

# Contents

<b>1</b>	<b>Defining and Understanding Service Chain Management</b>	<b>1</b>
1.1	Introduction	1
1.2	Book Objectives	2
1.3	Challenges in Service Operations	3
1.4	Key Success Factors in Services	4
1.5	Developing a Blueprint for Service Chain Management	7
1.5.1	Automating Scheduling and Dispatching	7
1.5.2	Moving to Advanced and Systematic Planning	8
1.5.3	FOS: An Example Suite for Integrated Service Chain Management	9
1.5.4	Contrasting with Supply Chain Management	10
1.6	The Broader Picture Across Verticals	12
1.7	Technologies for Services and Book Structure	13
1.8	The Emergence of Digital Services and Chains	14
1.9	Summary	17
<b>2</b>	<b>Customer Service: Emerging Requirements and Trends</b>	<b>19</b>
2.1	Introduction	19
2.2	Emerging Trends	20
2.3	Becoming a Real-Time Enterprise	21
2.4	Making Service Personal	22
2.5	Exploiting Customer Analytics	23
2.6	Engendering Customer and Employee Advocacy	25
2.7	Becoming a Knowledge-Driven Service Enterprise	26
2.8	Opening-up the Enterprise	27
2.9	Summary	28

## Part I Resource Planning

<b>3</b>	<b>Strategic Resource Planning</b> .....	35
3.1	Introduction .....	35
3.2	The Case for Strategic Resource Planning .....	36
3.3	Characterising the Strategic Resource Planning Process .....	37
3.4	Barriers to Implementing an Automated Strategic Resource Planning System .....	40
3.4.1	Demand Management .....	40
3.4.2	Supply Management and Planning .....	42
3.4.3	Variance Analysis, Recommendations and Reports .....	44
3.4.4	Enablers and Planning Environment .....	46
3.5	A Framework for Implementing an Automated Strategic Planning System .....	47
3.6	Summary .....	49
<b>4</b>	<b>Forecasting and Demand Planning</b> .....	51
4.1	Introduction .....	51
4.2	Demand Forecasting and Planning .....	51
4.3	Challenges in Demand Forecasting .....	53
4.4	The Forecasting Process .....	54
4.4.1	Data Analysis and Interpretation .....	54
4.4.2	Forecasting Methods .....	56
4.4.3	Forecasting Measures .....	60
4.5	Understanding Forecasting Impact on Demand Planning .....	62
4.6	Unprecedented Events and Risk Mitigation .....	63
4.7	Summary .....	64
<b>5</b>	<b>Tactical Resource Planning and Deployment</b> .....	65
5.1	Introduction .....	65
5.2	Defining Tactical Resource Planning .....	66
5.3	Challenges in Engineering a Tactical Resource Planning System ..	68
5.3.1	Decision Making in Tactical Resource Planning .....	68
5.3.2	Automation and Optimisation .....	70
5.3.3	Visibility and Control .....	70
5.3.4	Integration in the Service Chain .....	71
5.4	Optimising the Tactical Resource Planning Process .....	71
5.4.1	Fundamental Decisions .....	71
5.4.2	Plan Optimisation Techniques .....	72
5.5	A Case Study .....	74
5.6	Summary .....	76

**6 Network Planning for Telecom and Utilities** ..... 79

6.1 Introduction ..... 79

6.2 The Planning and Design Process ..... 81

6.3 Automating Network Design ..... 83

6.4 Optimisation of Telecommunication Network Design ..... 84

6.4.1 Network Tiers ..... 87

6.4.2 Network Layers ..... 89

6.4.3 Summarising Network Optimisation ..... 90

6.5 Applications of Network Optimisation Within Network Utilities .. 90

6.6 Summary ..... 93

**Part II Reservation Management and Resource Scheduling**

**7 Reservation Management and Resource CRM** ..... 99

7.1 Introduction ..... 99

7.2 A Brief Overview of the Use of Reservation Management Systems 100

7.3 Business and Technical Challenges in Implementing  
a Reservation Management System ..... 101

7.4 Strategies for Implementing a Reservation Management System .. 102

7.4.1 The Strategic Level ..... 102

7.4.2 The Tactical Level ..... 103

7.4.3 The Operational Level ..... 105

7.5 Key Technologies ..... 107

7.6 Summary ..... 107

**8 Demand Pricing and Revenue Management** ..... 109

8.1 Introduction ..... 109

8.1.1 Old Ideas – New Methodologies ..... 110

8.2 Revenue Management – Techniques and Technology ..... 111

8.2.1 Basic Principles ..... 111

8.2.2 Revenue Management Systems ..... 114

8.3 RM – Theory and Practice ..... 116

8.3.1 Theory Outline ..... 116

8.3.2 Industry Adopters ..... 122

8.4 Summary ..... 122

8.5 Further Reading ..... 123

**9 Personnel Shift Scheduling and Rostering** ..... 125

9.1 Introduction ..... 125

9.2 General Description ..... 126

9.2.1 Staffing ..... 127

9.2.2 Shift and Roster Design ..... 129

9.2.3 Shift and Roster Allocation ..... 132

9.3 The Family of Approaches ..... 134

9.3.1 Solutions to Staffing Problems ..... 134

9.3.2 Solutions to Shift Design and Shift Allocation ..... 135

9.4 Summary ..... 137

<b>10</b>	<b>Work Allocation and Scheduling</b> .....	139
10.1	Introduction .....	139
10.2	Challenges in Work Allocation and Scheduling .....	140
10.2.1	Data Availability .....	140
10.2.2	Responsiveness and Flexibility .....	140
10.2.3	Scale and Complexity .....	141
10.3	A General Description of Work Allocation Problems .....	142
10.3.1	Main Concepts Found in Work Allocation .....	143
10.3.2	The Dynamic Nature of the Problem .....	145
10.3.3	Variants of Work Allocation Problems .....	146
10.4	The Family of Approaches .....	147
10.4.1	Exact Searches .....	147
10.4.2	Approximate Searches .....	148
10.5	Implementing Work Allocation and Scheduling .....	148
10.5.1	Rescheduling and Disruption Management .....	150
10.5.2	Mobility Support .....	151
10.6	Summary .....	152
<b>11</b>	<b>People and Attendance Management</b> .....	153
11.1	Introduction .....	153
11.2	What is People and Attendance Management? .....	154
11.2.1	People .....	155
11.2.2	Attendance .....	155
11.2.3	Absence .....	156
11.2.4	Maintaining the Mix Between a Fully Automated System and People Involvement .....	157
11.3	Current Practices in People and Attendance Management .....	157
11.3.1	Analysing the Market Segment for Attendance Management .....	158
11.3.2	Dealing with Attendance in Organisations .....	158
11.4	Implementing People and Attendance Management .....	159
11.4.1	People Management .....	159
11.4.2	Attendance Management .....	160
11.4.3	Absence Management .....	160
11.5	Future Trends .....	162
11.5.1	Mobility and Office Solutions .....	162
11.5.2	Shift Bidding .....	163
11.5.3	Plan-Driven Attendance Management .....	164
11.6	Summary .....	165

## Part III Process, Communications and Information

<b>12 Flexible Workflows</b> .....	171
12.1 Introduction .....	171
12.2 What is Workflow and Workflow Support? .....	172
12.2.1 Leavitt's Diamond .....	172
12.2.2 A Socio-Cognitive Perspective .....	172
12.2.3 Agents in a Workflow .....	173
12.2.4 Control Flow .....	173
12.2.5 Why Are Workflow Support Tools Useful? .....	173
12.3 Previous Approaches .....	174
12.3.1 Workflow Management Systems .....	174
12.3.2 Running Workflows .....	174
12.3.3 Transactional Model .....	174
12.3.4 Workflow Modelling .....	175
12.3.5 Summary .....	175
12.4 Contemporary Approaches .....	176
12.4.1 Why Enterprises Need Service-Oriented Architectures? ...	176
12.4.2 Workflow Specification Languages .....	176
12.4.3 Modern Architectural Styles .....	178
12.4.4 Recovery Mechanisms and Techniques .....	182
12.5 Summary .....	185
<b>13 Personalised Communications</b> .....	187
13.1 Introduction .....	187
13.2 Service Delivery Architectures and Platforms .....	188
13.2.1 UC Services .....	188
13.2.2 The Principles and Elements of SDPs .....	190
13.3 SIP Technologies .....	193
13.3.1 An Overview of SIP .....	193
13.3.2 SIP Deployments .....	195
13.3.3 SIP Application Creation .....	196
13.3.4 SIP Application Orchestration .....	197
13.4 Communications Personalisation and Feature-Oriented Engineering .....	198
13.4.1 Feature-Based Personalisation .....	199
13.4.2 Feature-Oriented Architectures .....	200
13.5 Summary .....	202
<b>14 Predictive Customer Analytics and Real-Time Business Intelligence</b>	205
14.1 Introduction .....	205
14.2 Customer Analytics .....	206
14.2.1 Predicting Customer Events .....	207
14.2.2 Customer Satisfaction and Loyalty .....	208
14.3 Real-Time Business Intelligence .....	208

14.3.1	A Consolidated Semantic Data Layer .....	210
14.3.2	Analytical Performance Frameworks .....	211
14.3.3	Monitoring Performance .....	213
14.3.4	Learning Relationships .....	213
14.3.5	What-If-Scenarios, Target Optimisation and Prediction ...	214
14.4	Summary .....	214
<b>15</b>	<b>The Agile Delivery of Service Chain Management Solutions .....</b>	<b>215</b>
15.1	Introduction .....	215
15.2	The Need for Agile Delivery .....	215
15.2.1	Challenges in Realising Agile Delivery .....	216
15.3	Realising Agile Delivery .....	217
15.3.1	The Development Strategy .....	217
15.3.2	The Adaptive Service Development Approach .....	220
15.4	Managing Agile Delivery .....	223
15.5	Summary .....	223
 <b>Part IV The Future Service Chain</b>		
<b>16</b>	<b>Collaborative Demand Forecasting in Service Chains .....</b>	<b>229</b>
16.1	Introduction .....	229
16.2	What is Collaborative Forecasting? .....	229
16.3	Challenges in Collaborative Forecasting .....	230
16.4	The Objectives of Collaborative Forecasting .....	231
16.5	The Collaborative Forecasting Framework .....	232
16.6	Learning from Product Supply Chains .....	235
16.7	Summary .....	237
<b>17</b>	<b>Business to Business Online Revenue Management .....</b>	<b>239</b>
17.1	Introduction .....	239
17.2	The Impact of Internet and E-Commerce on Service Industries ...	239
17.3	The Logistics Service Chain: An Example Case of B2B E-Commerce Impact .....	241
17.4	Flexible Pricing in E-Commerce .....	242
17.4.1	Online Auctions .....	244
17.4.2	Reverse Auctions .....	244
17.4.3	Quantity Pricing .....	244
17.4.4	Pricing Matching .....	245
17.4.5	Group Pricing .....	245
17.4.6	Trading Exchanges .....	245
17.5	Foundations of Online Revenue Management .....	246
17.6	Models and Algorithms for Online Revenue Management .....	248
17.7	Summary .....	250

<b>18</b>	<b>Electronic Marketplaces and Resource Exchanges</b>	251
18.1	Introduction	251
18.2	Electronic Marketplaces	251
18.3	Agents and Marketplaces	252
18.3.1	Partnership Formation	252
18.3.2	Brokering	253
18.3.3	Negotiation	253
18.3.4	Auctions in B2B eCommerce	254
18.4	Resource Exchanges for Service Chain Management	255
18.5	Business Scenarios for Resource Exchanges	256
18.5.1	Resource Exchange Using a Central Exchange Agent	256
18.5.2	Distributed Agent-Based Resource Exchange	258
18.5.3	A Central Auctioneer-Based Marketplace	259
18.6	Technologies for Implementation	260
18.7	Summary	261
<b>19</b>	<b>Multi-Agent Systems for Staff Empowerment</b>	263
19.1	Introduction	263
19.2	A Workforce Scheduling Problem	264
19.3	How to Achieve the Goals?	265
19.4	Handling Multiple Objectives	266
19.5	How to Generate a Pareto Set of Schedules?	267
19.6	Self-Interested Multi-Agent Scheduling	268
19.7	RECONNET – Local Search over Schedules	269
19.8	Dynamic Scheduling	270
19.9	Research Frontier	270
19.10	Summary	272
<b>Epilogue</b>		
<b>20</b>	<b>A Practical Guide to Benefit Realisation</b>	275
20.1	Introduction	275
20.2	What Does Automation Mean?	275
20.2.1	The Scheduler	276
20.2.2	The Mobile Platform	276
20.2.3	Tracking	276
20.2.4	Device Selection	277
20.2.5	Management Information	277
20.3	What Does Benefit Achievement Mean?	278
20.3.1	Productivity Gains	278
20.3.2	Customer Service Improvements	279
20.3.3	Faster Invoicing	279
20.3.4	Standardisation	280
20.3.5	The Implementation of a Service Policy and Customer Priorities	280

- 20.3.6 Better Quality Work ..... 281
- 20.3.7 A Better Understanding of the Real Performance  
of the Organisation ..... 281
- 20.4 Understanding Existing Processes ..... 282
- 20.5 Selecting Suppliers and Products ..... 282
- 20.6 Piloting and Implementing ..... 283
- 20.7 Summary ..... 285
- Index** ..... 303