

Chapter Seven

Managing Risk

Risk Management Process

- Risk
 - Uncertain or chance events that planning cannot overcome or control
- Risk Management
 - An attempt to recognize and manage potential and unforeseen trouble spots that may occur when the project is implemented
 - What can go wrong (risk event)
 - How to minimize the risk event's impact (consequences)
 - What can be done before an event occurs (anticipation)
 - What to do when an event occurs (contingency plans)

The Risk Event Graph

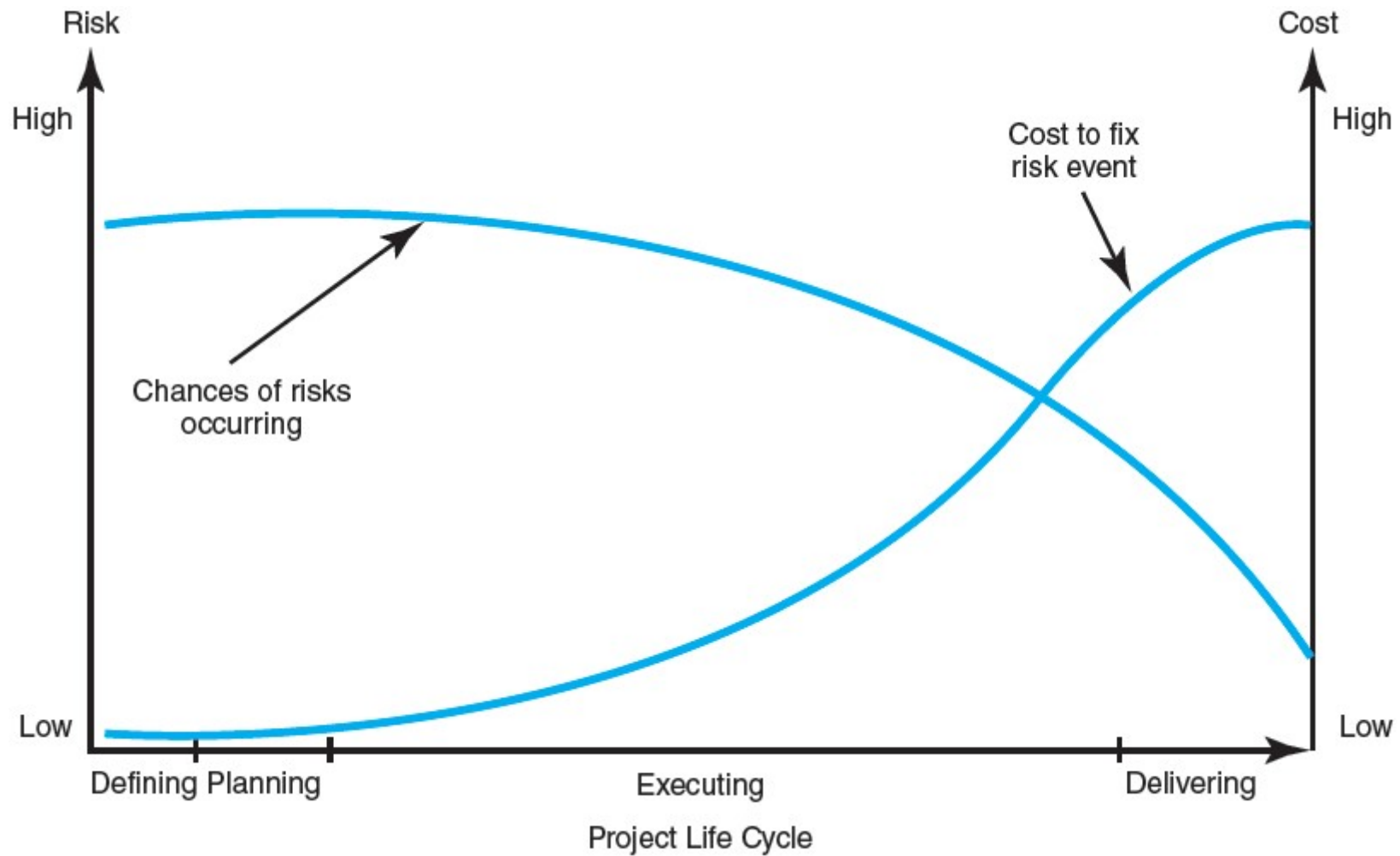


FIGURE 7.1

Risk Management's Benefits

- A proactive rather than reactive approach
- Reduces surprises and negative consequences
- Prepares the project manager to take advantage of appropriate risks
- Provides better control over the future
- Improves chances of reaching project performance objectives within budget and on time



The Risk Management Process

FIGURE 7.2

Managing Risk

- Step 1: Risk Identification
 - Generate a list of possible risks through brainstorming, problem identification and risk profiling
 - Use risk breakdown structure (RBS) in conjunction with work breakdown structure (WBS) to identify and analyze risks
 - Macro risks first, then specific events
 - Risk profile is a list of questions addressing additional areas of uncertainty on a project.

The Risk Breakdown Structure (RBS)

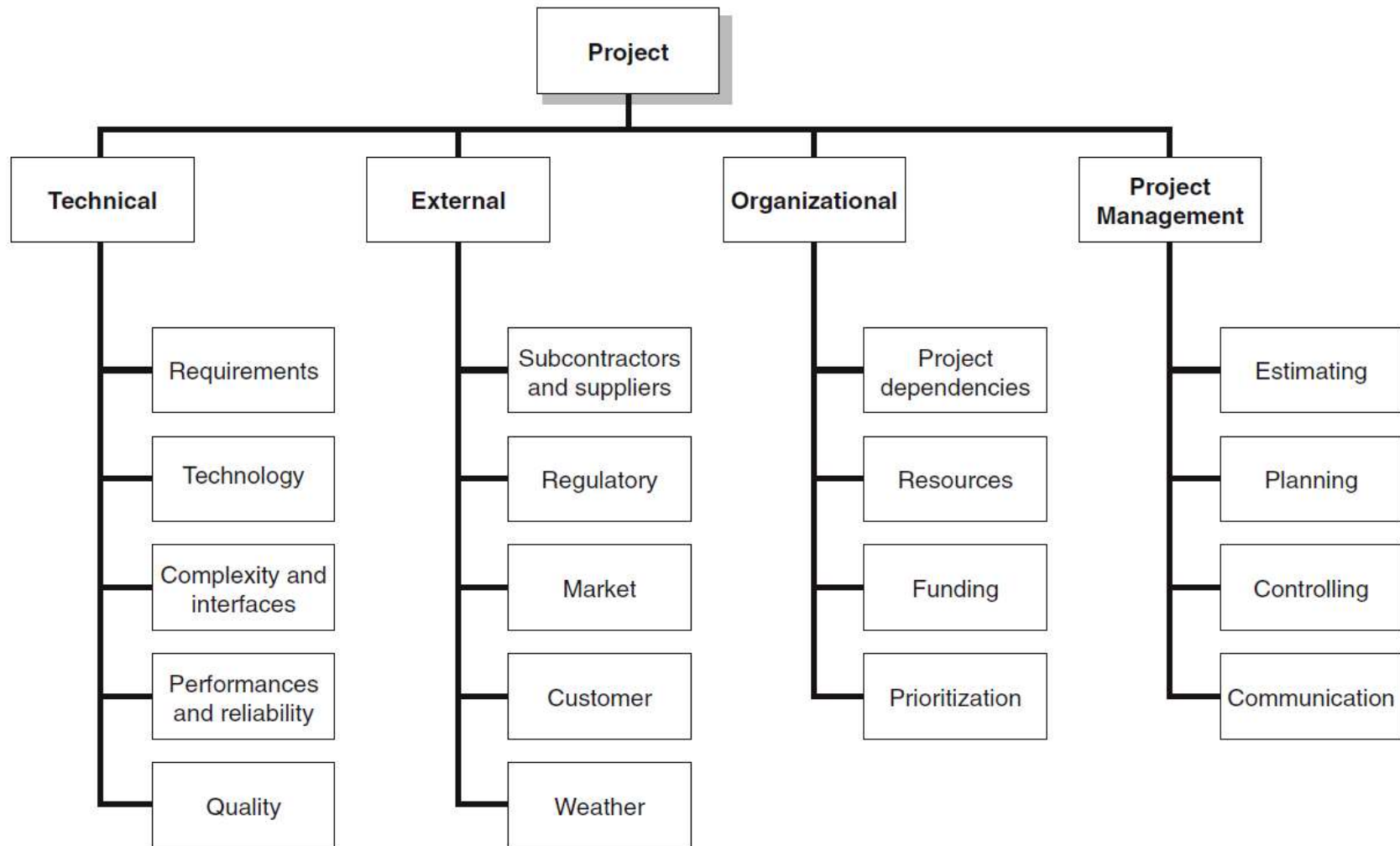


FIGURE 7.3

Partial Risk Profile for Product Development Project

Technical Requirements

Are the requirements stable?

Design

Does the design depend on unrealistic or optimistic assumptions?

Testing

Will testing equipment be available when needed?

Development

Is the development process supported by a compatible set of procedures, methods, and tools?

Schedule

Is the schedule dependent upon the completion of other projects?

Budget

How reliable are the cost estimates?

Quality

Are quality considerations built into the design?

Management

Do people know who has authority for what?

Work Environment

Do people work cooperatively across functional boundaries?

Staffing

Is staff inexperienced or understaffed?

Customer

Does the customer understand what it will take to complete the project?

Contractors

Are there any ambiguities in contractor task definitions?

FIGURE 7.4

Managing Risk

- Step 2: Risk Assessment
 - Scenario analysis for event probability and impact
 - Risk assessment form
 - Risk severity matrix
 - Failure Mode and Effects Analysis (FMEA)
Risk Value = Impact x Probability x Detection
 - Probability analysis
 - Decision trees, NPV, and PERT

Defined Conditions for Impact Scales of a Risk on Major Project Objectives (Examples for negative impacts only)

Relative or Numerical Scale					
Project Objective	1 Very Low	2 Low	3 Moderate	4 High	5 Very High
Cost	Insignificant cost increase	< 10% cost increase	10–20% cost increase	20–40% cost increase	> 40% cost increase
Time	Insignificant time increase	< 5% time increase	5–10% time increase	10–20% time increase	> 20% time increase
Scope	Scope decrease barely noticeable	Minor areas of scope affected	Major areas of scope affected	Scope reduction unacceptable to sponsor	Project end item is effectively useless
Quality	Quality degradation barely noticeable	Only very demanding applications are affected	Quality reduction requires sponsor approval	Quality reduction unacceptable to sponsor	Project end item is effectively useless

FIGURE 7.5

Risk Assessment Form

Risk Event	Likelihood	Impact	Detection Difficulty	When
Interface problems	4	4	4	Conversion
System freezing	2	5	5	Start-up
User backlash	4	3	3	Postinstallation
Hardware malfunctioning	1	5	5	Installation

FIGURE 7.6

Risk Severity Matrix

Failure Mode and Effects Analysis (FMEA)

Impact × Probability × Detection = Risk Value

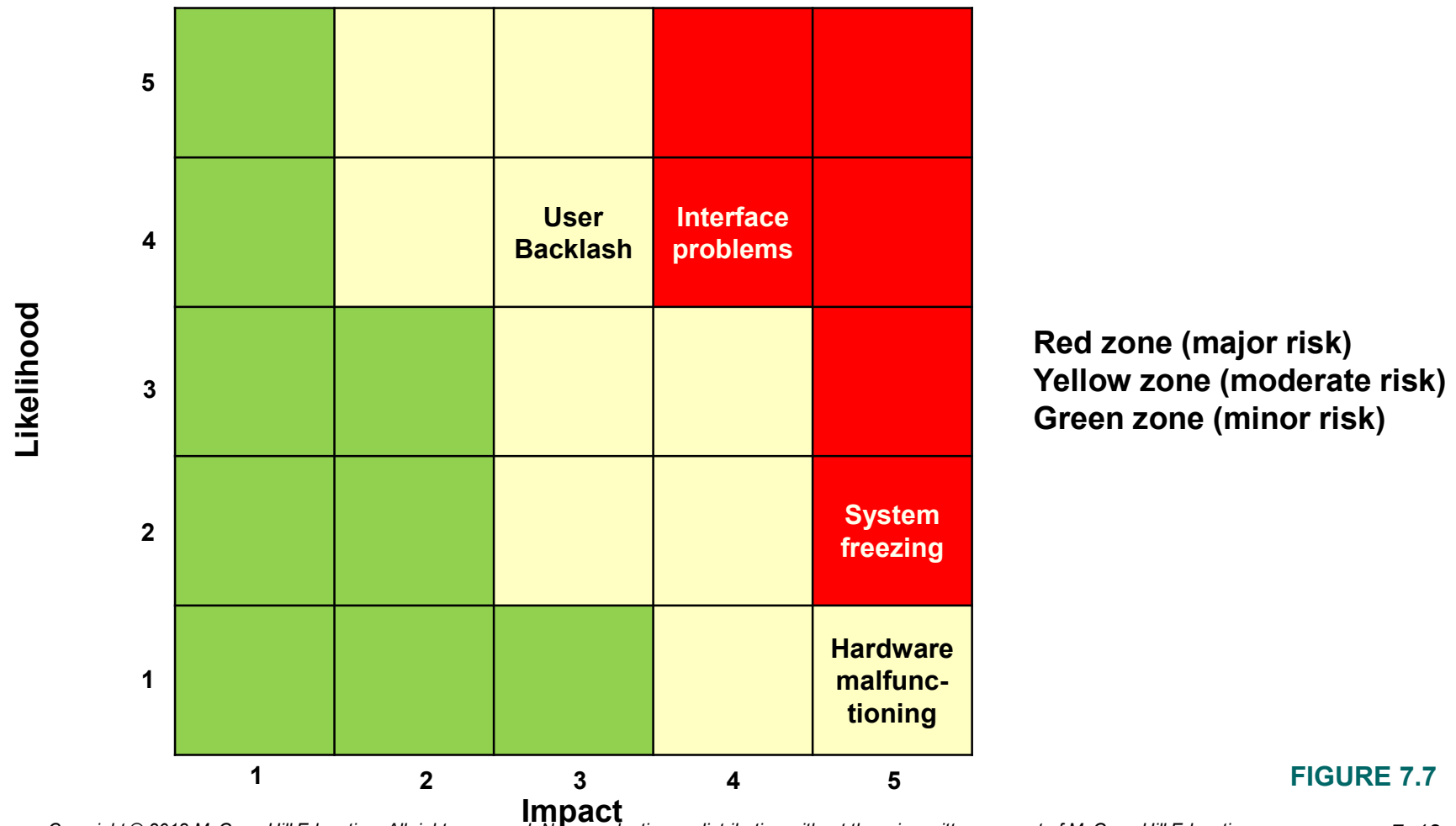


FIGURE 7.7

Managing Risk (cont'd)

- Step 3: Risk Response Development
 - Mitigating Risk
 - Reducing the likelihood an adverse event will occur
 - Reducing the impact of an adverse event
 - Avoiding Risk
 - Changing the project plan to eliminate the risk or condition
 - Transferring Risk
 - Paying a premium to pass the risk to another party
 - Requiring Build-Own-Operate-Transfer (BOOT) provisions
 - Accepting Risk
 - Making a conscious decision to accept the risk

Contingency Planning

- Contingency Plan
 - An alternative plan that will be used if a possible foreseen risk event actually occurs
 - A plan of actions that will reduce or mitigate the negative impact (consequences) of a risk event
- Risks of Not Having a Contingency Plan
 - Having no plan may slow managerial response
 - Decisions made under pressure can be potentially dangerous and costly

Risk Response Matrix

Risk Event	Response	Contingency Plan	Trigger	Who Is Responsible
Interface problems	Mitigate: Test prototype	Work around until help comes	Not solved within 24 hours	Nils
System freezing	Mitigate: Test prototype	Reinstall OS	Still frozen after one hour	Emmylou
User backlash	Mitigate: Prototype demonstration	Increase staff support	Call from top management	Eddie
Equipment malfunctions	Mitigate: Select reliable vendor Transfer: Warranty	Order replacement	Equipment fails	Jim

FIGURE 7.8

Risk and Contingency Planning

- Technical Risks

- Backup strategies if chosen technology fails
- Assessing whether technical uncertainties can be resolved

- Schedule Risks

- Use of slack increases the risk of a late project finish
- Imposed duration dates (absolute project finish date)
- Compression of project schedules due to a shortened project duration date

Risk and Contingency Planning (cont'd)

- Cost Risks

- Time/cost dependency links: costs increase when problems take longer to solve than expected.
- Price protection risks (a rise in input costs) increase if the duration of a project is increased.

- Funding Risks

- Changes in the supply of funds for the project can dramatically affect the likelihood of implementation or successful completion of a project.

Opportunity Management

- Exploit
 - Seeking to eliminate the uncertainty associated with an opportunity to ensure that it definitely happens
- Share
 - Allocating some or all of the ownership of an opportunity to another party who is best able to capture the opportunity for the benefit of the project
- Enhance
 - Taking action to increase the probability and/or the positive impact of an opportunity
- Accept
 - Being willing to take advantage of an opportunity if it occurs, but not taking action to pursue it

Contingency Funding and Time Buffers

- Contingency Funds
 - Funds to cover project risks—identified and unknown
 - Size of funds reflects overall risk of a project.
 - Budget reserves
 - Are linked to the identified risks of specific work packages.
 - Management reserves
 - Are large funds to be used to cover major unforeseen risks (e.g., change in project scope) of the total project.
- Time Buffers
 - Amounts of time used to compensate for unplanned delays in the project schedule
 - Severe risk, merge, noncritical, and scarce resource activities

Contingency Fund Estimate

Activity	Budget Baseline	Budget Reserve	Project Budget
Design	\$500,000	\$15,000	\$515,000
Code	900,000	80,000	980,000
Test	20,000	2,000	22,000
Subtotal	\$1,420,000	\$97,000	\$1,517,000
Management reserve	—	—	50,000
Total	\$1,420,000	\$97,000	\$1,567,000

TABLE 7.1

Managing Risk (cont'd)

- Step 4: Risk Response Control
 - Risk control
 - Execution of the risk response strategy
 - Monitoring of triggering events
 - Initiating contingency plans
 - Watching for new risks
 - Establishing a Change Management System
 - Monitoring, tracking, and reporting risk
 - Fostering an open organization environment
 - Repeating risk identification/assessment exercises
 - Assigning and documenting responsibility for managing risk

Change Control Management

- Sources of Change
 - Project scope changes
 - Implementation of contingency plans
 - Improvement changes



Change Management Systems

1. Identify proposed changes
2. List expected effects of proposed changes on schedule and budget
3. Review, evaluate, and approve or disapprove of changes formally
4. Negotiate and resolve conflicts of change, condition, and cost
5. Communicate changes to parties affected
6. Assign responsibility for implementing change
7. Adjust master schedule and budget
8. Track all changes that are to be implemented

Benefits of a Change Control System

1. Inconsequential changes are discouraged by the formal process.
2. Costs of changes are maintained in a log.
3. Integrity of the WBS and performance measures is maintained.
4. Allocation and use of budget and management reserve funds are tracked.
5. Responsibility for implementation is clarified.
6. Effect of changes is visible to all parties involved.
7. Implementation of change is monitored.
8. Scope changes will be quickly reflected in baseline and performance measures.