

# Contents

<b>1</b>	<b>Introduction to Business Process Management</b>	1
1.1	Processes Everywhere	1
1.2	Ingredients of a Business Process	3
1.3	Origins and History of BPM	8
1.3.1	The Functional Organization	8
1.3.2	The Birth of Process Thinking	10
1.3.3	The Rise and Fall of BPR	12
1.4	The BPM Lifecycle	15
1.5	Recap	26
1.6	Solutions to Exercises	26
1.7	Further Exercises	28
1.8	Further Reading	31
<b>2</b>	<b>Process Identification</b>	33
2.1	Focusing on Key Processes	33
2.1.1	The Designation Phase	34
2.1.2	The Evaluation Phase	38
2.2	Designing a Process Architecture	42
2.2.1	Identify Case Types	44
2.2.2	Identify Functions for Case Types	45
2.2.3	Construct Case/Function Matrices	49
2.2.4	Identify Processes	50
2.2.5	Complete the Process Architecture	55
2.3	Recap	57
2.4	Solutions to Exercises	57
2.5	Further Exercises	59
2.6	Further Reading	60
<b>3</b>	<b>Essential Process Modeling</b>	63
3.1	First Steps with BPMN	63
3.2	Branching and Merging	67
3.2.1	Exclusive Decisions	67

- 3.2.2 Parallel Execution . . . . . 69
- 3.2.3 Inclusive Decisions . . . . . 72
- 3.2.4 Rework and Repetition . . . . . 77
- 3.3 Information Artifacts . . . . . 79
- 3.4 Resources . . . . . 82
- 3.5 Recap . . . . . 89
- 3.6 Solutions to Exercises . . . . . 89
- 3.7 Further Exercises . . . . . 93
- 3.8 Further Reading . . . . . 95
- 4 Advanced Process Modeling . . . . . 97**
  - 4.1 Process Decomposition . . . . . 97
  - 4.2 Process Reuse . . . . . 100
  - 4.3 More on Rework and Repetition . . . . . 102
    - 4.3.1 Parallel Repetition . . . . . 104
    - 4.3.2 Uncontrolled Repetition . . . . . 107
  - 4.4 Handling Events . . . . . 108
    - 4.4.1 Message Events . . . . . 108
    - 4.4.2 Temporal Events . . . . . 110
    - 4.4.3 Racing Events . . . . . 111
  - 4.5 Handling Exceptions . . . . . 114
    - 4.5.1 Process Abortion . . . . . 115
    - 4.5.2 Internal Exceptions . . . . . 116
    - 4.5.3 External Exceptions . . . . . 117
    - 4.5.4 Activity Timeouts . . . . . 118
    - 4.5.5 Non-interrupting Events and Complex Exceptions . . . . . 119
    - 4.5.6 Interlude: Event Sub-processes . . . . . 121
    - 4.5.7 Activity Compensation . . . . . 122
  - 4.6 Processes and Business Rules . . . . . 124
  - 4.7 Process Choreographies . . . . . 125
  - 4.8 Recap . . . . . 129
  - 4.9 Solutions to Exercises . . . . . 130
  - 4.10 Further Exercises . . . . . 146
  - 4.11 Further Reading . . . . . 152
- 5 Process Discovery . . . . . 155**
  - 5.1 The Setting of Process Discovery . . . . . 155
    - 5.1.1 Process Analyst Versus Domain Expert . . . . . 156
    - 5.1.2 Three Process Discovery Challenges . . . . . 158
    - 5.1.3 Profile of a Process Analyst . . . . . 159
  - 5.2 Discovery Methods . . . . . 161
    - 5.2.1 Evidence-Based Discovery . . . . . 161
    - 5.2.2 Interview-Based Discovery . . . . . 162
    - 5.2.3 Workshop-Based Discovery . . . . . 164
    - 5.2.4 Strengths and Limitations . . . . . 165

- 5.3 Process Modeling Method . . . . . 167
  - 5.3.1 Identify the Process Boundaries . . . . . 167
  - 5.3.2 Identify Activities and Events . . . . . 167
  - 5.3.3 Identify Resources and Their Handovers . . . . . 168
  - 5.3.4 Identify the Control Flow . . . . . 169
  - 5.3.5 Identify Additional Elements . . . . . 169
- 5.4 Process Model Quality Assurance . . . . . 171
  - 5.4.1 Syntactic Quality and Verification . . . . . 171
  - 5.4.2 Semantic Quality and Validation . . . . . 172
  - 5.4.3 Pragmatic Quality and Certification . . . . . 174
  - 5.4.4 Modeling Guidelines and Conventions . . . . . 175
- 5.5 Recap . . . . . 178
- 5.6 Solutions to Exercises . . . . . 179
- 5.7 Further Exercises . . . . . 181
- 5.8 Further Reading . . . . . 183
- 6 Qualitative Process Analysis . . . . . 185**
  - 6.1 Value-Added Analysis . . . . . 185
    - 6.1.1 Value Classification . . . . . 185
    - 6.1.2 Waste Elimination . . . . . 189
  - 6.2 Root Cause Analysis . . . . . 190
    - 6.2.1 Cause–Effect Diagrams . . . . . 191
    - 6.2.2 Why–Why Diagrams . . . . . 196
  - 6.3 Issue Documentation and Impact Assessment . . . . . 198
    - 6.3.1 Issue Register . . . . . 198
    - 6.3.2 Pareto Analysis and PICK Charts . . . . . 201
  - 6.4 Recap . . . . . 204
  - 6.5 Solutions to Exercises . . . . . 205
  - 6.6 Further Exercises . . . . . 208
  - 6.7 Further Reading . . . . . 210
- 7 Quantitative Process Analysis . . . . . 213**
  - 7.1 Performance Measures . . . . . 213
    - 7.1.1 Process Performance Dimensions . . . . . 213
    - 7.1.2 Balanced Scorecard . . . . . 217
    - 7.1.3 Reference Models and Industry Benchmarks . . . . . 218
  - 7.2 Flow Analysis . . . . . 219
    - 7.2.1 Calculating Cycle Time Using Flow Analysis . . . . . 219
    - 7.2.2 Cycle Time Efficiency . . . . . 224
    - 7.2.3 Cycle Time and Work-In-Process . . . . . 225
    - 7.2.4 Other Applications and Limitations of Flow Analysis . . . . . 227
  - 7.3 Queues . . . . . 229
    - 7.3.1 Basics of Queueing Theory . . . . . 229
    - 7.3.2 M/M/1 and M/M/c Models . . . . . 232
    - 7.3.3 Limitations of Basic Queueing Theory . . . . . 234

- 7.4 Simulation . . . . . 235
  - 7.4.1 Anatomy of a Process Simulation . . . . . 235
  - 7.4.2 Input for Process Simulation . . . . . 236
  - 7.4.3 Simulation Tools . . . . . 240
  - 7.4.4 A Word of Caution . . . . . 243
- 7.5 Recap . . . . . 243
- 7.6 Solutions to Exercises . . . . . 244
- 7.7 Further Exercises . . . . . 246
- 7.8 Further Reading . . . . . 250
- 8 Process Redesign . . . . . 253**
  - 8.1 The Essence of Process Redesign . . . . . 253
    - 8.1.1 Why Redesign? . . . . . 253
    - 8.1.2 What Is Redesign? . . . . . 256
    - 8.1.3 The Devil’s Quadrangle . . . . . 258
    - 8.1.4 How to Redesign? . . . . . 259
  - 8.2 Heuristic Process Redesign . . . . . 262
    - 8.2.1 Customer Heuristics . . . . . 263
    - 8.2.2 Business Process Operation Heuristics . . . . . 264
    - 8.2.3 Business Process Behavior Heuristics . . . . . 266
    - 8.2.4 Organization Heuristics . . . . . 267
    - 8.2.5 Information Heuristics . . . . . 270
    - 8.2.6 Technology Heuristics . . . . . 271
    - 8.2.7 External Environment Heuristics . . . . . 271
  - 8.3 The Case of a Health Care Institution . . . . . 273
    - 8.3.1 Sending Medical Files by Post . . . . . 275
    - 8.3.2 Periodic Meetings . . . . . 275
    - 8.3.3 Requesting Medical Files . . . . . 276
  - 8.4 Product-Based Design . . . . . 278
    - 8.4.1 Analysis: Creating a Product Data Model . . . . . 279
    - 8.4.2 Design: Deriving a Process from a Product Data Model . . . . . 285
  - 8.5 Recap . . . . . 288
  - 8.6 Solutions to Exercises . . . . . 289
  - 8.7 Further Exercises . . . . . 292
  - 8.8 Further Reading . . . . . 295
- 9 Process Automation . . . . . 297**
  - 9.1 Automating Business Processes . . . . . 297
    - 9.1.1 Business Process Management Systems . . . . . 298
    - 9.1.2 Architecture of a BPMS . . . . . 299
    - 9.1.3 The Case of ACNS . . . . . 304
  - 9.2 Advantages of Introducing a BPMS . . . . . 309
    - 9.2.1 Workload Reduction . . . . . 309
    - 9.2.2 Flexible System Integration . . . . . 310
    - 9.2.3 Execution Transparency . . . . . 311
    - 9.2.4 Rule Enforcement . . . . . 312

- 9.3 Challenges of Introducing a BPMS . . . . . 313
  - 9.3.1 Technical Challenges . . . . . 313
  - 9.3.2 Organizational Challenges . . . . . 314
- 9.4 Turning Process Models Executable . . . . . 316
  - 9.4.1 Identify the Automation Boundaries . . . . . 317
  - 9.4.2 Review Manual Tasks . . . . . 319
  - 9.4.3 Complete the Process Model . . . . . 323
  - 9.4.4 Bring the Process Model to an Adequate Granularity Level . . . . . 324
  - 9.4.5 Specify Execution Properties . . . . . 327
  - 9.4.6 The Last Mile . . . . . 337
- 9.5 Recap . . . . . 338
- 9.6 Solutions to Exercises . . . . . 338
- 9.7 Further Exercises . . . . . 347
- 9.8 Further Reading . . . . . 351
- 10 Process Intelligence . . . . . 353**
  - 10.1 Process Execution and Event Logs . . . . . 353
    - 10.1.1 The Perspective of Participants on Process Execution . . . . . 354
    - 10.1.2 The Perspective of the Process Owner on Process Execution . . . . . 354
    - 10.1.3 Structure of Event Logs . . . . . 356
    - 10.1.4 Challenges of Extracting Event Logs . . . . . 359
  - 10.2 Automatic Process Discovery . . . . . 360
    - 10.2.1 Assumptions of the  $\alpha$ -Algorithm . . . . . 360
    - 10.2.2 The Order Relations of the  $\alpha$ -Algorithm . . . . . 361
    - 10.2.3 The  $\alpha$ -Algorithm . . . . . 364
    - 10.2.4 Robust Process Discovery . . . . . 366
  - 10.3 Performance Analysis . . . . . 367
    - 10.3.1 Time Measurement . . . . . 367
    - 10.3.2 Cost Measurement . . . . . 369
    - 10.3.3 Quality Measurement . . . . . 370
    - 10.3.4 Flexibility Measurement . . . . . 372
  - 10.4 Conformance Checking . . . . . 373
    - 10.4.1 Conformance of Control Flow . . . . . 374
    - 10.4.2 Conformance of Data and Resources . . . . . 377
  - 10.5 Recap . . . . . 378
  - 10.6 Solutions to Exercises . . . . . 379
  - 10.7 Further Exercises . . . . . 382
  - 10.8 Further Reading . . . . . 382
- References . . . . . 385**
- Index . . . . . 391**



<http://www.springer.com/978-3-642-33142-8>

Fundamentals of Business Process Management

Dumas, M.; La Rosa, M.; Mendling, J.; Reijers, H.

2013, XXVII, 399 p., Hardcover

ISBN: 978-3-642-33142-8