The Project Risk Maturity Model

Measuring and Improving Risk Management Capability

MARTIN HOPKINSON
QinetiQ, UK

GOWER
Contents

List of Figures vii
List of Tables ix
Foreword xi
Preface xiii

PART I INTRODUCTION TO THE PROJECT RISK MATURITY MODEL

Chapter 1 The Project Risk Maturity Model 3
Chapter 2 Scope and Context 17
Chapter 3 Starting from the Top: Using a Multi-pass Risk Management Process 37
Chapter 4 The UK MoD Defence Procurement Agency: A Project Risk Maturity Model Case Study 65
Chapter 5 Risk Maturity Model Data Collection 87

PART II GUIDE TO THE PROJECT RISK MATURITY MODEL

Chapter 6 Stakeholders 95
Chapter 7 Risk Identification 113
Chapter 8 Risk Analysis 127
Chapter 9 Risk Responses 165
Chapter 10 Project Management 179
Chapter 11 Risk Management Culture 199

Appendix A Attributes of Risk Maturity Model Levels 219
Appendix B Project Risk Management Principles 221
Appendix C Governance of Project Management 225
Appendix D QinetiQ 229
References 231
Software User Instructions 235
Index 243
List of Figures

Figure 1.1 Risk maturity model levels ........................................... 4
Figure 1.2 Example of the results from a Project RMM Assessment .......... 8
Figure 1.3 PRAM Guide mapping for four of the RMM perspectives .......... 9
Figure 1.4 Augmented version of the PRAM Guide process ................. 9
Figure 1.5 Project RMM assessment results for Project A .................. 12
Figure 1.6 Project RMM assessment results for Project B .................. 13
Figure 2.1 The extended project life cycle (APM Body of Knowledge) .... 20
Figure 2.2 Graphical representations of overall project cost risk .......... 21
Figure 2.3 Comparison of risk forecasts for NPV ............................ 23
Figure 2.4 Risk management process being delivered over time (PRAM 2004) 25
Figure 2.5 Risk management process (PRAM 2004) ....................... 27
Figure 2.6 Example of a PIM for prioritising threats and opportunities ..... 29
Figure 3.1 Profile of first pass bridge project estimates ..................... 42
Figure 3.2 First pass NPV risk modelling results .......................... 43
Figure 3.3 Tornado chart from the first pass modelling results ............. 43
Figure 3.4 Effect of NPV discount factor on first pass modelling estimates 44
Figure 3.5 Second pass analysis NPV risk modelling results ............... 49
Figure 3.6 Third pass NPV risk modelling results .......................... 52
Figure 4.1 The CADMID project life cycle ................................ 66
Figure 4.2 Derivation of three-point confidence forecasts ................. 68
Figure 4.3 Idealised comparison of Initial Gate and Main Gate confidence forecasts 69
Figure 4.4 Weakest RMM perspective analysis ............................. 72
Figure 4.5 Comparison of MoD and prime contract RMM results for one project 75
Figure 4.6 Comparison of MoD and prime contract RMM results for one project 76
Figure 4.7 Summary of RMM results for 30 major projects ................ 77
Figure 4.8 Comparison of first and second RMM assessment results .... 78
Figure 4.9 Illustration of the NAO’s calculation of risk differential consumed 80
Figure 4.10 Schedule risk differential consumed for 13 major projects .... 81
Figure 4.11 Percentage in-year cost variance for 19 major projects ....... 82
Figure 4.12 Percentage schedule and cost variance for 13 major projects 83
Figure 8.1 A risk description broken into three components ............... 130
Figure 8.2 Variability risk described using three components ............. 131
Figure 8.3 Ambiguity risk described using three components ............. 132
Figure 8.4 Relationship between a risk description and types of risk response 133
Figure 8.5 Examples of risk probability distributions .................... 137
Figure 8.6 Relationship between two Beta Pert distributions .............. 139
Figure 8.7 Illustration of the process of uncertainty suppression ......... 146
Figure 8.8 Simple model for detecting vulnerability to estimating bias . 148
Figure 8.9 Simple model for detecting vulnerability to estimating bias . 148
Figure 8.10 Typical features of a Monte Carlo schedule risk analysis model 151
Figure 8.11 Effect of the inclusion of correlation in a Monte Carlo risk model 154
<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.12</td>
<td>Example of a faulty common-practice cost risk model</td>
<td>157</td>
</tr>
<tr>
<td>8.13</td>
<td>Overall cost risk shown as a distribution of possible outcomes</td>
<td>158</td>
</tr>
<tr>
<td>8.14</td>
<td>Example of a faulty common-practice Monte Carlo cost risk model</td>
<td>159</td>
</tr>
<tr>
<td>10.1</td>
<td>Typical labelling and purpose of project financial contingencies</td>
<td>194</td>
</tr>
<tr>
<td>11.1</td>
<td>Example of a risk that includes both threat and opportunity</td>
<td>213</td>
</tr>
<tr>
<td>C.1</td>
<td>Governance of Project Management (APM 2004)</td>
<td>225</td>
</tr>
<tr>
<td>C.2</td>
<td>Governance of Project Management: four components</td>
<td>227</td>
</tr>
</tbody>
</table>
List of Tables

Table 2.1  Examples of different ways of conceptualising risks 31
Table 3.1  Illustration of the effects of the Net Present Value calculation 40
Table 3.2  First pass risk estimates 41
Table 3.3  Effect of risk sharing on third pass risk estimates for revenue 51
Table 3.4  Risk forecasts from fourth pass analysis 54
Table 3.5  Database fields selection 57
Table 4.1  Overall RMM Assessments for the 30 major projects 72
Table 9.1  Risk management strategies identified by three guides 169
Table 10.1  Typical purposes of risk reports 190