PART I
The Remarkable History of POM

1 Evolution of the POM Discipline
   Martin K. Starr, Sushil K. Gupta, and Christopher Tang
   1 Introduction to Evolving POM 3
   2 The Value of Historical Perspective for POM 4
   3 First POM Milestone—The Division of Labor 5
      3.1 The Holistic Production System of Volvo (Opposite to
          Division of Labor) 6
      3.2 Division of Labor Applied to Services 6
   4 Second POM Milestone—Interchangeable Parts (IP) and the Science
      of Tolerance Ranges 7
   5 Third POM Milestone—Statistical Quality Control (SQC) and
      Standardization 8
      5.1 Standardized Parts and Operations 9
   6 Four Industrial Revolutions—IR 1.0, IR 2.0, IR 3.0, and IR 4.0 10
      6.1 The First Industrial Revolution (IR 1.0), 1776 to 1840 10
      6.2 The Second Industrial Revolution (IR 2.0), 1840 to 1914 11
      6.3 The Third Industrial Revolution (IR 3.0), 1914 to 1999 12
      6.4 Industry 4.0: The Fourth Industrial Revolution (IR 4.0),
          1999 and beyond 13
   7 Global Forces Acting on POM 15
   8 Global Competition: The Japanese Effect 15
Global Supply Chain Management

Henrique L. Correa

1 Introduction 24
2 Technological Evolution 24
3 Today's Competition: Between Supply Chains, Not Companies 25
4 Historical Evolution of Supply Chain Management 25
   4.1 First Phase: The Operation Management Scope Is the Production Unit—“One Best Way” 25
   4.2 Second Phase: The Operations Management Scope Crosses Borders Between Functions 26
   4.3 Third Phase: The Operations Management Scope Crosses Borders Between Organizations—Supply Chains 26
   4.4 Fourth Phase: The Operations Management Scope Crosses National Borders—Global Supply Chains 27
   4.5 Fifth Phase: The Operations Management Scope Crosses the Borders of Organizations' Global Objectives—The Triple Bottom Line 27
5 Everyone Wins With Good Supply Chain Management 27
6 Supply Chain Management: Some Essential Concepts 28
   6.1 The Strategic "Make or Buy" Decision 28
      6.1.1 Transaction Cost Economics 29
      6.1.2 Resource-Based View of Strategy 30
      6.1.3 A Framework for the Strategic "Make or Buy" Decision 30
   6.2 Supply Chain Segmentation 31
      6.2.1 What Is the Right Supply Chain for Your Product? 32
      6.2.2 Aligning Competences in Supply Chains 34
      6.2.3 Avoiding Incentive Misalignment Among the Constellation of Partners in Supply Chains 34
   6.3 The Bullwhip Effect: Caused by Lack of Communication and Coordination Between Partners in Supply Chains 35
   6.4 Risk Assessment in Supply Chains 38
7 Conclusion and Directions for Future Research 40
References and Bibliography 40
PART II

Core POM Functions 43

3 Forecasting: State-of-the-Art in Research and Practice 45

Nada R. Sanders

1 Introduction to Forecasting in POM 45
   1.1 Forecasting Versus Planning 45
   1.2 Demand Management 46
   1.3 Impact on Costs 47

2 The Forecasting Process 47
   2.1 Steps in the Forecasting Process 47
   2.2 Factors in Method Selection 49

3 Forecasting Methodologies 50
   3.1 Categorization of Forecasting Methods 50
      3.1.1 Judgmental Forecasting Methods 51
      3.1.2 Statistical Forecasting Methods 52
   3.2 Combining Forecasting Methods 52
      3.2.1 Combining Judgmental and Statistical Methods 53
      3.2.2 The Role of Domain Knowledge and Contextual Information 55

4 The Future of Forecasting 55
   4.1 Information Access 56
   4.2 Big Data Analytics 56
   4.3 Information Sharing 57

5 Relevance for Managers 57

6 Research Opportunities 58

7 Conclusion 59

References and Bibliography 59

4 Aggregate Production Planning 63

Lee Krajewski

1 Introduction 63
   1.1 The Importance of Aggregate Production Planning 63
   1.2 Dimensions of Aggregation 63
      1.2.1 Products 64
      1.2.2 Workforce 64
      1.2.3 Time 64
   1.3 Information Inputs 64
   1.4 Decision Variables and Supply Options 65

2 Historical Perspective of Aggregate Production Planning Research 66
   2.1 Linear Decision Rules 66
      2.1.1 Regular Time Wages 66
      2.1.2 Overtime Wages 67
      2.1.3 Hiring and Firing Costs 67
Contents

2.1.4 Inventory and Backorder Costs 67
2.1.5 Objective Function and the Rules 67
2.2 Linear Programming 68
2.3 Heuristics 69
2.4 Evaluation of Early Aggregate Planning Models 70
2.5 Goal Programming and Other Methodological Thrusts 70

3 Disaggregation of Aggregate Production Plans 71
3.1 Levels in Operations Planning and Scheduling 72
  3.1.1 Level 1 73
  3.1.2 Level 2 73
  3.1.3 Level 3 73
3.2 Manufacturing 74
  3.2.1 Hierarchical Production Planning (HPP) 74
  3.2.2 Setups, Resource Profiles, and Distribution Plans 74
3.3 Services 75

4 Aggregate Production Planning in Practice 75
4.1 Step 1: Roll the Plan Forward 76
4.2 Step 2: Forecast and Demand Planning 76
4.3 Step 3: Update the Sales and Operations Plan 76
4.4 Step 4: Consensus Meetings 76
4.5 Step 5: Executive S&OP Meeting 76
4.6 Step 6: Update and Revise Final Plans 77

5 Conclusions 77
5.1 Future Research 77
  5.1.1 Employment Planning in Manufacturing 77
  5.1.2 Employment Planning in Services 77
  5.1.3 Aggregation 77
  5.1.4 Uncertainty 78
  5.1.5 Sustainability and Reverse Logistics 78
  5.1.6 Supply Chain Visibility 78
5.2 Implications for Practitioners 79

References and Bibliography 79

5 Scheduling in Manufacturing and Services 82
Kangbok Lee and Michael Pinedo
1 Introduction 82
  1.1 Classifications of Scheduling Problems 83
2 Preliminaries and Fundamentals 84
  2.1 Computational Complexity of Scheduling Problems 84
  2.2 Solution Methodologies 85
3 Scheduling in Manufacturing 86
  3.1 Job Shop Scheduling 86
    3.1.1 Scheduling Problems with the Total Weighted Completion Time Objective 86
    3.1.2 Scheduling Problems with the Total Completion Time Objective 87
2 The Context of QM Successes and Failures 126
3 A Compelling Case for Achieving Quality Management Excellence in POM 127
4 A Brief History of Quality Management 128
  4.1 Key Figures 128
  4.2 After World War II 131
5 Present Situations 132
  5.1 Malcolm Baldrige National Quality Award 132
  5.2 ISO 9001 2015 132
  5.3 Quality Function Deployment (QFD) 133
  5.4 Statistical Process Control (SPC) 135
  5.5 Quality Improvement (QI) Story 140
  5.6 Six Sigma 140
  5.7 Lean 141
  5.8 Lean Six Sigma 141
  5.9 Design for Manufacture and Assembly (DFMA) 142
  5.10 Quality Risk Management and Quality Recovery Plans 142
  5.11 Quality Management Themes 142
  5.12 Quality Culture 143
6 Future Projections 143
7 Further Research Directions 144
References and Bibliography 145

8 Facilities Design and Planning
  Sunderesh S. Heragu and Ahmed Jamoussi
  1 Introduction 147
  2 Motivating Case Study 147
  3 Flow Patterns and Flow Process Charts 149
    3.1 Flow Patterns 149
    3.2 Flow Process Chart 149
  4 Facilities Layout 152
    4.1 Types of Layout 152
    4.2 Systematic Layout Planning 152
    4.3 Algorithms and Software for Layout Planning 153
      4.3.1 Layout Algorithms 153
      4.3.2 Software for Layout Design 153
  5 Materials Handling 155
    5.1 Types of Material Handling Devices 155
    5.2 Automated MHDs Used in a Shipping Port 156
    5.3 Ten Principles of Materials Handling 157
  6 Warehouse Design 158
    6.1 Warehouse Storage Policies 158
  7 Trends in Facilities Design 160
    7.1 Material Handling and Logistics US Roadmap: Trends 160
      7.1.1 E-Commerce 160
Contents

7.1.2 Competition among Third-Party Logistics Providers 161
7.1.3 Mass Customization 161
7.1.4 Urbanization 161
7.1.5 Mobile and Wearable Computing 161
7.1.6 Robotics and Automation 161
7.1.7 Sensors and the Internet of Things 161
7.1.8 Big Data and Predictive Analytics 162
7.1.9 The Changing Workforce 162
7.1.10 Sustainability 162

7.2 Material Handling and Logistics US Roadmap: Capabilities by 2025 162
7.2.1 Total Supply Chain Visibility 163
7.2.2 Standardization 163
7.2.3 High-Speed Delivery 163
7.2.4 Low-Cost, Low-Impact Materials Handling and Logistics 163
7.2.5 Planning and Optimization 164
7.2.6 Impact of E-Commerce 164
7.2.7 Collaboration 164

7.3 Energy and Resource Efficient Manufacturing 164
7.4 Leadership in Energy and Environmental Design 165
7.5 Implications for Managers 165
7.6 Directions for Future Research 166

References and Bibliography 167

9 Manufacturing Strategy 169
 Raffaella Cagliano and Federico Caniato
1 Introduction 169
2 The Strategic Role of Manufacturing Operations 170
3 Key Concepts in Manufacturing Strategy 171
 3.1 Manufacturing Strategy Content 171
 3.2 Manufacturing Strategy Process 172
4 Manufacturing Paradigms 172
 4.1 The Most Relevant Manufacturing Paradigms 173
    4.1.1 World Class Manufacturing 173
    4.1.2 Lean Production 173
    4.1.3 Strategically Flexible Production 173
    4.1.4 Other Manufacturing Strategy Paradigms 173
    4.1.5 Smart Manufacturing: The Emerging Manufacturing Paradigm 174
4.2 Manufacturing Paradigm Versus Strategic Choices: The Debate 174
5 The Strategic Goals of Manufacturing Operations 175
 5.1 Strategic Trade-Offs and Cumulative Capabilities 175
    5.1.1 The Trade-Off Model 176
    5.1.2 The Cumulative Model 176
    5.1.3 The Integrative Model 176
5.2 Strategic Configurations 177
6 Manufacturing Decisions 177
   6.1 Manufacturing Decisions from a Contingency Perspective 178
   6.2 Manufacturing Improvement Programs and Best Practices 178
7 Manufacturing Strategy and the Evolution of Technology 179
   7.1 Automation 180
   7.2 The Role of Information Technology 180
   7.3 Flexible Technologies 180
   7.4 Digital Technologies 180
   7.5 New Technologies 181
8 Global Manufacturing Strategies 181
   8.1 Enablers and Drivers 181
   8.2 Plant Location 182
   8.3 Manufacturing Networks 182
   8.4 Recent Trends 183
9 How to Research Manufacturing Strategy 183
   9.1 Large-Scale Surveys 183
   9.2 Limitations and Future Developments 184
10 New Challenges for Manufacturing Strategy 184
References and Bibliography 185

PART III
POM Process and Project Categories 195

10 Process Capabilities and Leveraging Advances in Science and Technology 197
   Cheryl Gaimon, Manpreet Hora, and Karthik Ramachandran
1 Introduction 197
   1.1 Process Capabilities and New Product Development 197
   1.2 Process Capabilities and Profitability 198
   1.3 Recent Advances in Process Capabilities 199
   1.4 Greenfield Versus Brownfield Change to Process Capabilities 199
2 Managing Internal Knowledge to Develop Process Capabilities 200
   2.1 Integrating Product and Process Knowledge in a Single NPD Project 200
   2.2 Derivative and Radical NPD Projects 202
      2.2.1 A Radical NPD Project 202
      2.2.2 Funding Radical and Derivative NPD Projects 203
   2.3 Investments in Technical Support 203
3 Managing External Knowledge to Develop Process Capabilities 204
   3.1 Alliances in a Supply Network 204
   3.2 Alliances with Competitors 204
      3.2.1 Trade-Offs in Coopetitive Development 205
   3.3 Acquiring Knowledge from Non-Competing Firms 205
4 Future Opportunities for Research 206
   4.1 Leveraging Internal Knowledge 206
4.2 Leveraging External Knowledge 207
   4.2.1 Alliances in a Supply Network 207
   4.2.2 Alliances with Competitors 207
   4.2.3 Acquiring Knowledge from a Non-Competing Firm 208

5 Implications for Practitioners 208

6 Conclusion 209

References and Bibliography 210
3 Supply Chains 281
   3.1 Forward Supply Chains 281
      3.1.1 Product and Retail Competition 281
      3.1.2 Component Commonality and Remanufacturing 281
      3.1.3 Order Quantities and Customer Environmental Concerns 282
   3.2 Reverse Supply Chains 282
      3.2.1 Reverse Supply Chain Networks 282
      3.2.2 Managing the Collection Process 283
      3.2.3 Remanufacturing 283
4 Environmental Legislation 284
   4.1 Life-Cycle Assessment and New Product Introduction 284
   4.2 Extended Producer Responsibility (EPR) 285
   4.3 Policy Implications 286
5 Directions for Future Research 287
References and Bibliography 288

15 The Interdependence of Data Analytics and Operations Management 291
   Kaushik Dutta, Abhijeet Ghoshal, and Subodha Kumar
1 Introduction 291
2 Retail Operations 291
   2.1 Design Aspects of Recommender Systems 292
   2.2 Future Research on Recommender Systems 292
      2.2.1 Algorithm Design 292
      2.2.2 Recommendations Considering Trade-Offs 293
   2.3 Economic and Supply Chain Problems on Recommender Systems 293
      2.3.1 Effect of Recommendations on the Overall Supply Chain 293
      2.3.2 Information Sharing within a Supply Chain 294
3 Mobile 294
   3.1 Existing Research on Using Data from Mobile Devices and Platforms 294
      3.1.1 Impact of Advertisements on Sales 295
      3.1.2 Location Determination of Users 295
   3.2 Future Research in the Space of Mobile Technology 295
      3.2.1 Operations of Mobile Phones 295
      3.2.2 Operations of Mobile Apps 296
      3.2.3 Operations of Mobile Network Service 296
4 Online Advertising 296
   4.1 Advertisement Scheduling 297
   4.2 Real-Time Bidding Platforms 297
      4.2.1 The Ad Allocation Problem 297
      4.2.2 Audience Targeting in Mobile Apps 297
Contents

5.3 Kitting 315
5.4 End-of-Runway Location 315
6 Logistics Clusters Benefits—Innovation 316
   6.1 Environmental Innovation 316
   6.2 Intra-Organizational Inter-Cluster Innovation Transfer 316
7 Logistics Clusters Benefits—Jobs 317
   7.1 Blue- and White-Collar Jobs 317
   7.2 Sub-Cluster Development and Jobs 317
   7.3 Education and Training 318
   7.4 Upward Mobility 318
8 The Future of Logistics Clusters 318
   8.1 Factors Leading to Logistics Clusters Growth 319
   8.2 Factors Leading to Possible Decline of Logistics Clusters 319
9 Implications for Practitioners and Policy Makers 320
   9.1 Considerations of Site Selection 320
   9.2 Globalization 320
   9.3 Support for Cluster Development: Zoning, Connectivity, and Finance 321
   9.4 Regulations and Taxes 321
   9.5 International Trade 321
10 Future Research Opportunities 322
References and Bibliography 323

17 Human Behavior in Operations 326
   Elliot Bendoly, Adam McClintock, and Rahul Pandey
1 Introduction 326
2 A Brief Historical Overview 327
   2.1 Early Rumbling of a Domain 327
   2.2 The BeOps Renaissance 328
3 Contemporary Foundations from Aligned Domains 329
   3.1 Cognitive Psychology 329
      3.1.1 Common Biases 330
      3.1.2 Established Heuristics 332
   3.2 Group and Social Influences 333
   3.3 System Dynamics and Systems Thinking 334
4 Designing for Behavior: Bridging OM Science and Practice 335
   4.1 Anticipating Cuts and Pastes 335
      4.1.1 Set Biases 336
      4.1.2 Trend Biases 336
      4.1.3 Casual Biases 337
5 Conclusions 337
   5.1 Best Practices in Design for OM Tools 337
   5.2 Implications for Practitioners 338
   5.3 Directions for Future Research 339
References and Bibliography 340

xix
PART V
POM Interface with Other Functions

18 Management Accounting and Operations Management

Thomas Hemmer and Eva Labro

1 Introduction 345

2 The Importance of Considering Incentives and Performance Measurement in Optimizing Operations 346
   2.1 Introduction to Performance Measurement and Incentives 346
      2.1.1 Agency Theory 346
      2.1.2 The Sufficient Statistic Condition 347
      2.1.3 Implications for Operations Management 348
   2.2 Throughput Maximization and Capacity Constraints 349
      2.2.1 An Operations Management Perspective on Throughput Maximization Under Capacity Constraints 349
      2.2.2 A Management Accounting Perspective on Throughput Maximization Under Capacity Constraints 350
      2.2.3 Alternate Solutions Proposed by the Management Accounting Perspective 351
         2.2.3.1 Profit Sharing 351
         2.2.3.2 Performance Measurement and the Balanced Scorecard 351
   2.3 Push Versus Pull Production 352
      2.3.1 An Operations Management Perspective on Push Versus Pull Production 352
      2.3.2 A Management Accounting Perspective on Push Versus Pull Production 352
         2.3.2.1 Incentives Under the Push System 352
         2.3.2.2 Incentives Under the Pull System 353
         2.3.2.3 A Measure of Intermediate Product Quality 353
   2.4 Implications for Practice 354
3 The Importance of Considering Operations When Designing Cost Measurement Systems 354
   3.1 The Mechanics of Cost Measurement 354
      3.1.1 Traditional Costing Methods 354
      3.1.2 Activity-Based Costing 355
      3.1.3 Time-Driven Activity-Based Costing 355
   3.2 Operations Management Choices Affecting Cost Measurement Accuracy 356
      3.2.1 Validity of the ABC Hierarchy 356
      3.2.2 Cost of Product Variety 356
   3.3 Implications for Practice 357
4 Directions for Future Research 358
   4.1 Service Sector Considerations 358
   4.2 Accounting Information Technology Advances 358
   4.3 Dynamic Cost Measurement in Specific Operations Environments 358
References and Bibliography 359
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>19 POM and Finance</td>
<td>360</td>
</tr>
<tr>
<td><em>John R. Birge</em></td>
<td></td>
</tr>
<tr>
<td>1 Introduction</td>
<td>360</td>
</tr>
<tr>
<td>2 Impact of Financing Needs on Single Firm Operational Decisions</td>
<td>361</td>
</tr>
<tr>
<td>3 Impact of Financial Markets on Single Firm Operational Decisions</td>
<td>362</td>
</tr>
<tr>
<td>4 Impact of Financial Considerations on Supply Chain Operations</td>
<td>367</td>
</tr>
<tr>
<td>5 Impact of Operational Decisions on Financial Asset Prices</td>
<td>368</td>
</tr>
<tr>
<td>6 Empirical Results in Operations and Finance Interactions</td>
<td>368</td>
</tr>
<tr>
<td>7 Conclusions and Future Research Directions</td>
<td>370</td>
</tr>
<tr>
<td>References and Bibliography</td>
<td>370</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 POM and Marketing</td>
<td>374</td>
</tr>
<tr>
<td><em>Manoj K. Malhotra, Ramkumar Janakiraman, Saurabh Mishra, and Moontwon Chung</em></td>
<td></td>
</tr>
<tr>
<td>1 Introduction</td>
<td>374</td>
</tr>
<tr>
<td>2 Input Context-Multichannel Retailing as a Challenge to Customer</td>
<td>375</td>
</tr>
<tr>
<td>Segmentation, Inventory Management, and Reverse Logistics</td>
<td></td>
</tr>
<tr>
<td>2.1 Complex Market Segments</td>
<td>376</td>
</tr>
<tr>
<td>2.2 Increased Inventory Volatility</td>
<td>377</td>
</tr>
<tr>
<td>2.3 Returned and Remanufactured Products</td>
<td>377</td>
</tr>
<tr>
<td>3 Process Coordination: Intra-/Inter-Firm Issues in POM and Marketing Interface</td>
<td>378</td>
</tr>
<tr>
<td>3.1 Focus on Micro-Level Process Integration with Data</td>
<td>378</td>
</tr>
<tr>
<td>Rich Forecasting</td>
<td></td>
</tr>
<tr>
<td>3.2 Joint Capability Planning</td>
<td>379</td>
</tr>
<tr>
<td>3.3 Reverse Logistics and Sustainability</td>
<td>380</td>
</tr>
<tr>
<td>4 Output Consequence: Complementarity Between POM and Marketing for Building Shareholder Wealth</td>
<td>381</td>
</tr>
<tr>
<td>4.1 Theoretical Frameworks for Research on Shareholder Wealth</td>
<td>381</td>
</tr>
<tr>
<td>4.2 Current Research on Shareholder Wealth in POM and Marketing</td>
<td>382</td>
</tr>
<tr>
<td>5 Future POM and Marketing Interface Research Avenues</td>
<td>383</td>
</tr>
<tr>
<td>5.1 Deepening Consumer Knowledge and Channel Dynamics</td>
<td>383</td>
</tr>
<tr>
<td>Across Channels</td>
<td></td>
</tr>
<tr>
<td>5.2 Designing Better Socially Responsible and Environmentally</td>
<td>385</td>
</tr>
<tr>
<td>Sustainable Processes in POM and Marketing</td>
<td></td>
</tr>
<tr>
<td>5.3 Fostering Complementarity Between POM and Marketing Capabilities</td>
<td>386</td>
</tr>
<tr>
<td>6 Implications for Practitioners</td>
<td>386</td>
</tr>
<tr>
<td>7 Conclusion and Future Research Directions</td>
<td>387</td>
</tr>
<tr>
<td>References and Bibliography</td>
<td>387</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>21 The Strategic Role of Human Resources in Enabling POM</td>
<td>392</td>
</tr>
<tr>
<td><em>Robert K. Prescott, Henrique L. Correa, and Adeola O. Shabiyi</em></td>
<td></td>
</tr>
<tr>
<td>1 Introduction</td>
<td>392</td>
</tr>
<tr>
<td>1.1 Purpose of the Chapter</td>
<td>392</td>
</tr>
<tr>
<td>1.2 Background</td>
<td>392</td>
</tr>
</tbody>
</table>

xxi
Contents

2 A Call for Synergy Between Human Resources and Production and Operations Management 393
  2.1 A Strategic Imperative—Review of the Literature 393
  2.2 Current Trends in Human Resources Management (HRM) 394
    2.2.1 Human Capital Research and Analytics 394
    2.2.2 Integrating HR Practices with POM 394
    2.2.3 Organizational Development (OD) and Human Resources (HR) in Production and Operations Management (POM) 394
  2.3 Best Practices in Human Resources Management (HRM) 395
    2.3.1 Internal HR Professionals and POM 395
    2.3.2 Human Resources (HR) and the Organizational Performance Linkage 396
    2.3.3 The HR—Performance Linkage and Geographic Implications 396
    2.3.4 The HR—Performance Linkage and Learning 397
  2.4 Current Issues in Production and Operations Management (POM) 397
    2.4.1 Human Resources (HR) and Production and Operations Management (POM) Research 397
    2.4.2 HR and Operations Practices and Organizational Performance 399
    2.4.3 Group Social Dynamics and Performance 399
    2.4.4 Cross-Functional Coordination, Information Systems Capability, and Performance 399
    2.4.5 Systems Thinking and Performance 400
  3 Professional Perspective 400
    3.1 Explanatory Survey with HR and POM Leaders—“A Synthesis of Needs” 400
    3.2 Results 401
      3.2.1 How Is the Overall Role of SHRM Evaluated by Industry Production and Operations Leaders and Managers? 401
      3.2.2 How Is the Partnership Role of SHRM with POM Evaluated by Industry Human Resources Leaders and Managers? 401
      3.2.3 What Is the Contemporary Role of SHRM in POM? 402
      3.2.4 How Can SHRM Enable POM? 402
    3.3 Survey Conclusions 402
      3.3.1 HR and POM Partnership 402
      3.3.2 HR and POM Best Practices 403
      3.3.3 HR as a Change Agent 404
  4 HR Enabling POM to Win the Talent War 404
  5 Implications for Managers 407
  7 Conclusions 408
References and Bibliography 408
**PART VI**  
**POM Domains of Application**  

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Authors</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>Operations Management in Hospitality</td>
<td>Rohit Verma, Lu Kong, and Zhen Lin</td>
<td>413</td>
</tr>
<tr>
<td></td>
<td>1 Introduction</td>
<td></td>
<td>413</td>
</tr>
<tr>
<td></td>
<td>2 The Essence of Hospitality</td>
<td></td>
<td>414</td>
</tr>
<tr>
<td></td>
<td>3 Product and Service Innovation in Hospitality</td>
<td></td>
<td>414</td>
</tr>
<tr>
<td></td>
<td>4 Integrating Service Quality in Operational Processes</td>
<td></td>
<td>415</td>
</tr>
<tr>
<td></td>
<td>5 The Role of Employees</td>
<td></td>
<td>415</td>
</tr>
<tr>
<td></td>
<td>6 Demand and Capacity Management</td>
<td></td>
<td>416</td>
</tr>
<tr>
<td></td>
<td>7 Yield and Revenue Management</td>
<td></td>
<td>416</td>
</tr>
<tr>
<td></td>
<td>8 Ownership Structure, Franchising, and Cost of Operations</td>
<td></td>
<td>417</td>
</tr>
<tr>
<td></td>
<td>9 Start-Up of New Locations and Managing Hospitality Projects</td>
<td></td>
<td>418</td>
</tr>
<tr>
<td></td>
<td>10 Managing Risk and Disruption</td>
<td></td>
<td>419</td>
</tr>
<tr>
<td></td>
<td>11 Role of Lean Thinking and Sustainable Operations in Hospitality</td>
<td></td>
<td>420</td>
</tr>
<tr>
<td></td>
<td>12 The Role of New Media in Managing Hospitality Operations</td>
<td></td>
<td>420</td>
</tr>
<tr>
<td></td>
<td>13 Directions for Future Research</td>
<td></td>
<td>421</td>
</tr>
<tr>
<td></td>
<td>References and Bibliography</td>
<td></td>
<td>423</td>
</tr>
</tbody>
</table>

| 23      | POM for Healthcare—Focusing on the Upstream: Management of Preventive and Emergency Care | Vedat Verter | 427 |
|         | 1 Introduction                                                      |                                  | 427   |
|         | 2 POM for Preventive Care                                           |                                  | 430   |
|         | 2.1 Preventive Care Processes                                       |                                  | 430   |
|         | 2.2 A Basic Formulation for Designing Preventive Care Networks      |                                  | 431   |
|         | 2.3 Extended Models for Preventive Care                             |                                  | 432   |
|         | 3 POM for Emergency Care                                            |                                  | 433   |
|         | 3.1 Key Challenges in ED Management                                 |                                  | 434   |
|         | 3.2 Simulation of ED Processes                                      |                                  | 435   |
|         | 3.3 A Case Study in ED Triage                                       |                                  | 436   |
|         | 4 Implications for Managers                                         |                                  | 439   |
|         | 5 Conclusions and Future Research Directions                        |                                  | 440   |
|         | References and Bibliography                                         |                                  | 440   |

| 24      | Sports Operations Management: The Whole Nine Yards                   | David Bamford, Benjamin Dehe, Iain Reid, James Bamford, and Marina Papalexi | 443   |
|         | 1 Introduction                                                      |                                  | 443   |
|         | 2 Past History                                                      |                                  | 443   |
3.2.3 Capacity Pricing 534
3.2.4 Future Research 534
3.3 Operations Management of Cloud Computing 534
  3.3.1 Job Scheduling in the Cloud 534
  3.3.2 Resource Optimization in the Cloud 535
  3.3.3 Future Research 535
4 Applications of Telecommunications in Operations 536
  4.1 Humanitarian Operations 536
    4.1.1 Online Education 536
    4.1.2 Disaster Recovery and Rescue Operations 536
    4.1.3 Further Research 537
  4.2 Healthcare Operations 537
    4.2.1 Tele-Medicine 537
    4.2.2 Health Information Exchanges (HIEs) 537
    4.2.3 Future Research 538
  4.3 Homeland Security Applications 538
    4.3.1 Further Research 538
5 Implications for Managers 539
6 Conclusions and Directions for Future Research 539
References and Bibliography 539

29 POM for Disaster Management
   Peter W. Robertson, Sushil K. Gupta, and Martin K. Starr
1 Introduction 543
2 Context 543
3 Compelling Case for the Achievement of Disaster Management Excellence in POM 544
4 Past History 547
5 Present Situation 548
  5.1 Explanation of Figure 29.1—Disaster Management Cycle 548
  5.2 Present DM Taxonomies 548
  5.3 Present DM Typologies 550
6 Future Projections 551
7 Disaster Management Research 553
8 Implications for Managers 555
9 Future Research Directions 555
References and Bibliography 556

30 The Impact of POM on Transport and Logistics
   Dongping Song
1 Introduction 557
2 Transport Modes and Features 558
   2.1 Road Transport 558
   2.2 Rail Transport 558
Contents

2.3 Air Transport 559
2.4 Water (Maritime) Transport 559
2.5 Pipeline Transport 559
2.6 Comparison of Transport Modes 559
3 Transport Systems and Key Performance Indicators (KPIs) 560
3.1 Transport Systems 560
3.2 KPIs 561
4 POM Research in Transport and Logistics 561
4.1 Service Network Design 562
4.1.1 Solution Techniques 563
4.2 Fleet Sizing and Deployment 564
4.3 Vehicle/Inventory Routing and Scheduling 565
4.3.1 Vehicle Routing Problem (VRP) 565
4.3.2 Inventory Routing Problem 566
4.3.3 Cargo Routing Problem 566
4.3.4 Schedule Design Problem 566
4.4 Speed Management and Slow Streaming 567
4.5 Empty Vehicle/Container Management 567
4.5.1 Empty Vehicle Management 568
4.5.2 Empty Container Management 568
4.6 Disruption Management 568
4.7 Crew Scheduling and Rostering 569
4.8 Port/Terminal Management 570
4.9 Emission Management 571
5 Implications for Managers 572
6 Directions for Future Research 572
6.1 General POM Modelling Opportunities 572
6.1.1 Objective Functions and Constraints 572
6.1.2 Decision Integration 573
6.1.3 Stochastic and Dynamic Operations 573
6.1.4 Solution Techniques and Heuristic Rules 573
6.2 Emerging ICT-Driven Opportunities 574
References and Bibliography 574

31 POM and Retailing
Vishal Gaur
1 Introduction 579
2 A Historical Perspective of Research in Retail Operations 580
2.1 Inventory Management 580
2.2 Retail Supply Chains 582
2.3 Customer Service 583
2.4 Pricing and Clearance Markdowns 583
2.5 Shelf Space Management 584
2.6 Assortment Planning 584
2.7 Financial Performance of Retailing Firms 585
3 Present Situation 586
  3.1 Store Execution and Workforce Management 587
  3.2 Online and Omnichannel Retailing 587
4 Directions for Future Research 588
  4.1 Availability of Individual Customer-Level High-Frequency Data Will Drive Research in New Decision Models and Experiments 589
  4.2 New In-Store Technologies Will Transform Retail Stores, Making Bricks and Clicks a Reality and Changing the Customer Experience 589
  4.3 Emerging Retail Formats, Warehouse Logistics, and Package Delivery Methods Will Create More Opportunities for Research 590
  4.4 Environmental Sustainability Will Grow as a Research Area in Retailing 590
  4.5 Merchandising and Sourcing Functions Will See Research in New Models 591
5 Implications for Practitioners 591
6 Conclusions 592
References and Bibliography 592

PART VII
Expert POM Practitioners' Perspectives 599

32 POM for the Hospitality Industry 601

Lee Cockerell
   1 POM for the Hospitality Industry 601
   2 Mapping Customer Service—Managing Systems and Processes 601
   3 Management Is About Control 601
   4 Management Titles and POM Methods in the Hospitality Industry 602
   5 Walt Disney World® Principles for Success 602
        5.1 Chain of Excellence at Walt Disney World® 603
   6 Great Leader Strategies at Walt Disney World® 603
   7 The Disney World Purpose Statement 604
   8 Creating Disney World Magic 604
   9 Eliminate Hassles (Policies, Procedures, and Operating Guidelines) 604
  10 Stay Ahead of the Pack 605
  11 The Four Keys Model 606
  12 Learn to Tell a Good Story 606
        12.1 “Be Safe, Not Sorry!—Focused Attention Creates Positive Results” 607
        12.2 “Quality over Quantity . . . Quality Always Wins Out!” 607
        12.3 “Messy and Not Clean Look the Same to Guests/Customer” 607
        12.4 “9/11 Was the Saddest and Proudest Day of My Career” 608
        12.5 “How to Take the Wind Out of Hurricanes” 609
Contents

13 The Concept of POM: Find the Best Way to Do Everything and Then Do It That Way 609
References and Bibliography 610

33 Trends in Global Sourcing, Procurement, and Distribution
Research and Practice 611
Edwin Keh
1 Global Trade's Role and Influence on Historical Developments 611
2 The Modern Era of Global Trade 612
3 Large-Scale Migration and Contract Manufacturing 613
4 The Forces Influencing the New Global Trade—An Inflection Point 613
5 Pollution and Other Costs to Consuming and Manufacturing 614
6 New Consumption Models and the Complex Cycles of Global Sourcing 615
7 Global Sourcing 616
8 Procurement 617
9 Costing 620
10 Building Relationships Rather Than Making Transactions 621
11 The Challenges of Distribution 622
12 The Opportunities Ahead 622
13 Effective Global Supply Chain Operations—A Product and Process Characteristics-Based Decision-Making Framework 623
13.1 Product Characteristics 624
13.2 Manufacturing Process Characteristics 624
14 Implications for Future Research 630
References and Bibliography 630

34 Best Practice: Supply Chain Optimization at Yihaodian 632
Gang Yu and Ping (David) Yang
1 Introduction 632
2 Company Overview 632
3 Industry Landscape and YHD's Supply Chain Strategy 633
4 Supply Chain Models and YHD's Innovation 634
4.1 Supplier Logistics Center (SLC) 635
4.2 Pallet Pooling Service 637
4.3 Aggregated Supplier Delivery 639
4.4 Cross-Docking Logistics (CDL) 640
5 Performance Improvements 641
6 Future Development 641
6.1 Collaborative Planning, Forecast, and Replenishment (CPFR) 642
6.2 Data-Driven Supply Chain Management 642
References and Bibliography 644
PART VIII
POM—The Next Era

35 The Evolutionary Trends of POM Research in Manufacturing
Tinglong Dai and Sridhar Tayur
1 Introduction: Creating Wealth and Happiness, Massively 647
2 Modern Manufacturing: An Orchestration of Technologies 649
3 What Is Orchestrating Technology? 649
4 Operational Innovations and PPOMs 650
   4.1 POM Inside the Factory 652
   4.2 POM Outside the Factory 654
   4.3 Interface Between the Inside and the Outside of the Factory 655
5 Capital Versus Labor 657
6 Implications for Managers 658
7 Conclusion: The Future of POM and Manufacturing 659
References and Bibliography 660

36 Future Trends for Research and Practice in the Management of
   Global Supply Chains 663
Henrique L. Correa
1 Introduction 663
   1.1 Increase in Volatility 663
   1.2 Increase in Complexity 664
   1.3 Increase in the Influence of Organized Society and Governments to Make
       Organizations Pursue the Triple Bottom Line (3BL) 664
2 Implication of the Identified Trends for Practitioners 665
   2.1 Competencies to Deal with the Rise in Supply Chain Volatility 665
   2.2 Competencies to Deal with the Increase in Supply Chain Complexity 666
      2.2.1 The Use of Postponement 666
      2.2.2 Integration of Decision-Making Processes and
          Increased Collaboration 666
      2.2.3 The Use of New Technologies 667
      2.2.4 Segmentation of Supply Chains 667
   2.3 Competencies to Deal with the Increase in Pressure for 3BL 668
3 Directions for Research in Supply Chain Management 669
   3.1 Supporting Theories 669
   3.2 Proposed Research Directions in Supply Chain Management 670
      3.2.1 Future Research Related to Increased Volatility 670
      3.2.2 Future Research Related to Increased Complexity 671
      3.2.3 Future Research Related to Increased 3BL Performance 672
4 Conclusion 672
References and Bibliography 673