecasting (Chapter 4)
- ◆ Quality Management (Chapter 6)
- ◆ Supply Chain Management (Chapter 11)
- ◆ Inventory Management (Chapter 12)

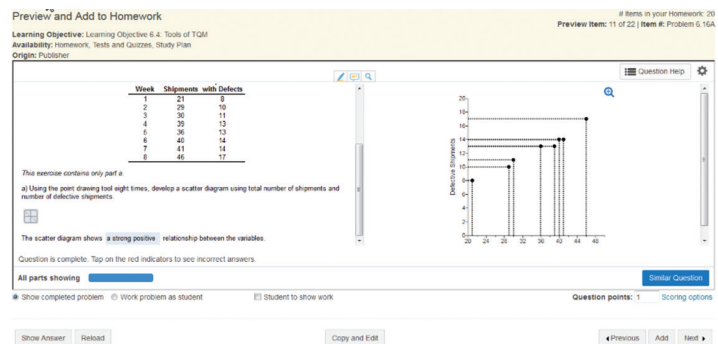
Students tell us that they enjoy learning OM through these simulations!

A Powerful Homework and Test Manager

Problems from the textbook can be assigned to students via a robust platform. This allows instructors to manage, create, and import online homework assignments, quizzes, and tests that are automatically graded. Instructors can choose from a wide range of assignment options, including time limits, proctoring, and maximum number of attempts allowed. The bottom line: **MyLab Operations Management** means more learning and less time grading.

Learning Aids

Right at the time of learning, students can access Learning Aids like Help Me Solve This, Videos from the authors of similar problems being solved, Ask My Instructor, and eText Pages. All of which provides the student feedback and assistance when they need it most.



Working with Excel Software

Excel use in the Operations Management course is becoming more important, and instructors often ask their students to develop their own Excel spreadsheet models. For this reason, we provide “Creating Your Own Excel Spreadsheets,” examples toward the end of numerous chapters.

Decision Support Software

We also provide two decision support software programs, Excel OM for Windows and Mac, and POM for Windows, to help solve homework problems and case studies. More information on these packages can be found in [MyLab Operations Management](#) in the Download Center.

Using Software to Solve Outsourcing Problems

Excel, Excel OM, and POM for Windows may be used to solve many of the problems in this chapter.

CREATING YOUR OWN EXCEL SPREADSHEETS

Program 2.1 illustrates how to build an Excel spreadsheet for the data in Example 1. In this example the factor rating method is used to compare National Architects’ three potential outsourcing providers.

This program provides the data inputs for seven important factors, including their weights (0.0–1.0) and ratings (1–5 scale where 5 is the highest rating) for each country. As we see, BIM is most highly rated, with a 3.9 score, versus 3.3 for S.P.C. and 3.8 for Telco.

FACTOR (CRITERION)	IMPORTANCE WEIGHT	BIM (U.S.)	S.P.C. (INDIA)	TELCO (ISRAEL)
1. Can reduce operating costs	0.2	3	1	5
2. Can reduce capital investment	0.2	4	3	3
3. Skilled personnel	0.2	5	4	3
4. Can improve quality	0.1	4	5	2
5. Can gain access to technology not in the company	0.1	5	3	5
6. Can create additional capacity	0.1	4	2	4
7. Aligns with policy/philosophy/culture	0.1	2	3	5
Total Weighted Score		3.9	3.3	3.8

Program 2.1

Using Excel to Develop a Factor Rating Analysis, With Data from Example 1

✕ USING EXCEL OM

Excel OM (free with your text and also found in [MyLab Operations Management](#)) may be used to solve Example 1 (with the Factor Rating module).

▶ USING POM FOR WINDOWS

POM for Windows also includes a factor rating module. For details, refer to Appendix II. POM for Windows is also found in [MyLab Operations Management](#) and can solve all problems labeled with a ▶.

Jay, Barry, & Chuck's OM Blog

As a complement to this text, we have created a companion blog, with coordinated features to help teach the OM course. There are teaching tips, highlights of OM items in the news (along with class discussion questions and links), video tips, guest posts by instructors using our text, and much more—all arranged by chapter. To learn more about any chapter topics, visit www.heizerrenderOM.wordpress.com. As instructors prepare their lectures and syllabus, they can scan our blog for discussion ideas, teaching tips, and classroom exercises.

ABOUT THE AUTHORS

JAY HEIZER



The Jesse H. Jones Professor Emeritus of Business Administration, Texas Lutheran University, Seguin, Texas. He received his B.B.A. and M.B.A. from the University of North Texas and his Ph.D. in Management and Statistics from Arizona State University. He was previously a member of the faculty at the University of Memphis, the University of Oklahoma, Virginia Commonwealth University, where he was department chair, and the University of Richmond. He has also held visiting positions at Boston University, George Mason University, the Czech Management Center, and the Otto-Von-Guericke University, Magdeburg.

Dr. Heizer's industrial experience is extensive. He learned the practical side of operations management as a machinist apprentice at Foringer and Company, as a production planner for Westinghouse Airbrake, and at General Dynamics, where he worked in engineering administration. In addition, he has been actively involved in consulting in the OM and MIS areas for a variety of organizations, including Philip Morris, Firestone, Dixie Container Corporation, Columbia Industries, and Tenneco. He holds the CPIM certification from APICS—the Association for Operations Management.

Professor Heizer has co-authored five books and has published more than 30 articles on a variety of management topics. His papers have appeared in the *Academy of Management Journal*, *Journal of Purchasing*, *Personnel Psychology*, *Production & Inventory Control Management*, *APICS—The Performance Advantage*, *Journal of Management History*, *IIE Solutions*, and *Engineering Management*, among others. He has taught operations management courses in undergraduate, graduate, and executive programs.

BARRY RENDER



The Charles Harwood Professor Emeritus of Operations Management, Crummer Graduate School of Business, Rollins College, Winter Park, Florida. He received his B.S. in Mathematics and Physics at Roosevelt University, and his M.S. in Operations Research and Ph.D. in Quantitative Analysis at the University of Cincinnati. He previously taught at George Washington University, University of New Orleans, Boston University, and George Mason University, where he held the Mason Foundation Professorship in Decision Sciences and was Chair of the Decision Sciences Department. Dr. Render has also worked in the aerospace industry for General Electric, McDonnell Douglas, and NASA.

Professor Render has co-authored 10 textbooks for Pearson, including *Managerial Decision Modeling with Spreadsheets*, *Quantitative Analysis for Management*, *Service Management*, *Introduction to Management Science*, and *Cases and Readings in Management Science*. *Quantitative Analysis for Management*, now in its 14th edition, is a leading text in that discipline in the United States and globally. Dr. Render's more than 100 articles on a variety of management topics have appeared in *Decision Sciences*, *Production and Operations Management*, *Interfaces*, *Information and Management*, *Journal of Management Information Systems*, *Socio-Economic Planning Sciences*, *IIE Solutions*, and *Operations Management Review*, among others. Dr. Render has been honored as an AACSB Fellow and was twice named a Senior Fulbright Scholar. He was Vice President of the Decision Science Institute Southeast Region and served as Software Review Editor for *Decision Line* for six years and as Editor of the *New York Times* Operations Management special issues for five years. For nine years, Dr. Render was President of Management Service Associates of Virginia, Inc., whose technology clients included the FBI, NASA, the U.S. Navy, Fairfax County, Virginia, and C&P Telephone. Dr. Render has received Rollins College's Welsh Award as leading Professor and was selected by Roosevelt University as the recipient of the St. Claire Drake Award for Outstanding Scholarship. Dr. Render also received the Rollins College MBA Student Award for Best Overall Course and was named Professor of the Year by full-time MBA students.

Professor of Operations Management and Carson College of Business Ph.D. Program Director, Washington State University, Pullman, Washington. He received his BSBA *summa cum laude* in finance, along with his MSBA and Ph.D. in operations management, from Washington University in St. Louis. For three years, he worked as a financial analyst for Contel Telephone Corporation.

Professor Munson serves as a senior editor for *Production and Operations Management*, and he serves on the editorial review board of four other journals. He has published more than 25 articles in such journals as *Production and Operations Management*, *IIE Transactions*, *Decision Sciences*, *Naval Research Logistics*, *European Journal of Operational Research*, *Journal of the Operational Research Society*, and *Annals of Operations Research*. He is editor of the book *The Supply Chain Management Casebook: Comprehensive Coverage and Best Practices in SCM*, and he has co-authored the research monograph *Quantity Discounts: An Overview and Practical Guide for Buyers and Sellers*. He is also coauthor of *Managerial Decision Modeling: Business Analytics with Spreadsheets* (4th edition), published by deGruyter.

Dr. Munson has taught operations management core and elective courses at the undergraduate, MBA, and Ph.D. levels at Washington State University. He has also conducted several teaching workshops at international conferences and for Ph.D. students at Washington State University. His major awards include winning the Sahlin Faculty Excellence Award for Instruction (Washington State University's top teaching award, 2016); being a Founding Board Member of the Washington State University President's Teaching Academy (2004); winning the WSU College of Business Outstanding Teaching Award (2001 and 2015), Research Award (2004), and Service Award (2009 and 2013); and being named the WSU MBA Professor of the Year (2000 and 2008).

CHUCK MUNSON

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Instructor's Solutions Manual	The Instructor's Solutions Manual, written by the authors, contains the answers to all of the discussion questions, Ethical Dilemmas, Active Models, and cases in the text, as well as worked-out solutions to all the end-of-chapter problems, additional homework problems, and additional case studies.
Test Bank authored by Jianli Hu, Cerritos College	<ul style="list-style-type: none"> • More than 1,500 multiple-choice, true-or-false, and essay questions • Keyed by learning objective • Classified according to difficulty level • AACSB learning standard identified (Ethical Understanding and Reasoning; Analytical Thinking Skills; Information Technology; Diverse and Multicultural Work; Reflective Thinking; Application of Knowledge)
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PowerPoints authored by Jeff Heyl, Lincoln University	An extensive set of PowerPoint presentations is available for each chapter. With well over 2,000 slides, this set has excellent color and clarity. A set of PowerPoints is also available as an ADA-compliant version that meet accessibility standards for students with disabilities. Features include: <ul style="list-style-type: none"> • Keyboard and screen reader access • Alternative text for images • High contrast between background and foreground colors
Excel Data Files, Excel OM, POM for Windows, and Active Models developed by Howard Weiss, Temple University	<ul style="list-style-type: none"> • The data files are prepared for specific examples and allow users to solve all the marked text examples without reentering any data. • POM for Windows is a powerful tool for easily solving OM problems. • Excel OM is our exclusive user-friendly Excel add-in. Excel OM automatically creates worksheets to model and solve problems. This software is great for student homework, what-if analysis, and classroom demonstrations. • Active Models are Excel-based OM simulations, designed to help students understand the quantitative methods shown in the textbook examples. Students may change the data to see how the changes affect the answers.

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Northern Arizona University

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California State University–Bakersfield

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California State University–Hayward

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San Francisco State University

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University of South Florida

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ILLINOIS

Suad Alwan
Chicago State University

Lori Cook
DePaul University

Matt Lontine
University of Illinois–Chicago

Zafar Malik
Governors State University

INDIANA

Barbara Flynn
Indiana University

B.P. Lingeraj
Indiana University

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Indiana University

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University of Notre Dame

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Debra Bishop
Drake University

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University of Iowa

KANSAS

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Wichita State University

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Kansas State University

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Washburn University

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Wichita State University

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Wade Ferguson
Western Kentucky University

Kambiz Tabibzadeh
Eastern Kentucky University

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Roy Clinton
*University of Louisiana at
Monroe*

L. Wayne Shell (retired)
Nicholls State University

MARYLAND

Eugene Hahn
Salisbury University

Samuel Y. Smith, Jr.
University of Baltimore

MASSACHUSETTS

Peter Ittig
University of Massachusetts

Jean Pierre Kuilboer
*University of Massachusetts–
Boston*

Dave Lewis
University of Massachusetts–Lowell

Mike Maggard (retired)
Northeastern University

Peter Rourke
Wentworth Institute of Technology

Daniel Shimshak
University of Massachusetts–Boston

Ernest Silver
Curry College

MICHIGAN

Darlene Burk
Western Michigan University

Sima Fortsch
University of Michigan–Flint

Damodar Golhar
Western Michigan University

Dana Johnson
Michigan Technological University

Doug Moodie
Michigan Technological University

MINNESOTA

Rick Carlson
Metropolitan State University

John Nicolay
University of Minnesota

Michael Pesch
St. Cloud State University

Manus Rungtusanatham
University of Minnesota

Kingshuk Sinha
University of Minnesota

Peter Southard
University of St. Thomas

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Shahid Ali
Rockhurst University

Stephen Allen
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Sema Alptekin
University of Missouri–Rolla

Gregory L. Bier
University of Missouri–Columbia

James Campbell
University of Missouri–St. Louis

Wooseung Jang
University of Missouri–Columbia

Mary Marrs
University of Missouri–Columbia

A. Lawrence Summers
University of Missouri

NEBRASKA

Zialu Hug
University of Nebraska–Omaha

NEVADA

Joel D. Wisner
University of Nevada, Las Vegas

NEW HAMPSHIRE

Dan Bouchard
Granite State College

NEW JERSEY

Daniel Ball
Monmouth University

Leon Bazil
*Stevens Institute of
Technology*

Mark Berenson
Montclair State University

Grace Greenberg
Rider University

Joao Neves
The College of New Jersey

Leonard Presby
William Paterson University

Faye Zhu
Rowan University

NEW MEXICO

William Kime
University of New Mexico

NEW YORK

Michael Adams
SUNY Old Westbury

Theodore Boreki
Hofstra University

John Drabouski
DeVry University

Richard E. Dulski
Daemen College

Jonatan Jelen
Baruch College

Beate Klingenberg
Marist College

Purushottam Meena
*New York Institute of
Technology*

Donna Mosier
SUNY Potsdam

Elizabeth Perry
SUNY Binghamton

William Reisel
St. John's University

Abraham Seidmann
University of Rochester

Kaushik Sengupta
Hofstra University

Girish Shambu
Canisius College

Rajendra Tibrewala
*New York Institute of
Technology*

NORTH CAROLINA

Coleman R. Rich
Elon University
Ray Walters
*Fayetteville Technical
Community College*

OHIO

Victor Berardi
Kent State University
Lance Chen
University of Dayton
Andrew R. Thomas
University of Akron

OKLAHOMA

Wen-Chyuan Chiang
University of Tulsa

OREGON

Anne Deidrich
Warner Pacific College
Gordon Miller
Portland State University
John Sloan
Oregon State University

PENNSYLVANIA

Jeffrey D. Heim
Pennsylvania State University
James F. Kimpel
University of Pittsburgh
Ian M. Langella
Shippensburg University
Prafulla Oglekar
LaSalle University
Stanford Rosenberg
LaRoche College
Edward Rosenthal
Temple University
Susan Sherer
Lehigh University
Howard Weiss
Temple University

RHODE ISLAND

Laurie E. Macdonald
Bryant College
Susan Sweeney
Providence College

SOUTH CAROLINA

Jerry K. Bilbrey
Anderson University

Luis Borges
College of Charleston
Larry LaForge
Clemson University
Emma Jane Riddle
Winthrop University

TENNESSEE

Hugh Daniel
Lipscomb University
Cliff Welborn
Middle Tennessee State University

TEXAS

Phillip Flamm
Texas Tech University
Gregg Lattier
Lee College
Arunachalam Narayanan
Texas A&M University
Ranga V. Ramasesh
Texas Christian University
Mohan Rao
*Texas A&M University–
Corpus Christi*
Cecelia Temponi
Texas State University
John Visich-Disc
University of Houston
Dwayne Whitten
Texas A&M University
Bruce M. Woodworth
University of Texas–El Paso

UTAH

William Christensen
Dixie State College of Utah
Shane J. Schvaneveldt
Weber State University
Madeline Thimmes (retired)
Utah State University

VIRGINIA

Sidhartha Das
George Mason University
Cheryl Druehl
George Mason University
Andy Litteral
University of Richmond
Arthur C. Meiners, Jr.
Marymount University
Michael Plumb
Tidewater Community College

Yu (Amy) Xia
College of William and Mary

WASHINGTON

Mark McKay
University of Washington
Chris Sandvig
Western Washington University
John Stec
Oregon Institute of Technology
Scott Swenson
Washington State University

WASHINGTON, DC

Narendra K. Rustagi
Howard University

WEST VIRGINIA

Charles Englehardt
Salem International University
Daesung Ha
Marshall University
James S. Hawkes
University of Charleston

WISCONSIN

James R. Gross
University of Wisconsin–Oshkosh
Marilyn K. Hart (retired)
University of Wisconsin–Oshkosh
Niranjan Pati
University of Wisconsin–La Crosse
X. M. Safford
Milwaukee Area Technical College
Rao J. Taikonda
University of Wisconsin–Oshkosh

WYOMING

Cliff Asay
University of Wyoming

INTERNATIONAL

Steven Harrod
Technical University of Denmark
Wolfgang Kersten
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We wish you a pleasant and productive introduction to operations management.

JAY HEIZER

Texas Lutheran University
1000 W. Court Street
Seguin, TX 78155
Email: jheizer@tlu.edu

BARRY RENDER

Graduate School of Business
Rollins College
Winter Park, FL 32789
Email: brender@rollins.edu

CHUCK MUNSON

Carson College of Business
Washington State University
Pullman, WA 99164-4746
Email: munson@wsu.edu