

Project Risk Management

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Project Risk Management

Project Risk Management

- Project Risk Management includes the processes of conducting risk management planning, risk identification, risk analysis, risk response planning, risk response implementation, and monitoring risk of a project.
- The **objectives** of project risk management are to increase the probability and/or impact of positive risks and to decrease the probability and/or impact of negative risks, in order to optimize the chances of project success.

Processes of project risk management

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- 1 • Plan Risk Management
 - 2 • Identify Risks
 - 3 • Perform Qualitative Risk Analysis
 - 4 • Perform Quantitative Risk Analysis
 - 5 • Plan Risk Responses
 - 6 • Implement Risk Responses
 - 7 • Monitor Risks

1. Plan risk management

- Process of defining how to conduct risk management activities for a project.
- **Key benefit:** it ensures that the degree, type, and visibility of risk management are proportionate to both risks and the importance of the project to the organization and other stakeholders.

Plan risk management- Overview

Plan Risk Management

Inputs

- .1 Project charter
- .2 Project management plan
 - All components
- .3 Project documents
 - Stakeholder register
- .4 Enterprise environmental factors
- .5 Organizational process assets

Tools & Techniques

- .1 Expert judgment
- .2 Data analysis
 - Stakeholder analysis
- .3 Meetings

Outputs

- .1 Risk management plan

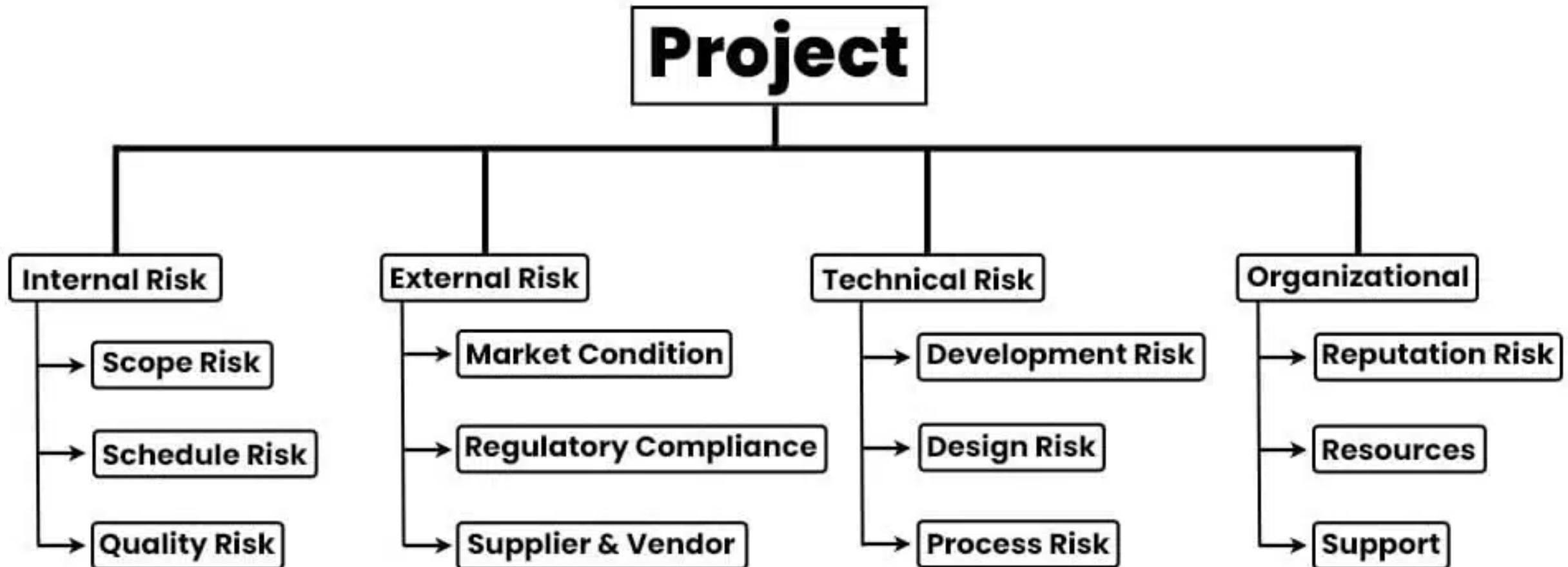
Outputs - Risk management plan

- Component of the project management plan that describes **how risk management activities will be structured and performed.**
- Risk management plan may include some or all of the following elements.
 - **Risk strategy:** Describes the general approach to managing risk on the project.
 - **Methodology:** Defines the specific approaches, tools, and data sources that will be used to perform risk management on the project.
 - **Roles and responsibilities:** Define the lead, support, and risk management team members for each type of activity described in the risk management plan and clarifies their responsibilities.
 - **Funding:** Identifies the funds needed to perform activities related to Project Risk Management. Establishes protocols for the application of contingency and management reserves.

Outputs - Risk management plan

- **Timing:** Defines when and how often the Project Risk Management processes will be performed throughout the project life cycle and establishes risk management activities for inclusion into the project schedule.
- **Risk categories:** Provide a means for grouping individual project risks. A common way to structure risk categories is with a risk breakdown structure (RBS), which is a hierarchical representation of potential sources of risk.
 - E.g.: Technical risks, Management risks, Commercial risks, External risks
- **Reporting formats:** Reporting formats define how the outcomes of the Project Risk Management process will be documented, analyzed, and communicated.
- **Tracking:** Tracking documents how risk activities will be recorded and how risk management processes will be audited.

Risk Breakdown Structure - Example



2. Identify risks

- Process of identifying individual project risks as well as sources of overall project risk and documenting their characteristics.
- **Key benefit:** documentation of existing individual project risks and the sources of overall project risk.

Identify Risks

Inputs	Tools & Techniques	Outputs
<ul style="list-style-type: none">.1 Project management plan<ul style="list-style-type: none">• Requirements management plan• Schedule management plan• Cost management plan• Quality management plan• Resource management plan• Risk management plan• Scope baseline• Schedule baseline• Cost baseline.2 Project documents<ul style="list-style-type: none">• Assumption log• Cost estimates• Duration estimates• Issue log• Lessons learned register• Requirements documentation• Resource requirements• Stakeholder register.3 Agreements.4 Procurement documentation.5 Enterprise environmental factors.6 Organizational process assets	<ul style="list-style-type: none">.1 Expert judgment.2 Data gathering<ul style="list-style-type: none">• Brainstorming• Checklists• Interviews.3 Data analysis<ul style="list-style-type: none">• Root cause analysis• Assumption and constraint analysis• SWOT analysis• Document analysis.4 Interpersonal and team skills<ul style="list-style-type: none">• Facilitation.5 Prompt lists.6 Meetings	<ul style="list-style-type: none">.1 Risk register.2 Risk report.3 Project documents updates<ul style="list-style-type: none">• Assumption log• Issue log• Lessons learned register

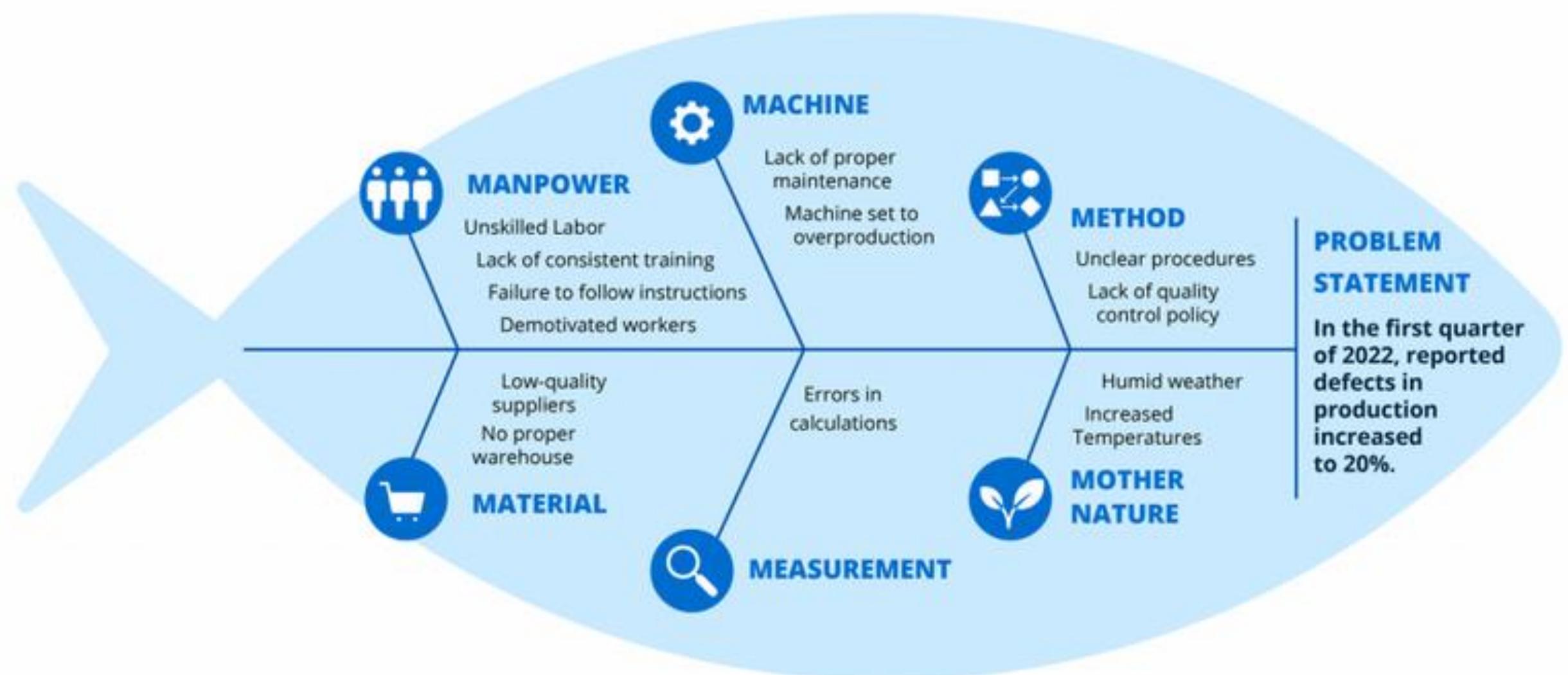
Identify Risks Overview

Tools and Techniques

Root cause analysis

- Root cause analysis is typically used to **discover the underlying causes that lead to a problem** and **develop preventive action**.
- It can be used **to identify threats** by starting with a **problem statement** (for example, the project might be delayed or over budget) and exploring which threats might result in that problem occurring.
- The same technique can be used to **find opportunities** by starting with a **benefit statement** (for example, early delivery or under budget) and exploring which opportunities might result in that benefit being realized.
- **Fish bone diagram** is a good method in representing the data collected through root course analysis. Another method is “**Five Whys**.”

Fish bone diagram - Example



Five Whys - Example

Let's say you're building a bridge, but deadlines are being missed.

- Q: “Why is the deadline being missed?”
 - A: The team couldn't finish their task in time.
- Q: “Why couldn't the team finish their task on time?”
 - A: Materials were delayed.
- Q: “Why were materials delayed?”
 - A: There was no follow-through with suppliers.
- Q: “Why was there no follow-through with suppliers?”
 - A: Teams weren't adequately trained.
- Q: “Why weren't teams adequately trained?”
 - A: The hybrid methodology has gaps

Tools and Techniques

Assumption and constraint analysis

- Every project and its project management plan are conceived and developed based on a set of assumptions and within a series of constraints. These are often already incorporated in the scope baseline and project estimates.
- Assumption and constraint analysis explores the validity of assumptions and constraints to determine which pose a risk to the project.
- Threats may be identified from the inaccuracy, instability, inconsistency, or incompleteness of assumptions.
- Constraints may give rise to opportunities through removing or relaxing a limiting factor that affects the execution of a project or process.

Tools and Techniques

SWOT analysis

- This technique examines the project from each of the strengths, weaknesses, opportunities, and threats (SWOT) perspectives.
- For risk identification, it is used to increase the extent of identified risks by including internally generated risks.



SWOT analysis - Example

SWOT analysis for large-scale transportation projects commissioned by the U.S. Federal Highway Association (FHWA)

	Positive	Negative
Internal	Strengths <ol style="list-style-type: none">1. Strong need2. Grassroots support3. Political support4. Funding5. Strong, creative leadership6. Collaborative process	Weaknesses <ol style="list-style-type: none">1. FHWA tends to be large, slow government2. Mega projects are very complex3. Mega projects are very costly4. Mega projects are likely to present many unforeseen problems5. Mega projects always have environmental impacts
External	Opportunities <ol style="list-style-type: none">1. Opportunities Improve the economy of the effected area2. Improve safety for those that live in the area3. Conserve the environment by eliminating other impacts	Threats <ol style="list-style-type: none">1. Environmental constraints2. Limited funding3. Scope creep4. Time - delays increase costs5. Politics - People use large projects to satisfy personal needs6. Opposition - People hate change

Outputs

Risk Register

- The content of the risk register may include but is not limited to:
 - i. **List of identified risks:** Each individual project risk is given a unique identifier in the risk register. Identified risks are described in as much detail as required to ensure unambiguous understanding. A structured risk statement may be used to distinguish risks from their cause(s) and their effect(s).
 - ii. **Potential risk owners:** Where a potential risk owner has been identified during the Identify Risks process, the risk owner is recorded in the risk register.
 - iii. **List of potential risk responses:** Where a potential risk response has been identified during the Identify Risks process, it is recorded in the risk register.

Outputs

Risk report

- The risk report presents information on sources of overall project risk, together with summary information on identified individual project risks.

Types of Project Risks

Type of Risk	Examples
Financial Risks	Budget Overruns, Payment Delays
Schedule Risks	Delays in Permits and Approvals
Technical Risks	Design Errors or Omissions, Poor Workmanship
Supply Chain Risks	Material Shortages, Vendor/Supplier Bankruptcy
Environmental Risks	Adverse Weather Conditions, Natural Disasters
Health and Safety Risks	Accidents on Site, Unsafe Working Conditions
Legal and Regulatory Risks	Regulatory Changes, Contract Disputes
Labor Risks	Labor Shortages, High Labor Turnover
Stakeholder Risks	Client-Induced Changes, Community Opposition
Political Risks	Policy Changes, Tariffs or Trade Restrictions
Environmental and Sustainability Risks	Failure to Meet Environmental Standards, Ecological Disruptions

3. Perform Qualitative Risk Analysis

- Process of prioritizing individual project risks for further analysis or action by assessing their probability of occurrence and impact as well as other characteristics.
- Expert judgment is one of the commonly used method to perform qualitative risk analysis.
- **Key benefit:** it focuses efforts on high-priority risks.

Risk Assessment Matrix

		Impact <i>How severe would the outcomes be if the risk occurred?</i>				
		Insignificant 1	Minor 2	Significant 3	Major 4	Severe 5
Probability <i>What is the probability the risk will happen?</i>	5 Almost Certain	Medium 5	High 10	Very high 15	Extreme 20	Extreme 25
	4 Likely	Medium 4	Medium 8	High 12	Very high 16	Extreme 20
	3 Moderate	Low 3	Medium 6	Medium 9	High 12	Very high 15
	2 Unlikely	Very low 2	Low 4	Medium 6	Medium 8	High 10
	1 Rare	Very low 1	Very low 2	Low 3	Medium 4	Medium 5

4. Perform Quantitative Risk Analysis

- Process of numerically analyzing the combined effect of identified individual project risks and other sources of uncertainty on overall project objectives.
- **Key benefit:** it quantifies overall project risk exposure, and it can also provide additional quantitative risk information to support risk response planning.

Quantification of Risks

- Technique for quantifying risks:

Expected Monetary Value (EMV) Analysis

- EMV is the product of the risk event probability and the risk event's monetary value.

Expected Monetary Value (EMV) Analysis - Example

	Probability	Outcome (MRs)	EMV
Tender 1	Win $p = 20\%$	20%	30
	Loose $p = 80\%$	80%	-4
Total			2.8

	Probability	Outcome (MRs)	EMV
Tender 2	Win $p = 70\%$	70%	6
	Loose $p = 20\%$	20%	-5
	Loose $p = 10\%$	10%	-2
Total			3.0

Example – ctd.

- The higher the EMV the better.
- Since the EMV is positive for both projects the firm may decide to bid for both projects.
- If the firm has to choose between the two projects, the project should bid for tender 2 because it has a higher EMV.

5. Plan Risk Responses

- Process of developing options, selecting strategies, and agreeing on actions to address overall project risk exposure, as well as to treat individual project risks.
- **Key benefit:** it identifies appropriate ways to address overall project risk and individual project risks.

6. Implement Risk Responses

- Process of **implementing agreed-upon risk response plans.**
- **Key benefit:** it ensures that agreed-upon risk responses are executed as planned in order to address overall project risk exposure, minimize individual project threats, and maximize individual project opportunities.

7. Monitor Risks

- Process of monitoring the implementation of agreed-upon risk response plans, tracking identified risks, identifying, and analyzing new risks, and evaluating risk process effectiveness throughout the project.
- **Key benefit:** it enables project decisions to be based on current information about overall project risk exposure and individual project risks.

Thank You