

Chapter 11: Project Risk Management

Information Technology Project Management, Sixth Edition

Note: See the text itself for full citations.



The Importance of Project Risk Management

- * Project risk management is the art and science of identifying, analyzing, and responding to risk throughout the life of a project and in the best interests of meeting project objectives
- * Risk management is often overlooked in projects, but it can help improve project success by helping select good projects, determining project scope, and developing realistic estimates

What is Project Risk?

- * What is Project Risk?
 - * Project risk is an uncertain event or condition that, if it occurs, has a positive or negative effect on at least one project objective.
- * What are the Project Risk Management objectives?
 - * The objectives of project risk management is to minimize potential **negative risks** while maximizing potential **positive risks**.

3

Possible Project Risks

1. The prices for computers rise higher than planned.
2. Found a good open source module that spare the team a week that is otherwise needed for development
3. The prices for computers fall lower than planned
4. A special offer for bulk purchase
5. The main programmer on the project quitting the job
6. The teacher unexpectedly postpones the deadline for project submission
7. A certain function or class will no longer be supported in the next version of Java programming language
8. There is a chance that you may get some highly skilled workers from another project at lower rates

4

Negative Risk (Threat)

- * Negative risk involves understanding potential problems that might occur in the project and how they might impede project success
- * Examples:
 - * The price for purchasing the computers rise higher than planned 2 months ago
 - * The main programmer on the project quitting the job
 - * A certain function or class will no longer be supported in the next version of Java programming language

5

Risk Can Be Positive (Opportunity)

- * Positive risks are risks that result in good things happening; sometimes called opportunities
- * Examples:
 - * The price for purchasing the computers falls lower than planned 2 months ago
 - * A special offer for bulk purchase
 - * The teacher unexpectedly postpones the deadline for project submission
 - * There is a chance that you may get some highly skilled workers from another project at lower rates
 - * Found a good open source module that spare the team a week that is otherwise needed for development

Project Risk Management Processes

- * **Planning risk management:** deciding how to approach and plan the risk management activities for the project
- * **Identifying risks:** determining which risks are likely to affect a project and documenting the characteristics of each
- * **Performing qualitative risk analysis:** prioritizing risks based on their probability and impact of occurrence

7

Project Risk Management Processes (continued)

- * **Performing quantitative risk analysis:** numerically estimating the effects of risks on project objectives
- * **Planning risk responses:** taking steps to enhance opportunities and reduce threats to meeting project objectives
- * **Monitoring and controlling risks:** monitoring identified and residual risks, identifying secondary risks, carrying out risk response plans, and evaluating the effectiveness of risk strategies throughout the life of the project

8

Figure 11-3. Project Risk Management Summary

Planning

Process: **Plan risk management**

Output: Risk management plan

Process: **Identify risks**

Output: Risk register

Process: **Perform qualitative risk analysis**

Output: Risk register updates

Process: **Perform quantitative risk analysis**

Output: Risk register updates

Process: **Plan risk responses**

Outputs: Risk register updates, risk-related contract decisions, project management plan updates, project document updates

Monitoring and Controlling

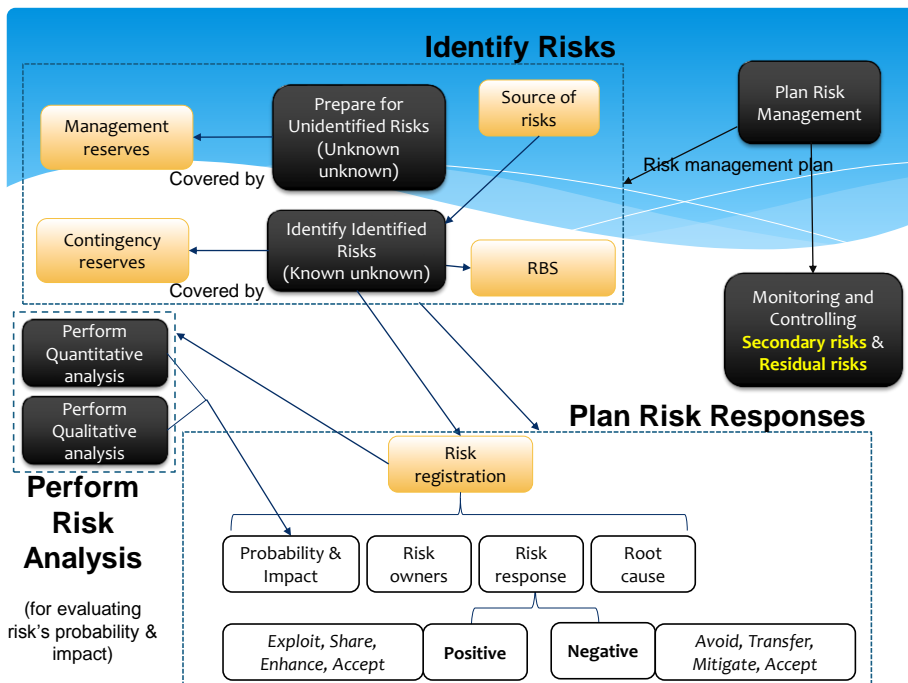
Process: **Monitor and control risks**

Outputs: Risk register updates, organizational process assets updates, change requests, project management plan updates, project document updates

Project Start

Project Finish

9



Risk Management Planning

*The **Plan Risk Management** defining how to conduct risk management activities for a project.*

- * The main output of risk management planning is a **risk management plan**, a plan that documents the procedures for managing risk throughout a project
- * The project team should review project documents and understand the organization's and the sponsor's approaches and attitudes to risk

11

Identifying Risks

- * Identifying risks is the process of understanding what potential events might hurt or enhance a particular project
- * Risk identification tools and techniques include (Information gathering):
 - * Brainstorming
 - * The Delphi Technique
 - * Interviewing

12

Common Sources of Risk in Information Technology Projects

- * **Sources of risk:**

- * The Standish Group developed an IT success potential scoring sheet based on potential risks
- * Other broad categories of risk help identify potential risks
- * Constraints & Assumptions
- * Categorization by each knowledge area

13

Table 11-3. Information Technology Success Potential Scoring Sheet

Success Criterion	Relative Importance
User Involvement	19
Executive Management support	16
Clear Statement of Requirements	15
Proper Planning	11
Realistic Expectations	10
Smaller Project Milestones	9
Competent Staff	8
Ownership	6
Clear Visions and Objectives	3
Hard-Working, Focused Staff	3
Total	100

Broad Categories of Risk

- * **Market risk**
 - * deliverables useful, helpful, sellable, competitive?
- * **Financial risk**
 - * Affordable, worth doing the project, Benefit>Cost?
- * **Technology risk**
 - * Technically feasible, tech proven and available?
- * **People risk**
 - * Needed talents available, with senior management’s and user’s support?
- * **Structure / process risk**
 - * Maturity of the organization, complexity of the stockholder groups, adaptation to and interoperation with existing infrastructure

15

Assumptions Analysis

- * **Constraints** and **Assumptions** are common sources of risk
 - * Constraint: Something limit your options
 - * Assumption: You think they are true

Assumption or Constraint	Could this assumption/constraint prove false? (Y/N)	If false would it affect project? (Y/N)	Convert to a risk?

Constraints and Assumptions

Project constraints

- This must be finished before the commencement of the opening ceremony.
- The amount of funding is around 100,000.
- Use Paypal as the payment gateway.
- We do not have the domain knowledge and past experience for that project.
- We must use the Linux OS for the software.
- The software must support Java 1.12 or above.
- The core part of the system can only be revealed to a few appointed persons – biz secret.
- The weather in this region is rainy and windy quite often in this season.
- The network bandwidth is quite low for smooth video transmission.
- The delivery of the needed equipment will take at least 3 weeks.
- The effort relies on voluntary participation by multiple government agencies.

Project assumptions

- The weather in this region will be fine in this season.
- Customers will provide necessary business expertise as needed during development.
- The network bandwidth will be high enough for smooth video transmission.
- All imported data will be in XML format.
- Government regulation will not be changed in these 2 years.
- The 5G networks will be widespread in the region.
- Users will fully support the project.
- The sponsor really desires the project to finish with high quality and allows the high quality to justify the budget.

17

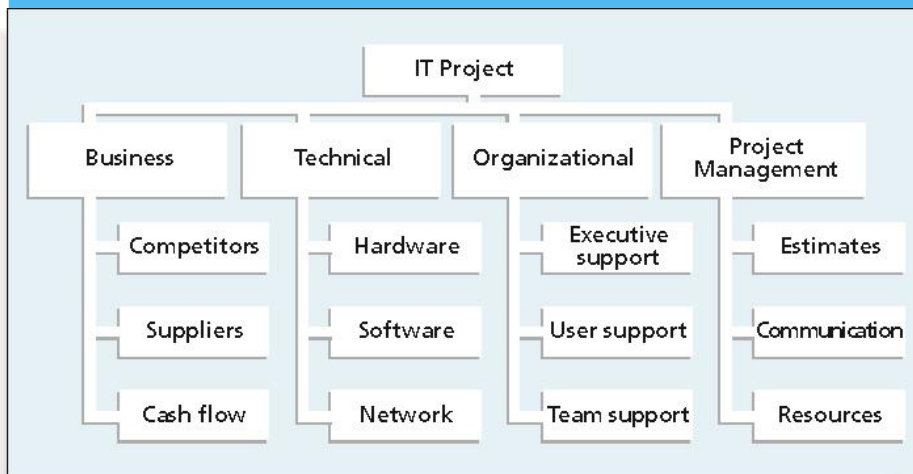
Table 11-4. Potential Negative Risk Conditions Associated with Each Knowledge Area

KNOWLEDGE AREA	RISK CONDITIONS
Integration	Inadequate planning; poor resource allocation; poor integration management; lack of post-project review
Scope	Poor definition of scope or work packages; incomplete definition
Time	Errors in estimating time or resource availability; errors in determining the critical path; poor allocation and management of float; early release of competitive products
Cost	Estimating errors; inadequate productivity, cost, change, or contingency
Quality	Poor attitude toward quality; substandard design/materials/workmanship; inadequate quality assurance program
Human Resources	Poor conflict management; poor project organization and definition of responsibilities; absence of leadership
Communications	Carelessness in planning or communicating; lack of consultation with key stakeholders
Risk	Ignoring risk; unclear analysis of risk; poor insurance management
Procurement	Unenforceable conditions or contract clauses; adversarial relations

Risk Breakdown Structure

- * A **risk breakdown structure (RBS)** is a hierarchy of potential risk categories for a project
- * Similar to a work breakdown structure but used to identify and categorize risks

Figure 11-4. Sample Risk Breakdown Structure



Risk Register

- * The main output of the risk identification process is a list of identified risks and other information needed to begin creating a risk register
- * A **risk register** is:
 - * A document that contains the results of various risk management processes and that is often displayed in a table or spreadsheet format
 - * A tool for documenting potential risk events and related information
- * **Risk events** refer to specific, uncertain events that may occur to the detriment or enhancement of the project

21

Risk Register Contents

For each entry of the risk register, there are:

- * An identification number for the risk event
- * A rank for the risk event
- * The name of the risk event
- * A description of the risk event
- * The category under which the risk event falls
- * The root cause of the risk

22

Risk Register Contents (continued)

- * **Triggers** for each risk; triggers are indicators or symptoms of actual risk events for triggering the risk responses
- * Potential responses to each risk
- * The **risk owner** or person who will own or take responsibility for each risk
- * The probability and impact of each risk occurring
- * The status of each risk

23

Table 11-5. Sample Risk Register

No.	RANK	RISK DESCRIPTION	CATEGORY	ROOT CAUSE	TRIGGERS	POTENTIAL RISK RESPONSES	RISK OWNER	PROBABILITY	IMPACT	STATUS
R44	1									
R21	2									
R7	3									

Identified Risk: The computer equipment may not be delivered on time.
Root Cause: This kind of equipment is often short of supply.
Potential Responses: Order in advance; Identify alternative vendors.

Identified Risk: Loss of data
Root Cause : System down
Potential Responses: Backup frequently; Redundancy

24

Performing Qualitative Risk Analysis

- * Assess the likelihood and impact of all identified risks (in Risk Register) to determine their magnitude and priority
- * It is a subjective analysis
- * Risk quantification tools and techniques include:
 - * Probability/impact matrixes
 - * The Top Ten Risk Item Tracking
 - * Expert judgment

25

Probability/Impact Matrix

- * A **probability/impact matrix** or **chart** lists the relative probability of a risk occurring on one side of a matrix or axis on a chart and the relative impact of the risk occurring on the other
- * List the risks and then label each one as high, medium, or low in terms of its probability of occurrence and its impact if it did occur
- * Can also calculate **risk factors**
 - * Numbers that represent the overall risk of specific events based on their probability of occurring and the consequences to the project if they do occur

26

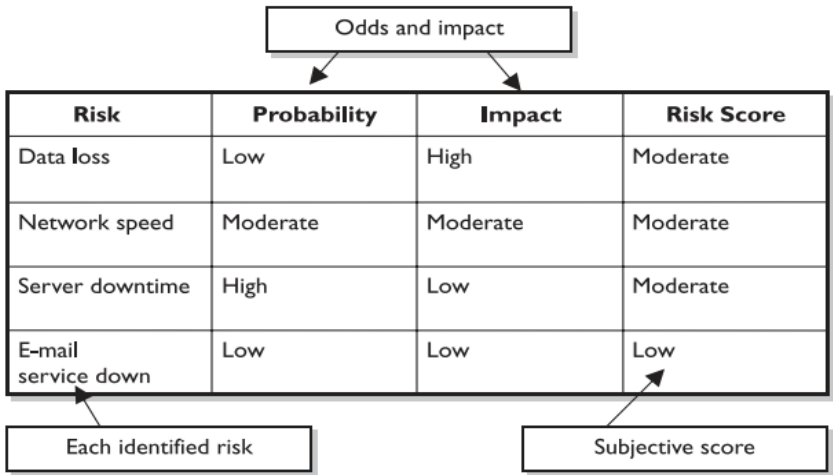
Figure 11-5. Sample Probability/Impact Matrix

Probability	High	risk 6	risk 9	risk 1 risk 4
	Medium	risk 3 risk 7	risk 2 risk 5 risk 11	
	Low		risk 8 risk 10	risk 12
		Low	Medium	High
		Impact		

Information Technology Project Management, Sixth Edition

27

How to use a Probability/Impact Matrix?



28

Top Ten Risk Item Tracking

- * **Top Ten Risk Item Tracking** is a qualitative risk analysis tool that helps to identify risks and maintain an awareness of risks throughout the life of a project
- * Establish a periodic review of the top ten project risk items
- * List the current ranking, previous ranking, number of times the risk appears on the list over a period of time, and a summary of progress made in resolving the risk item

Table 11-6. Example of Top Ten Risk Item Tracking

Risk Event	MONTHLY RANKING			Risk Resolution Progress
	Rank This Month	Rank Last Month	Number of Months in Top Ten	
Inadequate planning	1	2	4	Working on revising the entire project management plan
Poor definition	2	3	3	Holding meetings with project customer and sponsor to clarify scope
Absence of leadership	3	1	2	After previous project manager quit, assigned a new one to lead the project
Poor cost estimates	4	4	3	Revising cost estimates
Poor time estimates	5	5	3	Revising schedule estimates

Watch List

- * A **watch list** is a list of risks that are low priority but are still identified as potential risks
- * Qualitative analysis can also identify risks that should be evaluated on a quantitative basis

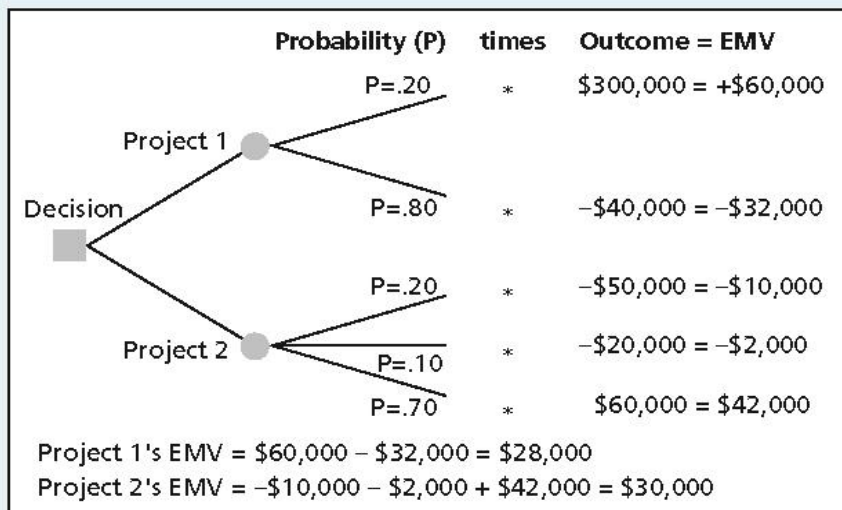
Performing Quantitative Risk Analysis

- * Often follows qualitative risk analysis, but both can be done together
- * Usually performed on risks that have been prioritized by the “Performing Qualitative Risk Analysis”
- * Large, complex projects involving leading edge technologies often require extensive quantitative risk analysis
- * Main techniques include:
 - * Decision tree analysis and EMV
 - * Simulation

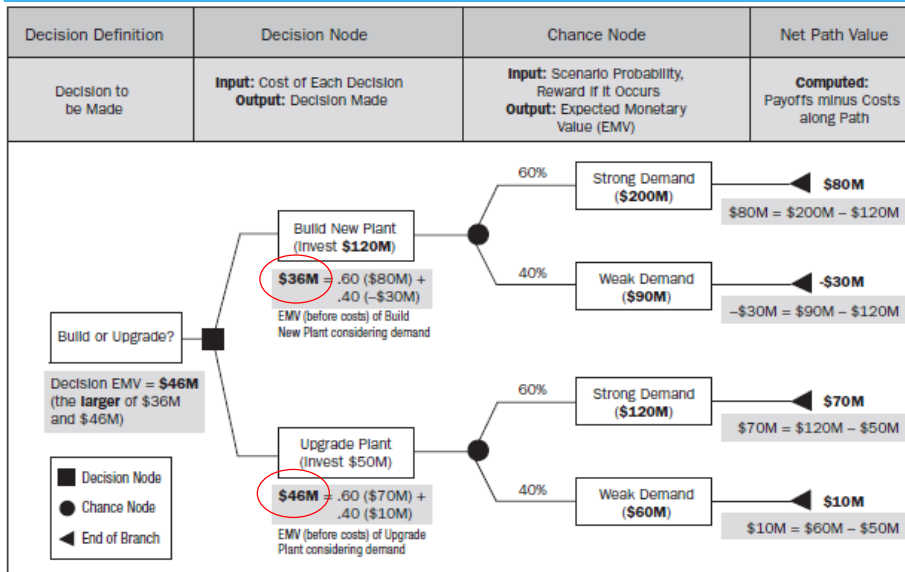
Decision Trees and Expected Monetary Value (EMV)

- * A **decision tree** is a diagramming analysis technique used to help select the best course of action in situations in which future outcomes are uncertain
- * **Estimated monetary value (EMV)** is the product of a risk event probability and the risk event's monetary value
- * You can draw a decision tree to help find the EMV

Figure 11-7. Expected Monetary Value (EMV) Example



Example of EMV



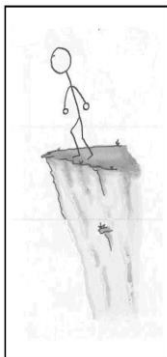
Planning Risk Responses

- * After identifying and quantifying risks, you must decide how to respond to them
- * Four main response strategies for **negative risks**
 - * Risk avoidance
 - * Risk acceptance
 - * Risk transference
 - * Risk mitigation

Risk responses for negative risks (threats)

- * **Avoid** - Changing the project management plan to eliminate the threat posed by an adverse risk, to isolate the project objectives from the risk's impact
 - * Example: Cancel the delivery by ship due to the high probability of piracy, and choose lorry transportation instead
- * **Transfer** - Shifting the negative impact of a threat, along with ownership of the response, to a third party
 - * Examples : Insurance, warranties
- * **Mitigate** - Implying a reduction in the probability and/or impact of an adverse risk event to an acceptable threshold
 - * Examples: prototypes, system redundancy
 - * Examples: Shipping partial goods in multiple shipments to minimal the potential loss
- * **Accept** - Some risk you can't avoid or mitigate or transfer
 - * Do nothing, but just document it ³⁷

Risk responses for negative risks (threats)



Your project

Avoid

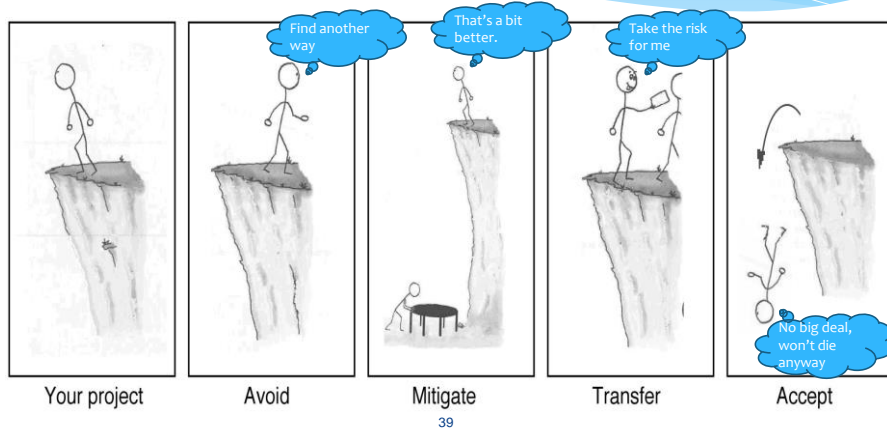
Mitigate

38

Transfer

Accept

Risk responses for negative risks (threats)



Risk Response for Positive Risks (Opportunities)

- * Risk exploitation
- * Risk sharing
- * Risk enhancement
- * Risk acceptance

Risk Response for Positive Risks (Opportunities)

- * **Exploit** – To do everything to make sure that to take advantage of an opportunity
 - * Assign best resources to exploit it
- * **Share** – Allocating ownership to a third party who is best able to capture the opportunity for the benefit of the project.
- * **Enhance** – by increasing probability and/or positive impacts, and by identifying and maximizing key drivers of these positive impact risks

41

Residual and Secondary Risks

- * It's also important to identify residual and secondary risks
- * **Secondary risks** are the risks that arise as a direct result of implementing a risk response
- * **Residual risks** are the risks that remain after all of the response strategies have been implemented

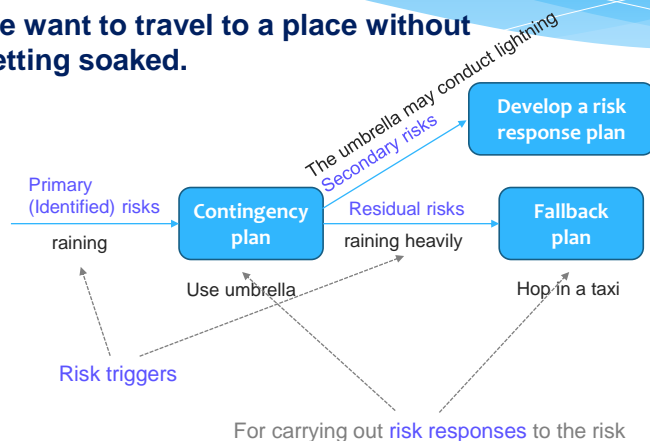
Contingency and Fallback Plans, Contingency Reserves

- * **Contingency plans** are predefined actions that the project team will take if an identified risk event occurs
- * **Fallback plans** are developed for risks that have a high impact on meeting project objectives and are put into effect if attempts to reduce the risk are not effective
- * **Contingency reserves** or **allowances** are provisions held by the project sponsor or organization to reduce the risk of cost or schedule overruns to an acceptable level

43

Example of Contingency and Fallback plans

We want to travel to a place without getting soaked.



44

Monitoring and Controlling Risks

- * Involves executing the risk management process to respond to risk events
- * **Workarounds** are unplanned responses to risk events that must be done when there are no contingency plans
- * Main outputs of risk monitoring and control are:
 - * Risk register updates
 - * Organizational process assets updates
 - * Change requests
 - * Updates to the project management plan and other project documents

45