



Operations Management

An Integrated Approach

edited by DANNY SAMSON
and PRAKASH J. SINGH

CAMBRIDGE

Contents

.....

List of Contributors	<i>page</i> xviii
Preface	xxi
Acknowledgements	xxiv

Part I Operations within Organisations – Building Blocks

1 What is Operations Management and Why is it Important?	3
<i>Prakash J. Singh</i>	
Learning objectives	3
Introduction	4
What is operations management?	5
Role of operations management in organisations	8
Operations management as a standalone function	8
Operations management as a ubiquitous function	9
Operations management within supply chains and networks	10
<i>Operations management from a strategic perspective</i>	10
An operational perspective	11
Integrated role of operations management	11
Differences and similarities between goods and services	15
Typical decision areas within operations management	17
Trends encouraging focus on operations	23
Develop a global focus	24
Think beyond organisation boundaries	24
Be more responsive to customers	24
Establish distinctive capabilities	25
Operations-led excellence	25
Treat employees as partners	25
Be an ethical operator	26
Historical evolution of the field	30
Craft production	31

Batch production	31
Mass production	31
Lean operation	32
Mass customisation	32
Careers in operations management	33
Summary	34
Discussion questions	35
2 Operating System Models	37
<i>David Parker</i>	
Learning objectives	37
Introduction . . . and a brief look back in time	38
Traditional and progressive operating systems	41
Delivering on the proposition	43
Work-in-progress and inventory issues	45
Philosophy of lean systems	46
What is value and what is waste?	47
Making value flow along the value stream	48
The components of lean practice	49
Building a lean organisation	54
Lean layouts and technology	55
Lean operating systems for services	56
Employee empowerment	57
The challenges of JIT management	58
Supply relationship management	58
Summary	60
Discussion questions	61
3 Key Decisions in OM	64
<i>Willem Selen and Danny Samson</i>	
Learning objectives	64
Introduction	65
Make-or-buy, outsource, or off-shore?	66
The make-or-buy decision	66
Outsourcing	68
Off-shoring	69
Alternatives to the make-or-buy decision	69
Forecasting decisions	70
Role of demand forecasting for products and services	70
Which forecasting approach to use?	72
Performance of forecasting methods	75

Location decisions	75
Strategic importance of location	75
Location decisions in supply chains	76
Locating service operations	77
Factors to consider when evaluating potential site locations	78
Capacity decisions	79
Issues in determining levels of capacity	80
Capacity measurement	81
Impact of capacity planning and control	81
Timing of capacity change and aggregate capacity strategies	82
Balancing of capacity and safety capacity	83
Capacity constraints	84
Service specific capacity issues	85
Summary	86
Discussion questions	88
4 Planning and Controlling the Use of Operating Assets and Resources	90
<i>Sum Chee Chuong</i>	
Learning objectives	90
Introduction	91
Inventory management	92
Inventory costs	93
Independent versus dependent demand	93
Inventory systems	94
Economic order quantity (EOQ) model	95
Example	97
Solution	98
Aggregate planning	98
What is aggregate planning?	98
Planning options	99
Aggregate planning strategies	101
Techniques for aggregate planning	103
Example	103
Solution	104
Master scheduling	105
What is a master schedule?	105
Master scheduling process	106
Material requirements planning (MRP)	107
Is ERP the same as MRP?	107
Example	112
Managing change	113

Other considerations	113
Successful MRP system	115
Enterprise resource planning (ERP)	116
How does ERP connect the functional areas?	116
Summary	118
Discussion questions	119

Part II Approaches to Understanding OM

5 Strategic Approach to Operations Management	123
<i>Senevi Kiridena and Prakash J. Singh</i>	
Learning objectives	123
Introduction	124
Strategy: general organisational perspectives	129
Defining strategy: reconciling multiple view points	129
Strategy and the organisational hierarchy	131
Strategy: content, process and context	132
Competitive advantage and generic strategies	135
Market-based view of competition	136
Resource-based view of competition	136
Market-driving vs market-driven organisations	138
Generic competitive strategies	139
The strategic approach to operations: key concepts	140
Strategic operations decision areas	141
Operations' contribution to competitive advantage	142
<i>Competitive priorities</i>	144
The concept of trade-offs in operations	144
Technology and the trade-offs concept	147
The 'sand cone' model	148
Defining operations strategy	149
Operations strategy: content, process and context	151
Operations strategy in practice	153
Major improvement programs as operations strategy	154
Specific organisational practices as operations strategy	154
Entrepreneurial initiatives as operations strategy	155
Operations strategy process in practice	155
Summary	156
Discussion questions	157
6 Processes and Systems in Operations Management	161
<i>Daniel Prajogo, Prakash J. Singh and Danny Samson</i>	
Learning objectives	161
Introduction	162

What does 'process' mean?	163
Classification of processes into generic types	169
Factors affecting choice of process type	169
Project process type	170
Job process type	171
Batch process type	172
Line or mass process type	173
Continuous process type	174
Process types in services	174
Process layout	175
Layout decision	176
Fixed-position layout	176
Process-focused layout	177
Product-focused layout	177
Cellular layout	178
Layout in services sector organisations	179
People and technology in processes	181
The role of people in processes	181
The role of technology in processes	182
Process analysis and measurement	185
Quality	186
Productivity	186
Utilisation	186
Standard time	187
Throughput time	187
Delivery-in-full-on-time-in-specification (DIFOTIS)	187
Flowchart or process mapping	188
Service blueprinting	189
Scheduling	189
Scheduling in high volume systems	191
Scheduling services	197
Summary	197
Discussion questions	198
7 Supply Chain or Network Approach to Operations Management	201
<i>Richard Lane</i>	
Learning objectives	201
Introduction	202
What is a supply chain?	204
Companies and situations	205
Operating the supply chain	206
Sourcing and strategic issues	208
Designing success with SCOR®	210

The Internet and IT	211
Strategy and the Internet	211
Internet and operations	213
Bullwhip and the Internet	215
Infrastructure and services	216
Infrastructure	216
Service providers	217
Current challenges and success	218
Summary	219
Discussion questions	221

Part III Moving Forward with OM – Creating Competitive Advantage

8 Innovation, Technology and Knowledge Management	225
<i>Paul Hyland and Claudine Soosay</i>	
Learning objectives	225
Introduction	226
The challenges and benefits of innovation success	227
The customer value proposition challenge	227
The channel to market challenge	228
The scale up and supply challenge	228
The key people challenge	228
The sustainable development challenge	229
The return on financial investment	229
Meeting the six challenges	230
Managing innovation	231
Innovation and its impact on operations management	231
Balancing operational effectiveness and innovation capacity	232
Rates of innovation	233
Radical innovation	233
Incremental innovation	234
Continuous innovation	234
Discontinuous innovation	235
Forms of innovation	236
Product and service innovation	236
Process innovation	237
Market position innovation	238
Paradigm innovation	240
Managing technology	240
Hard and soft technologies	241
Measuring and managing the impact of technologies	241
Harnessing information and communication technologies	242
New forms of organisational structures	243
Technology transfer	244

Managing knowledge	245
Absorptive capacity	245
Resource reconfiguration	246
Summary	247
Discussion questions	248
9 Quality Management in Operations	251
<i>Lawrie Corbett</i>	
Learning objectives	251
Introduction	252
Quality management	254
The meaning of quality	255
Defining quality	255
Transcendent quality	255
Product-based quality	256
Manufacturing-based quality	256
Value-based quality	256
User-based quality	256
Quality as meeting or exceeding expectations	257
Quality and grade	257
Competing on quality	258
Significant contributors	262
W. Edwards Deming	262
Joseph Juran	265
Standards-based approach to quality management	267
ISO 9000 quality management system	267
Current implementation and efficacy	269
Process control and improvement	270
Data: variable, attribute, subjective	270
Accuracy, precision and stability	270
Process control and inspection	271
Statistical process control	271
Process capability	273
Quality improvement tools	275
Implementation issues	275
Teams	280
Problems with implementation	281
Summary	282
Discussion questions	283
10 Operations Excellence	286
<i>Ross Chapman, Terry Sloan and Ron Beckett</i>	
Learning objectives	286
Introduction	287

Operations excellence and its context	288
Characteristics of high performing organisations	288
A good fit with the operating environment	288
All operations are viewed as a service	290
Excellent operations deliver great customer value	290
A mix of measures is used to judge performance	291
Operations deliver value with other organisational functions	292
There is a continuous search for ways to improve	293
Models of excellence	294
Development of the models	294
The Australian Business Excellence Framework	296
The Singapore business excellence awards	300
The New Zealand criteria for performance excellence	302
Summary of models of excellence	305
Measures of performance	308
Linking operations performance with financial performance	308
Keeping score	308
What to measure	309
A systemic view of operations performance management	310
Transformation tools	310
Six-sigma method	312
Just-in-time (JIT) methodology	316
Business process re-engineering	317
Other transformation tools	317
Summary	318
Discussion questions	320

Part IV Challenges and Opportunities in Operations

11 Managing Risk in Operations	325
<i>Damien Power and Danny Samson</i>	
Learning objectives	325
Introduction	326
Concepts and frameworks of risk management	329
COSO enterprise risk management	329
Risk Standard AS/NZ 4360	330
M-o-R: Management of Risk Framework	330
Risk in the key decision areas of operations	331
Inventory management	331
Information technology	334
Process technology	338
Operating planning and capacity management	339
Maintenance and servicing	341
Risk in service operations	342

Occupational health and safety	344
Environmental risk	344
Operations and corporate risk: managerial implications	346
Risk analysis process	347
Summary	348
Discussion questions	348
12 Sustainability in Operations Management	351
<i>Suzy Goldsmith and Danny Samson</i>	
Learning objectives	351
Introduction: What is sustainability?	352
How ideas of sustainability have developed	352
Accepted definitions	353
Sustainability: An organisational context	356
What makes sustainability practices successful?	361
What is a sustainability practice?	361
Quality and excellence	363
Strategic connection	367
Business case for sustainability	369
Building sustainability: the role of operations	370
Role of culture, strategy and operations	372
Operations management – a key role	373
New capabilities in operations management to support sustainability	374
Putting it into practice	375
Summary	376
Discussion questions	377
13 Operations Management in Different Settings	381
<i>Victoria Hanna</i>	
Learning objectives	381
Introduction	382
Operations management and organisational type	382
Role of operations managers in different industries	382
Relevance and setting	386
Five laws of operations management	391
Law of variability	392
Law of bottlenecks	392
Law of scientific methods	395
Law of quality	397
Law of factory focus	400
Summary	403
Discussion questions	404

Part V Case Studies

- 1 Innovation in the Biotechnology Sector: The Case of IDT Australia 409
 - John Morgan*
 - Introduction 409
 - Manufacturing capabilities and core competencies of IDT 410
 - Corporate structure and strategy of IDT 410
 - Organisational climate 411
 - Leadership style and vision of the CEO 412
 - Commercial orientation and commercialisation of research 412
 - Innovation intensity 412
 - Major challenges to innovation management 413
 - Accessing large markets through commercial orientation 413
 - Overcoming the 'not invented here' syndrome 414
 - Taxation system in Australia 414
 - Distance from major markets 414
 - Expanding the revenue base 414
 - Enhancing innovation intensity and performance 415
 - Quality standards and compliance 415
 - Maintaining documentation and clear 'audit trail' 415
 - Staff recruitment and development 416
 - Retention of valuable employees 416
 - Project management and continuous improvement 416
 - Innovation intensity and performance at IDT 417
 - Core competencies of IDT's staff 417
 - Modern state-of-the-art laboratories, plant and facilities 417
 - Quality standards and continuous improvement 417
 - Access to the large markets in the United States and Europe 417
 - Leadership and vision of the CEO 418
 - Discussion questions 418

- 2 New Zealand King Salmon: Value-Chain Innovation 419
 - Jay Sankaran*
 - Introduction 419
 - Strategic focus 419
 - Commitment to value-addition 421
 - Research and development at NZKS 422
 - Production research 422
 - Development of new products 423
 - Development of new processes 424
 - 'Pure R' versus 'D' 425
 - Innovation and development processes at NZKS 427

Organisational structures and management systems	430
The executive meeting	432
Discussion questions	434
3 Pili Clothing Company Goes Lean	435
<i>David Parker</i>	
Discussion questions	439
4 From Singapore to the World: Port Management in Singapore	440
<i>Sum Chee Chuong</i>	
Introduction	440
History	441
Operational excellence and capabilities	442
Technology and systems	444
PORTNET® system	444
CITOS® System	447
Flow-through gate system	447
Moving forward	447
5 Striving for Operations Excellence within Queensland Rail Supply Division	450
<i>Kevin Burgess</i>	
Queensland Rail (QR)	450
Shared Services Group – Supply Division	450
Leadership	451
Strategy and planning	454
Information and knowledge	461
People	466
Customer and market focus	468
Process management, improvement and innovation	469
Success and sustainability	471
Discussion questions	472
6 Should I Stay or Should I Go? Shiraishi Garments Company	473
<i>Bin Jiang and Patrick J. Murphy</i>	
Introduction	473
Background: Shiraishi Garments Company	474
Cutting costs	476
China: allures and challenges	476
Cheap labour	478
Chinese suppliers	479

Supplier 1	479
Supplier 2	480
Auditing	481
Should I stay or should I go?	482
Discussion questions	482
7 Towards a Green Supply Chain: Toyota Australia	483
<i>Dayna Simpson</i>	
Introduction	483
Background	484
Environmental performance management within Toyota Australia	485
Environmental performance management by Toyota with its suppliers	486
Toyota Purchasing's role in green supply	487
Discussion questions	489
8 Process Analyses and Improvement at Bartter Enterprises	490
<i>Tom Bevington, Phillip Irvine and Danny Samson</i>	
Company and industry history	492
The industry and market in 2006	493
Bartter Enterprises in 2005/6	494
Foundations for operations excellence strategy	494
The Beresfield pilot	495
Discussion questions	503
9 Operations Challenges at Firth Industries Limited Wellington Division	504
<i>Lawrie Corbett and D. Clay Whybark</i>	
Company background	504
The market	507
Local operations	511
The productivity issue	516
Discussion questions	517
10 Ford Motor Company: Moving Forward in Australia	518
<i>Brett Allen</i>	
Ford Motor Company – the beginning	518
Ford Australia	519
The purchasing function	520
Challenges to purchasing at Ford Australia	520
Transactional purchasing versus strategic purchasing	520
Local tactics versus a regional view	521
Local structure versus regional structure	522
Market and volume challenges	523

Raw material and commodity prices	524
Discussion questions	525
11 Technology Transfer at Hero Honda	527
<i>R. D. Pathak, Z. Husain, Sushil and Danny Samson</i>	
Technology history of the Hero Group	529
What impressed Honda about the Hero Group?	529
Technology management at HHML	530
Levels of technology absorption	533
Indigenisation: a significant challenge	534
Expected performance outcomes	535
Discussion questions	535
12 Why Is the Patient Resident Time so Long?: The Case of St Martin's and Charity Private Hospital	536
<i>Victoria Hanna and Kannan Sethuraman</i>	
Introduction	536
Hospital background	536
Day surgery unit at Charity campus	537
Schedule of surgeries	538
How does the hospital plan for its resources?	538
Typical patient flow at Charity	539
Discussion questions	541
Index	542