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.

Negative Risk

- A dictionary definition of risk is “the possibility of loss or injury.”

- Negative risk involves understanding potential problems that might occur in the project and how they might impede project success.

- Negative risk management is like a form of insurance; it is an investment.

Risk Can Be Positive

- Positive risks are risks that result in good things happening; sometimes called opportunities.

- A general definition of project risk is an uncertainty that can have a negative or positive effect on meeting project objectives.

- The goal of project risk management is to minimize potential negative risks while maximizing potential positive risks.
Risk Utility

- **Risk utility** or **risk tolerance** is the amount of satisfaction or pleasure received from a potential payoff
- Utility rises at a decreasing rate for people who are risk-averse
- Those who are risk-seeking have a higher tolerance for risk and their satisfaction increases when more payoff is at stake
- The risk-neutral approach achieves a balance between risk and payoff

Project Risk Management Processes

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

Project Risk Management Processes (continued)

- **Quantitative risk analysis**: numerically estimating the effects of risks on project objectives
- **Risk response planning**: taking steps to enhance opportunities and reduce threats to meeting project objectives
- **Risk monitoring and control**: monitoring identified and residual risks, identifying new risks, carrying out risk response plans, and evaluating the effectiveness of risk strategies throughout the life of the project
**Project Risk Management Summary**

<table>
<thead>
<tr>
<th>Planning</th>
<th>Risk Management Planning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outputs</td>
<td>Risk management plan</td>
</tr>
<tr>
<td></td>
<td>Risk register</td>
</tr>
<tr>
<td>Processes</td>
<td>Qualitative Risk Analysis</td>
</tr>
<tr>
<td></td>
<td>Quantitative Risk Analysis</td>
</tr>
<tr>
<td>Outputs</td>
<td>Updates to the risk register and project management plan, risk-related contractual agreements</td>
</tr>
</tbody>
</table>

**Topics Addressed in a Risk Management Plan**

- Methodology
- Roles and responsibilities
- Budget and schedule
- Risk categories
- Risk probability and impact
- Risk documentation

**Risk Management Planning**

- 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 to risk.
- The level of detail will vary with the needs of the project.

**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.
**Information Technology Success Potential Scoring Sheet**

<table>
<thead>
<tr>
<th>Success Criterion</th>
<th>Relative Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>User Involvement</td>
<td>19</td>
</tr>
<tr>
<td>Executive Management support</td>
<td>16</td>
</tr>
<tr>
<td>User Statement of Requirements</td>
<td>15</td>
</tr>
<tr>
<td>Proper Planning</td>
<td>11</td>
</tr>
<tr>
<td>Realistic Expectations</td>
<td>10</td>
</tr>
<tr>
<td>Smaller Project Milestones</td>
<td>9</td>
</tr>
<tr>
<td>Competent Staff</td>
<td>8</td>
</tr>
<tr>
<td>Ownership</td>
<td>6</td>
</tr>
<tr>
<td>Clear Visions and Objectives</td>
<td>3</td>
</tr>
<tr>
<td>Hard-Working, Focused Staff</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

**Broad Categories of Risk**

- Market risk
- Financial risk
- Technology risk
- People risk
- Structure/process risk

**Risk Breakdown Structure**

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

**Sample Risk Breakdown Structure**
Potential Negative Risk Conditions Associated With Each Knowledge Area

<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Risk Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration</td>
<td>Poor resource allocation; poor integration management; lack of post-project review</td>
</tr>
<tr>
<td>Scope</td>
<td>Poor definition of scope or work packages; incomplete definition</td>
</tr>
<tr>
<td>Time</td>
<td>Inadequate time estimate; time buffer insufficient; errors in determining critical path</td>
</tr>
<tr>
<td>Cost</td>
<td>Inadequate cost estimate; poor productivity; cost, change, or scope overruns</td>
</tr>
<tr>
<td>Quality</td>
<td>Poor quality assurance; inadequate quality assurance program</td>
</tr>
<tr>
<td>Human Resources</td>
<td>Poor human resources management; poor employee motivation and fulfillment of responsibilities; absence of leadership</td>
</tr>
<tr>
<td>Communications</td>
<td>Inadequate planning or communication; lack of consultation with key stakeholders</td>
</tr>
<tr>
<td>Risk</td>
<td>Ignoring risk; unclear analysis of risk; poor risk management</td>
</tr>
<tr>
<td>Procurement</td>
<td>Uncontrollable conditions or contract clauses; adverse market conditions</td>
</tr>
</tbody>
</table>

Risk Identification

- **Risk identification** is the process of understanding what potential events might hurt or enhance a particular project.
- Risk identification tools and techniques include:
  - Brainstorming
  - The Delphi Technique
  - Interviewing
  - SWOT analysis

Brainstorming

- Brainstorming is a technique by which a group attempts to generate ideas or find a solution for a specific problem by amassing ideas spontaneously and without judgment.
- An experienced facilitator should run the brainstorming session.
- Be careful not to overuse or misuse brainstorming.
  - Psychology literature shows that individuals produce a greater number of ideas working alone than they do through brainstorming in small, face-to-face groups.
  - Group effects often inhibit idea generation.

Delphi Technique

- The Delphi Technique is used to derive a consensus among a panel of experts who make predictions about future developments.
- Provides independent and anonymous input regarding future events.
- Uses repeated rounds of questioning and written responses and avoids the biasing effects possible in oral methods, such as brainstorming.
Interviewing

- **Interviewing** is a fact-finding technique for collecting information in face-to-face, phone, e-mail, or instant-messaging discussions.
- Interviewing people with similar project experience is an important tool for identifying potential risks.

SWOT Analysis

- SWOT analysis (strengths, weaknesses, opportunities, and threats) can also be used during risk identification.
- Helps identify the broad negative and positive risks that apply to a project.

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.

Risk Register Contents

- An identification number for each risk event.
- A rank for each risk event.
- The name of each risk event.
- A description of each risk event.
- The category under which each risk event falls.
- The root cause of each risk event.
Risk Register Contents (continued)

- Triggers for each risk; triggers are indicators or symptoms of actual risk events
- 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

Sample Risk Register

<table>
<thead>
<tr>
<th>NO.</th>
<th>NAME</th>
<th>RISK DESCRIPTION</th>
<th>CATEGORY</th>
<th>ROOT</th>
<th>TRIGGERS</th>
<th>POTENTIAL RESPONSES</th>
<th>RISK</th>
<th>OWNER</th>
<th>PROBABILITY</th>
<th>IMPACT</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>Risk1</td>
<td>Risk 1 description</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>R2</td>
<td>Risk2</td>
<td>Risk 2 description</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Medium</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
</tr>
</tbody>
</table>

Qualitative Risk Analysis

- Assess the likelihood and impact of identified risks to determine their magnitude and priority
- Risk quantification tools and techniques include:
  - Probability/impact matrixes
  - The Top Ten Risk Item Tracking
  - Expert judgment

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
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.

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Example of Top Ten Risk Item Tracking

<table>
<thead>
<tr>
<th>Risk Event</th>
<th>Rank Two Months</th>
<th>Rank Last Month</th>
<th>Rank on Top Ten</th>
<th>Project Progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inadequate planning</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>Working on revising the project management plan</td>
</tr>
<tr>
<td>Poor definition</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>Holding meetings with project caretaker and sponsor to clarify scope</td>
</tr>
<tr>
<td>Absence of leadership</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>After previous project manager quit, assigned a new one to lead the project</td>
</tr>
<tr>
<td>Poor cost estimates</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>Revising cost estimates</td>
</tr>
<tr>
<td>Poor time estimates</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>Revising schedule estimates</td>
</tr>
</tbody>
</table>
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

Quantitative Risk Analysis

- Often follows qualitative risk analysis, but both can be done together
- Large, complex projects involving leading edge technologies often require extensive quantitative risk analysis
- Main techniques include:
  - Decision tree analysis
  - Simulation
  - Sensitivity analysis

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

Expected Monetary Value (EMV) Example

<table>
<thead>
<tr>
<th>Probability (P)</th>
<th>times</th>
<th>Outcome = EMV</th>
</tr>
</thead>
<tbody>
<tr>
<td>P=20</td>
<td>X</td>
<td>$300,000 = +$60,000</td>
</tr>
<tr>
<td>P=80</td>
<td>X</td>
<td>$40,000 = -$32,000</td>
</tr>
<tr>
<td>P=70</td>
<td>X</td>
<td>$50,000 = -$10,000</td>
</tr>
<tr>
<td>P=10</td>
<td>X</td>
<td>$20,000 = -$2,000</td>
</tr>
<tr>
<td>P=70</td>
<td>X</td>
<td>$60,000 = $42,000</td>
</tr>
</tbody>
</table>

Project 1’s EMV = $60,000 - 32,000 = $28,000
Project 2’s EMV = $10,000 - 2,000 + 42,000 = $30,000
Risk Response Planning

- 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

Response Strategies for Positive Risks

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

General Risk Mitigation Strategies for Technical, Cost, and Schedule Risks

<table>
<thead>
<tr>
<th>TECHNICAL RISKS</th>
<th>COST RISKS</th>
<th>SCHEDULE RISKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emphasize team support and avoid stand-alone project structure</td>
<td>Increase the frequency of project monitoring</td>
<td>Increase the frequency of project monitoring</td>
</tr>
<tr>
<td>Increase project manager authority</td>
<td>Use WBS and CPM</td>
<td>Use WBS and CPM</td>
</tr>
<tr>
<td>Improve problem handling and communication</td>
<td>Improve communication, project goals understanding, and team support</td>
<td>Select the most experienced project manager</td>
</tr>
<tr>
<td>Increase the frequency of project monitoring</td>
<td>Increase project manager authority</td>
<td></td>
</tr>
<tr>
<td>Use WBS and CPM</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Residual and Secondary Risks

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

- 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:
  - Requested changes
  - Recommended corrective and preventive actions
  - Updates to the risk register, project management plan, and organizational process assets

Chapter Summary

- 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
- Main processes include:
  - Risk management planning
  - Risk identification
  - Qualitative risk analysis
  - Quantitative risk analysis
  - Risk response planning
  - Risk monitoring and control