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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. With high levels of volatility surrounding us on all sides, risk management is more needed now than ever, and cutting it would be a false economy. Rather than treating risk management as part of the problem, we should see it as a major part of the solution.

Negative Risk

- risk is “the possibility of loss or injury.”
- A general definition of a project risk is an uncertainty that can have a negative or positive effect on meeting project objectives.
- 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

Positive Risk

- 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

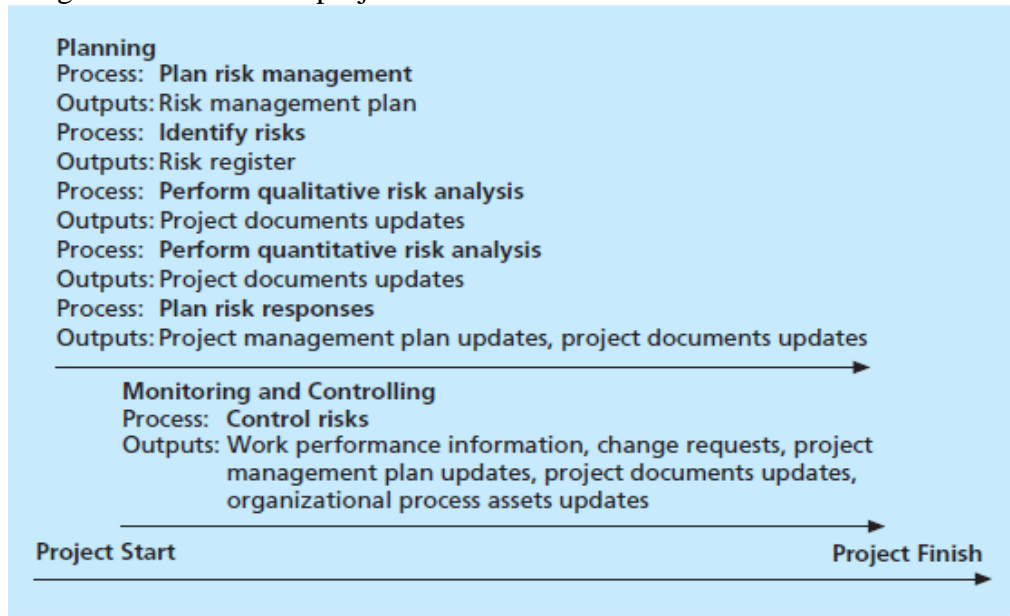
The goal of project risk management can be viewed as minimizing potential negative risks while maximizing potential positive risks.

- The term **Known risks** is sometimes used to describe risks that the project team has identified and analyzed. Known risks can be managed proactively.
- Unknown risks, or risks that have not been identified and analyzed, cannot be managed.
- Good project managers know it is good practice to take the time to identify and manage project risks

Major processes involved in project risk management

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

- **Performing quantitative risk analysis** involves numerically estimating the effects of risks on project objectives
- **Planning risk responses** involves taking steps to enhance opportunities and reduce threats to meeting project objectives.
- **Controlling risk** involves 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



PLANNING RISK MANAGEMENT

Planning risk management is the process of deciding how to approach risk management activities and plan for them in a project; the main output of this process is a risk management plan. A risk management plan documents the procedures for managing risk throughout the project.

- Project teams should hold several planning meetings early in the project's life cycle to help develop the risk management plan.
- The project team should review project documents as well as corporate risk management policies, risk categories, lessons-learned reports from past projects, and templates for creating a risk management plan.
- It is also important to review the risk tolerances of various stakeholders.

Broad Categories of Risk

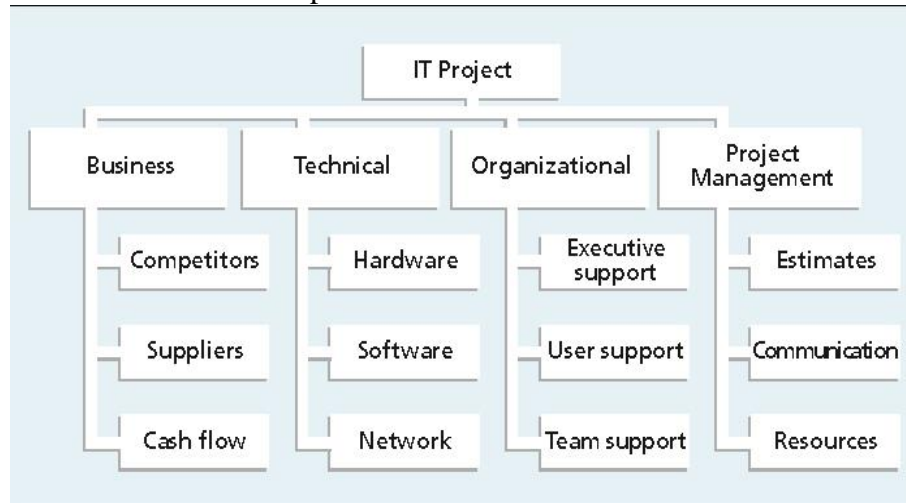
- Market risk
- Financial risk
- Technology risk
- People risk
- Structure/process risk

Based on these categories of risk, various risk questionnaire are developed

Risk breakdown structure

- Useful tool to help project managers consider potential risks in different categories
- Similar to work breakdown structure, but, is a hierarchy of potential risk categories for a project
- Risk breakdown structure provides a simple, one-page chart to help ensure that a project team considers important risk categories related to all IT projects

Sample risk breakdown structure



Potential negative risk conditions associated with each knowledge area

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

IDENTIFYING RISKS

The process of understanding what potential events might hurt or enhance a particular project

- **Inputs to identifying risks:**
 - Common sources of risks
 - Project's planning documents (for risk, cost, schedule, quality, and human resource management)
 - Activity cost and duration estimates
 - The scope baseline
 - Stakeholder register
 - Project documents
 - Procurement documents
 - Enterprise environmental factors
 - Organizational process assets
- **Tools and techniques for identifying risks**

Brainstorming:

- 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 and introduce new categories of potential risks to keep the ideas flowing.
- After the ideas are collected, the facilitator can group and categorize the ideas to make them more manageable

The Delphi technique:

- Used to derive a consensus among a panel of experts who make predictions about future developments
- A systematic, interactive forecasting procedure based on independent and anonymous input regarding future events
- Uses repeated rounds of questioning and written responses, including feedback to responses in earlier rounds, to take advantage of group input while avoiding the possible biasing effects of oral panel deliberations
- To use the Delphi technique, you must select a panel of experts for the particular area in question.

Interviewing:

- 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
- It is important to be well prepared for leading interviews; it often helps to create a list of questions to use as a guide during the interview.

SWOT analysis

- *It* can also be used during risk identification by having project teams focus on the broad perspectives of potential risks for particular projects

Checklists

- These are based on risks encountered in previous projects provide a meaningful template for understanding risks in a current project

Diagramming techniques

- *It* includes using cause-and-effect diagrams or fishbone diagrams, flowcharts, and influence diagrams.

Risk Register

A risk register is a document that contains results of various risk management processes; it is often displayed in a table or spreadsheet format. A risk register is 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

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

1. An identification number for each risk event
2. A rank for each risk event
3. The name of each risk event
4. A description of each risk event
5. The category under which each risk event falls
6. The root cause of each risk
7. Triggers for each risk; **triggers** are indicators or symptoms of actual risk events
8. Potential responses to each risk
9. The **risk owner** or person who will own or take responsibility for each risk
10. The probability and impact of each risk occurring
11. The status of each risk

PERFORMING QUALITATIVE RISK ANALYSIS

Qualitative risk analysis involves assessing the likelihood (will it occur) and impact of identified risks to determine their magnitude and priority

Risk qualitative tools and techniques include:

- Probability/impact matrixes
- The Top Ten Risk Item Tracking
- Expert judgment

Using Probability/Impact Matrixes to Calculate Risk Factors

People often describe a risk probability or consequence as being high, medium or moderate, or low. A project manager can chart the probability and impact of risks on a probability/impact matrix or chart, which lists the relative probability of a risk occurring and the relative impact of the risk occurring. 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. It may be useful to create a separate probability/impact matrix or chart for negative risks and positive risks to make sure that both types are adequately addressed. It can also calculate risk factors. Here, 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

| | | | | |
|-------------|--------|------------------|-----------------------------|------------------|
| 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 | | |

Top Ten Risk Item Tracking

- qualitative risk analysis tool that helps to identify risks and maintains awareness of risks throughout the life of a project
- Establish a periodic review of the top ten project risk items
- List includes 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

| MONTHLY RANKING | | | | |
|-----------------------|--------------------|--------------------|--------------------------------|---|
| RISK EVENT | RANK THIS MONTH | RANK LAST MONTH | NUMBER OF MONTHS IN TOP TEN | RISK RESOLUTION PROGRESS |
| 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 |

- A risk management review accomplishes several objectives.
 1. It keeps management and the customer (if included) aware of major influences that could prevent or enhance the project's success.
 2. By involving the customer, the project team may be able to consider alternative strategies for addressing the risks.
 3. The review promotes confidence in the project team by demonstrating to management and the customer that the team is aware of significant risks, has a strategy in place, and is effectively carrying out that strategy
- The main output of qualitative risk analysis is updating the risk register
- A **watch list** is a list of risks that are low priority but are still identified as potential risks

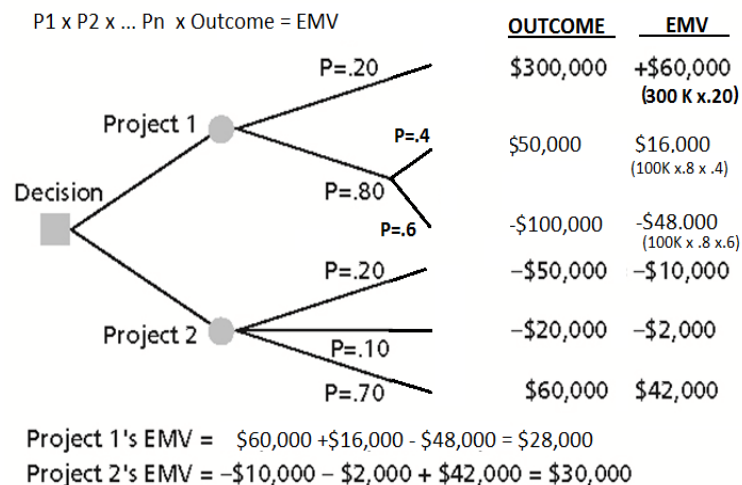
PERFORMING QUANTITATIVE RISK ANALYSIS

The process of numerically analyzing the effect of identified risk on overall project. Large, complex projects involving leading edge technologies often require extensive quantitative risk analysis. The main techniques include:

- Decision tree analysis
- Simulation
- Sensitivity analysis

Decision Trees and Expected Monetary Value

- A decision tree is a diagramming analysis technique used to help select the best course of action when future outcomes are uncertain
- Expected 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

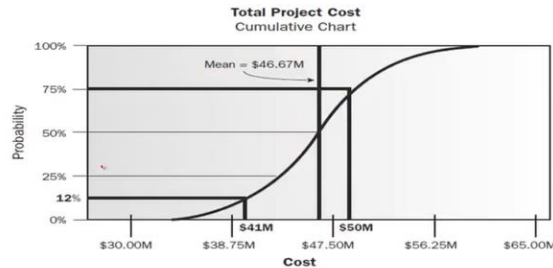


Simulation

- Uses a representation or model of a system to analyze its expected behavior or performance
- Most simulations are based on some form of Monte Carlo analysis

- Monte Carlo analysis can predict the probability of finishing by a certain date or the probability that the cost will be equal to or less than a certain value.

Modeling and simulation



A project simulation uses a model that translates the specified detailed uncertainties of the project into their potential impact on project objectives. Simulations are typically performed using the Monte Carlo technique.

Sensitivity Analysis

- Sensitivity analysis is used to see the effects of changing one or more variables on an outcome
- For example, many people use it to determine what the monthly payments for a loan will be given different interest rates or periods of the loan, or for determining break-even points based on different assumptions
- Spreadsheet software, such as Excel, is a common tool for performing sensitivity analysis

Sensitivity analysis

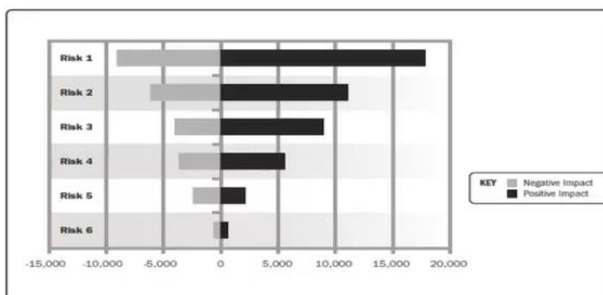


Figure 11-15. Example of Tornado Diagram

- * A quantitative risk analysis and modeling technique used to help determine which risks have the most potential impact on the project.
- It examines the extent to which the uncertainty of each project element affects the objective being examined when all other uncertain elements are held at their baseline values.
- The typical display of results is in the form of a tornado diagram.

Output of quantitative risk analysis

- The main outputs of quantitative risk analysis are updates to the risk register, such as revised risk rankings or detailed information behind those rankings.
- The quantitative analysis also provides high-level information in terms of the probabilities of achieving certain project objectives. This information might cause the project manager to suggest changes in contingency reserves.

- In some cases, projects may be redirected or canceled based on the quantitative analysis, or they might help initiate new projects to help the current one succeed

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

| TECHNICAL RISKS | COST RISKS | SCHEDULE RISKS |
|--|--|--|
| Emphasize team support and avoid stand-alone project structure | Increase the frequency of project monitoring | Increase the frequency of project monitoring |
| Increase project manager authority | Use WBS and CPM | Use WBS and CPM |
| Improve problem handling and communication | Improve communication, project goals understanding, and team support | Select the most experienced project manager |
| Increase the frequency of project monitoring | Increase project manager authority | |
| Use WBS and CPM | | |

PLANNING RISK RESPONSES

- Developing a response to risks involves developing options and defining strategies for reducing negative risks and enhancing positive risks
- **The four basic response strategies for negative risks are:**
 1. Risk avoidance or eliminating a specific threat, usually by eliminating its causes.
 2. Risk acceptance or accepting the consequences if a risk occurs by active approach to risk by having a contingency or backup plan and contingency reserves or passive approach and accept whatever facility the organization provides.
 3. Risk transference or shifting the consequence of a risk and responsibility for its management to a third party
 4. Risk mitigation or reducing the impact of a risk event by reducing the probability of its occurrence
- **The four basic response strategies for positive risks are:**
 1. Risk exploitation or doing whatever you can to make sure the positive risk happens.
 2. Risk sharing or allocating ownership of the risk to another party
 3. Risk enhancement or changing the size of the opportunity by identifying and maximizing key drivers of the positive risk
 4. Risk acceptance also applies to positive risks when the project team does not take any actions toward a risk.

- The main outputs of risk response planning include risk-related contractual agreements, updates to the project management plan and other project documents, and updates to the risk register

Residual and Secondary Risks

- It is 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

CONTROLLING RISKS

- Controlling risks involves executing the risk management processes to respond to risk events and ensuring that risk awareness is an ongoing activity performed by the entire project team throughout the entire project
- New risks will be identified as the project progresses. Newly identified risks need to go through the same process as those identified during the initial risk assessment.
- **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