

Contents

1 Introduction	1
1.1 Introduction	1
1.2 Why Managing Risk is Important	1
1.3 General Definition of Risk Management	2
1.4 Background and Structure	3
1.5 Aim	4
1.6 Scope of the Book	4
 2 The Concept of Risk and Uncertainty and the Sources and Types of Risk	 7
2.1 Introduction	7
2.2 Background	7
2.3 Risk and Uncertainty: Basic Concepts and General Principles	8
2.4 The Origin of Risk	9
2.4.1 Dimensions of Risk	11
2.5 Uncertainties	12
2.6 Sources of Risk	15
2.7 Typical Risks	18
2.7.1 Project Risks	18
2.7.2 Global Risks	20
2.7.3 Elemental Risks	20
2.7.4 Holistic Risk	20
2.7.5 Static Risk	21
2.7.6 Dynamic Risk	21
2.7.7 Inherent Risk	21
2.7.8 Contingent Risk	22

2.7.9	Customer Risk	23
2.7.10	Fiscal/Regulatory Risk	23
2.7.11	Purchasing Risk	23
2.7.12	Reputation/Damage Risk	24
2.7.13	Organisational Risk	24
2.7.14	Interpretation Risk	24
2.7.15	IT Risk	24
2.7.16	The OPEC Risk	25
2.7.17	Process Risk	26
2.7.18	Heuristics	27
2.7.19	Decommissioning Risk	28
2.7.20	Institutional Risks	28
2.7.21	Subjective Risk and Acceptable Risk	28
2.7.22	Pure Risks and Speculative Risks	29
2.7.23	Fundamental Risks and Particular Risks	29
2.7.24	Iatrogenic Risks	29
2.7.25	Destructive Technology Risk	29
2.7.26	Perceived and Virtual Risks	30
2.7.27	Force Majeure	30
2.8	Perceptions of Risk	33
2.9	Stakeholders in an Investment	34
2.9.1	Stakeholder Identification	35
2.9.2	Stakeholder Perspectives	36
2.9.3	Stakeholder Perceptions	36
2.10	Summary	37
3	The Evolution of Risk Management and the Risk Management Process	39
3.1	Introduction	39
3.2	The Evolution of Risk Management	39
3.2.1	The Birth of Risk Management	39
3.2.2	Risk Management in the 1970s – Early Beginnings	40
3.2.3	Risk Management in the 1980s – Quantitative Analysis Predominates	40
3.2.4	Risk Management in the 1990s – Emphasis on Methodology and Processes	42
3.3	Risk Management	44
3.4	The Risk Management Process – Identification, Analysis and Response	44

3.4.1	Risk Identification	47
3.4.2	Risk Quantification and Analysis	50
3.4.3	Risk Response	51
3.4.4	Selection of Risk Response Options	55
3.4.5	Outputs from the Risk Response Process	55
3.4.6	Risk Management within the Project Life Cycle	55
3.4.7	The Tasks and Benefits of Risk Management	57
3.4.8	The Beneficiaries of Risk Management	58
3.5	Embedding Risk Management into Your Organisation	60
3.6	Risk Management Plan	61
3.7	Executive Responsibility and Risk	62
3.8	Summary	65
4	Risk Management Tools and Techniques	67
4.1	Introduction	67
4.2	Definitions	67
4.3	Risk Analysis Techniques	68
4.3.1	Choice of Technique(s)	68
4.4	Qualitative Techniques in Risk Management	69
4.4.1	Brainstorming	69
4.4.2	Assumptions Analysis	70
4.4.3	Delphi	70
4.4.4	Interviews	71
4.4.5	Hazard and Operability Studies (HAZOP)	71
4.4.6	Failure Modes and Effects Criticality Analysis (FMECA)	71
4.4.7	Checklists	72
4.4.8	Prompt Lists	72
4.4.9	Risk Registers	72
4.4.10	Risk Mapping	73
4.4.11	Probability-Impact Tables	74
4.4.12	Risk Matrix Chart	74
4.4.13	Project Risk Management Road Mapping	76
4.5	Quantitative Techniques in Risk Management	76
4.5.1	Decision Trees	76
4.5.2	Controlled Interval and Memory Technique	78
4.5.3	Monte Carlo Simulation	79
4.5.4	Sensitivity Analysis	81
4.5.5	Probability-Impact Grid Analysis	83

4.6	Quantitative and Qualitative Risk Assessments	84
4.7	Value Management	85
4.7.1	Value Management Techniques	88
4.8	Other Risk Management Techniques	90
4.8.1	Soft Systems Methodology (SSM)	90
4.8.2	Utility Theory	92
4.8.3	Risk Attitude and Utility Theory	93
4.8.4	Nominal Group Technique	95
4.8.5	Stress Testing and Deterministic Analysis	95
4.8.6	Tornado Diagram	97
4.9	Country Risk Analysis	97
4.9.1	Country Risk Sources – the Checklist	99
4.9.2	Political Risk	99
4.9.3	Financial Risk	105
4.9.4	Organisational Usage of Risk Management Techniques	106
4.10	Summary	107
5	Financing Projects, their Risks and Risk Modelling	109
5.1	Introduction	109
5.2	Corporate Finance	109
5.3	Project Finance	111
5.3.1	Basic Features of Project Finance	112
5.3.2	Special Project Vehicle (SPV)	112
5.3.3	Non-recourse or Limited Recourse Funding	112
5.3.4	Off-balance-sheet Transaction	113
5.3.5	Sound Income Stream of the Project as the Predominant Basis for Financing	113
5.3.6	Projects and their Cash Flows	114
5.4	Financial Instruments	116
5.5	Debt	116
5.5.1	Term Loans	117
5.5.2	Standby Loans	118
5.5.3	Senior and Subordinate Debt	118
5.6	Mezzanine Finance Instruments	119
5.6.1	Bond Ratings	120
5.6.2	Types of Bonds	121
5.7	Equity	123
5.7.1	Ordinary Equity and Preference Shares	123
5.8	Financial Risks	126

5.8.1	Construction Delay	126
5.8.2	Currency Risk	127
5.8.3	Interest Rate Risk	127
5.8.4	Equity Risk	127
5.8.5	Corporate Bond Risk	128
5.8.6	Liquidity Risk	128
5.8.7	Counter-party Risk	128
5.8.8	Maintenance Risk	129
5.8.9	Taxation Risk	129
5.8.10	Reinvestment Risk	130
5.8.11	Country Risk	130
5.9	Non-Financial Risks Affecting Project	
	Finance	130
5.9.1	Dynamic Risk	130
5.9.2	Inherent Risk	131
5.9.3	Contingent Risk	131
5.9.4	Customer Risk	131
5.9.5	Regulatory Risk	131
5.9.6	Reputation/Damage Risk	132
5.9.7	Organisational Risk	132
5.9.8	Interpretation Risk	132
5.10	Managing Financial Risks	132
5.10.1	Construction Delay	133
5.10.2	Currency Risk	133
5.10.3	Interest Rate Risk	134
5.10.4	Equity Risk	136
5.10.5	Corporate Bond Risk	136
5.10.6	Liquidity Risk	137
5.10.7	Counter-party Risk	137
5.10.8	Maintenance Risk	138
5.10.9	Taxation Risk	138
5.10.10	Reinvestment Risk	138
5.10.11	Country Risk	138
5.11	Risk Modelling	139
5.12	Types of Risk Software	141
5.12.1	Management Data Software Packages	141
5.12.2	Spreadsheet-based Risk Assessment Software	142
5.12.3	Project Network-based Risk Assessment Software	142

5.12.4	Standalone Project Network-based Risk Assessment Software	142
5.13	Summary	142
6	Portfolio Analysis and Cash Flows	145
6.1	Introduction	145
6.2	Selecting a Portfolio Strategy	145
6.3	Constructing the Portfolio	146
6.4	Portfolio of Cash Flows	148
6.5	The Boston Matrix	149
6.6	Scenario Analysis	149
6.7	Diversification	150
6.7.1	Diversification of Risk	151
6.8	Portfolio Risk Management	152
6.8.1	Bundling Projects	153
6.8.2	Considerations	157
6.8.3	Bundling Projects into a Portfolio	157
6.9	Cross-Collateralisation	158
6.10	Cash Flows	159
6.10.1	Cash Flow Definition for Portfolios	161
6.10.2	Reasons for Choosing Cash Flow Curves	163
6.10.3	Projects Generating Multiple IRRs	163
6.10.4	Model Cash Flow	164
6.11	An Example of Portfolio Modelling	165
6.11.1	Financial Instruments	167
6.11.2	Development of the Mechanism	167
6.11.3	Spreadsheets	168
6.11.4	A Portfolio of Oil and Gas Projects	171
6.12	Summary	176
7	Risk Management at Corporate Level	179
7.1	Introduction	179
7.2	Definitions	179
7.3	The History of the Corporation	181
7.3.1	Equity Capital of a Corporation	184
7.4	Corporate Structure	184
7.5	Corporate Management	185
7.5.1	The Corporate Body	188
7.5.2	The Legal Obligations of Directors	188

7.5.3	The Board	189
7.5.4	The Composition of the Board	190
7.6	Corporate Functions	190
7.6.1	Corporate Governance	192
7.7	Corporate Strategy	195
7.8	Recognising Risks	197
7.9	Specific Risks at Corporate Level	199
7.10	The Chief Risk Officer	201
7.11	How Risks are Assessed at Corporate Level	201
7.12	Corporate Risk Strategy	202
7.12.1	Health and Safety and the Environment	203
7.13	Corporate Risk: An Overview	208
7.14	The Future of Corporate Risk	209
7.15	Summary	210
8	Risk Management at Strategic Business Level	211
8.1	Introduction	211
8.2	Definitions	211
8.3	Business Formation	212
8.4	Strategic Business Units	214
8.4.1	The Need for Strategic Linkages	215
8.4.2	The Wrappers Model	216
8.4.3	The Business Management Team	219
8.4.4	Strategic Business Management Functions	219
8.4.5	Typical Risks Faced by Strategic Business Units	220
8.5	Business Strategy	223
8.6	Strategic Planning	224
8.6.1	Strategic Plan	225
8.6.2	Strategy and Risk Management	226
8.7	Recognising Risks	226
8.7.1	Specific Risks at Business Level	227
8.7.2	Typical SBU Organisation	227
8.8	Portfolio Theory	229
8.8.1	Modern Portfolio Theory	230
8.8.2	Matrix Systems	231
8.9	Programme Management	233
8.10	Business Risk Strategy	235
8.11	Tools at Strategic Business Unit Level	236

8.12 Strategic Business Risk: An Overview	236
8.13 Summary	237
9 Risk Management at Project Level	239
9.1 Introduction	239
9.2 The History of Project Management	239
9.2.1 The Early Years: Late Nineteenth Century	239
9.2.2 Early Twentieth-century Efforts	239
9.2.3 Mid Twentieth-century Efforts	240
9.2.4 Late Twentieth-century Efforts	240
9.3 Definitions	241
9.4 Project Management Functions	242
9.4.1 The Project Team	244
9.4.2 Project Risk Assessment Teams	246
9.4.3 Project Goals	247
9.5 Project Strategy Analysis	247
9.6 Why Project Risk Management is Used	248
9.7 Recognising Risks	250
9.7.1 Specific Risks at Project Level	251
9.7.2 What Risks are Assessed at Project Level?	252
9.7.3 Project Managers and Their View of Risks	254
9.8 Project Risk Strategy	255
9.9 The Future of Project Risk Management	256
9.10 Summary	256
10 Risk Management at Corporate, Strategic Business and Project Levels	257
10.1 Introduction	257
10.2 Risk Management	257
10.3 The Risk Management Process	257
10.4 Common Approaches to Risk Management by Organisations	259
10.5 Model for Risk Management at Corporate, Strategic Business and Project Levels	261
10.6 Summary	267
11 Risk Management and Corporate Governance	269
11.1 Introduction	269
11.2 Corporate Governance	270

11.3 Corporate Governance Approach in France	276
11.4 Corporate Governance Approach by the European Commission	278
11.5 Corporate Governance and Internal Control	279
11.6 Summary	282
12 Risk Management and Basel II	283
12.1 Introduction	283
12.2 Risk Rating System (RRS)	285
12.2.1 Concept of Probability of Default	285
12.2.2 Concept of Loss Given Default (LGD)	287
12.2.3 Database	288
12.3 Borrower Risk Rating System and Probability of Default	288
12.3.1 Facility Risk Rating and Loss Given Default	289
12.3.2 Expected Loss	289
12.4 Risk Rating and Provisioning	290
12.4.1 Risk Rating and Capital Charges	290
12.5 Risk Rating and Pricing	291
12.5.1 Interest Rate and Fees	292
12.5.2 Managing Liabilities and the Cost of Funds	292
12.6 Methodology of RRS and Risk Pricing	293
12.6.1 Example of a Risk Rating System	294
12.7 Grid Analysis or Standardising the Risk Analysis	296
12.7.1 Risk Pricing Based on RRS – Sample Calculation	297
12.8 Regulation in Operational Risk Management	298
12.8.1 Basel II	298
12.9 Summary	302
13 Quality Related Risks	303
13.1 Introduction	303
13.2 Defining Quality Risks	303
13.3 Standardisation – ISO 9000 Series	305
13.4 Quality Risks in Manufacturing Products	307
13.4.1 Product Recall	308
13.4.2 Re-work	309
13.4.3 Scrap and Wastage	310
13.4.4 Consumer Complaints	312

13.5 Quality Risks in Services	313
13.6 Quality Control and Approaches to Minimise Product Quality Risks	314
13.7 Summary	318
14 CASE STUDY 1: Risks in Projects in the Pharmaceutical Industry	319
14.1 Introduction	319
14.2 The Pharmaceutical Industry	320
14.3 Filing with the Regulatory Authority	323
14.4 Identification and Response to Risks Encountered in DDPs	325
14.5 Summary	331
15 CASE STUDY 2: Risk Modelling of Supply and Off-take Contracts in a Petroleum Refinery Procured through Project Finance	333
15.1 Introduction	333
15.2 Financing a Refinery Project	334
15.3 Bundling Crude Oil Contracts	335
15.4 Assessing a Case Study	337
15.4.1 Test 1	339
15.4.2 Summary of Results of Test 2, Test 3 and Test 4	343
15.4.3 Test 5	343
15.4.4 Bundle Analysis	343
15.5 Bundle Solutions After Risk Management	344
15.6 Summary	346
16 CASE STUDY 3: Development of Risk Registers at Corporate, Strategic Business Unit and Project levels and a Risk Statement	349
16.1 Introduction	349
16.2 Levels of Risk Assessment	349
16.2.1 Corporate Risk Assessment	350
16.2.2 Strategic Business Unit Risk Assessment	350
16.2.3 Project Level Risk Assessment	351
16.3 Amalgamation and Analysis of Risks Identified	352
16.4 The Project: Baggage Handling Facility	355
16.4.1 Corporate Level	355

16.4.2 Strategic Business Unit Level	356
16.4.3 Project Level	357
16.5 Risk Statement	357
16.6 Summary	358
17 CASE STUDY 4: Development of a Typical Risk	
Statement to Shareholders	363
17.1 Introduction	363
17.2 UUU Overview and Risk Register	363
17.3 Corporate Risk Register	363
17.3.1 Foreign Exchange Risk	363
17.3.2 Political/Country Risk	364
17.3.3 Market Performance Risk (Demand Risk)	365
17.3.4 Commodity Prices (Supply Risk)	365
17.3.5 Interest Rates	365
17.3.6 Government Contract Risk (Demand Risk)	365
17.3.7 Legislative Risk	366
17.3.8 EH and Safety Risk	366
17.3.9 Information Technology Risk	366
17.3.10 Leadership Risk	366
17.3.11 Reputation/Product Quality Control Risk	367
17.3.12 Compliance Risk	367
17.3.13 Audit Risk	367
17.3.14 Legal Risk	367
17.3.15 Terrorism/Security Risk	368
17.3.16 Human Capital Risk	368
17.3.17 Merger and Acquisitions Risk	368
17.4 Strategic Business Units Risk Register	368
17.4.1 Verspack	370
17.4.2 Liftgro	370
17.4.3 Fisal	371
17.4.4 Jaypower	371
17.4.5 Aerobustec	372
17.5 Project Level Risk Register	373
17.5.1 Cultural/Language Risk	373
17.5.2 Purchasing Risk	374
17.5.3 Design Risk	375
17.5.4 Cash Flow/Liquidity Risk	375
17.5.5 Regulatory/Environmental Risk	375
17.5.6 Maintenance Risk	375

xviii Contents

17.5.7 Counter-Party Risk	375
17.5.8 Delay Risk	376
17.5.9 Technology/System's Integration Risk	376
17.6 Risk Statement to Shareholders	376
17.7 Summary	379
References	381
Index	395

<http://www.pbookshop.com>