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Project Risk Management

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Contents

Project Risk Management

" **Project Risk Management** includes the processes concerned with conducting risk management ***planning***, ***identification***, ***analysis***, ***responses***, and ***controlling*** on a project."

Objectives

The ***objectives*** of Project Risk Management are to:

increase the probability and impact of ***positive*** events, and

decrease the probability and impact of ***negative*** events.

Why We Manage Risks?

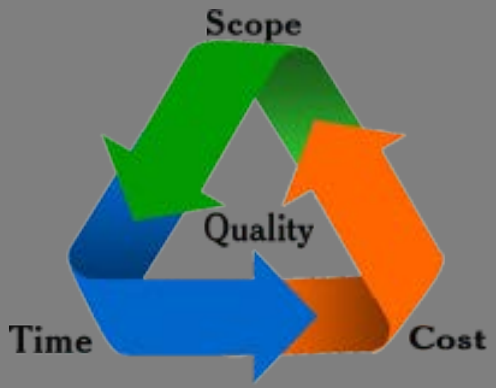
- Project problems can be reduced as much as **90%** by using risk analysis.

- **Positives:**
  - More info available during planning.
  - Improved probability of success/optimum project.

- **Negatives:**
  - Belief that all risks are accounted for.
  - Project cut due to risk level.

Key Terms

Risk is an uncertain event that could have a **positive** or **negative** effect on one or more project objectives such as:



- The goal of risk management is to be more **proactive** and less **reactive.**

- **Key question:** What would happen if ……..

Key Terms

Risks can be broken out into following primary types:

- **Pure Risk** (insurable)– risk **only** with potential loss.
- **Business Risk** (speculative risk) – risk with potential **loss or gain**
- **Force Majeure Risks** are so catastrophic that they're outside the scope of risk management planning and can be divided in:
  - **Forces of Nature**: earthquakes e.t.c.
  - **External Forces:** Government action, civil unrest, e.t.c.

Key Terms

Project risk	Is an uncertain event or condition that, if it occurs, has a positive or negative effect on one or more project objectives such as scope, schedule, cost, and quality
Uncertainty	Uncertainty is a lack of knowledge about an event that reduces confidence in conclusions drawn from the data
Probability	The likelihood that an event will occur.
Impact	The amount of pain (or the amount of gain) the risk event poses to the project.
Tolerances	The areas of risk that are acceptable or unacceptable. Tolerance at constraints such as scope, time, cost, quality, etc.
Threshold	The point at which a risk becomes unacceptable.
Known risks	Those that have been identified and analyzed, making it possible to plan responses for those risks (contingency reserve).
Unknown risks	Those that cannot be managed proactively and therefore may be assigned a management reserve.
Issue	A negative project risk that has occurred.
Triggers	Warning signs or symptoms that a risk event is about to occur.
Risk appetite	The degree of uncertainty an entity is willing to take on in anticipation of a reward
Risk Averse	Someone who does not want to take risks is said to be risk averse
Risk Seeker	Someone who is prone to take risks.
Risk Neutral	Tolerance to risk is **proportional** to the amount of **money** at stake.

How Do We Manage Risk?

We manage Risk by using the following processes:

Plan Risk Management.
Identify Risks.
Perform Qualitative Risk Analysis.
Perform Quantitative Risk Analysis.
Plan Risk Responses.
Control Risks.

Plan Risk Management

Plan Risk Management
1. Project Management Plan
2. Project Charter
3. Stakeholder Register
4. EEF
5. OPA
Tools & Techniques
1. Analytical Techniques
2. Expert Judgment
3. Meetings
Outputs
1. Risk Management plan

Characteristics

- How to **conduct** risk management activities for a project.
- **Key benefit** : It ensures that the degree, type, and visibility of risk management are commensurate with both the risks and the importance of the project to the organization.

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Plan Risk Management

Key Steps

1. Define the risk categories (these will assist the risk team in the Identify Risks process).
2. Determine how probability and impact will be defined (to be used in the Perform Qualitative Risk Analysis process).
3. Develop or modify the probability and impact matrix (to be used in the Perform Qualitative Risk Analysis process).

The team should have an agreed-upon basis for evaluating the identified risks later during the Perform Qualitative Risk Analysis process.

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Identify Risks

Identify Risks
1. Risk Management plan
2. Activity cost estimates
3. Activity duration estimates
4. Scope baseline
5. Stakeholder register
6. Cost Management plan
7. Schedule Management plan
8. Quality Management plan
9. Project documents
10. EEF (Attitudes, Databases, Benchmarkin
11. OPA (Historical Data, Templates)
Tools & Techniques
1. Expert Judgment
2 Doc Reviews
3. Info Gathering Techniques
4. Check List Analysis
5. Assumption s Analysis
6. Diagramming Techinques
(Cause & Effect, Flow Charts, Influence Diagram
7. SWOT Analysis
Outputs
1. Risk register

Characteristics

- Identify risks is an **iterative process**, because new risks may evolve or become known as the project progresses through its life cycle.
- The frequency of iteration and participation in each cycle will **vary by situation**.
- The format of the risk statements should be consistent to ensure that each risk **is understood clearly and unambiguously**.
- The risk statement should support the ability **to compare the relative effect** of one risk against others on the project.

Identify Risks

The objectives of the **Identify Risks** process are to:

- Identify and record a **long list of threats and opportunities** for the project and by work package.
- For many projects, the word **“long”** means hundreds of risks.
- Make sure all risks are in the **cause-risk-effect** format.
- **Understand** the risks.

Qualitative Risk Analysis

Perform Qualitative Risk Analysis
1. Risk register
2. Risk Management plan
3. Project scope statement
4. OPA
Tools & Techniques
1. Risk (P) and (I) Assessment
2. (P) and (I) Matrix
3. Risk Data Quality Assessment
4. Risk Categorization
5. Risk Urgency Assessment
6.Expert JUdgment
Outputs
1. Risk register updates

Characteristics

- Rapid and cost-effective for establishing priorities,
- Lays the foundation for Perform Quantitative Risk Analysis.
- Assesses :
  - **The priority** of identified risks.
  - The corresponding **impact** on project objectives if the risks occur,
  - The **time frame** for response,
  - The organization's **risk tolerance.**
- **Bias** is reduced by establishing definitions of the levels of probability and impact.

Probability and Impact Matrix

Impact Scale

Consequence	Health and Safety
Extreme	Fatality or multiple fatalities expected
High	Severe injury or disability likely; or some potential for fatality
Moderate	Lost time or injury likely; or some potential for serious injuries; or small risk of fatality
Low	First aid required; or small risk of serious injury
Negligible	No concern

Probability Scale

Likelihood Class	Likelihood of Occurrence (events/year)
Not Likely (NL)	<0.01% chance of occurrence
Low (L)	0.01 - 0.1% chance of occurrence
Moderate (M)	0.1 - 1% chance of occurrence
High (H)	1 - 10% chance of occurrence
Expected (E)	>10% chance of occurrence

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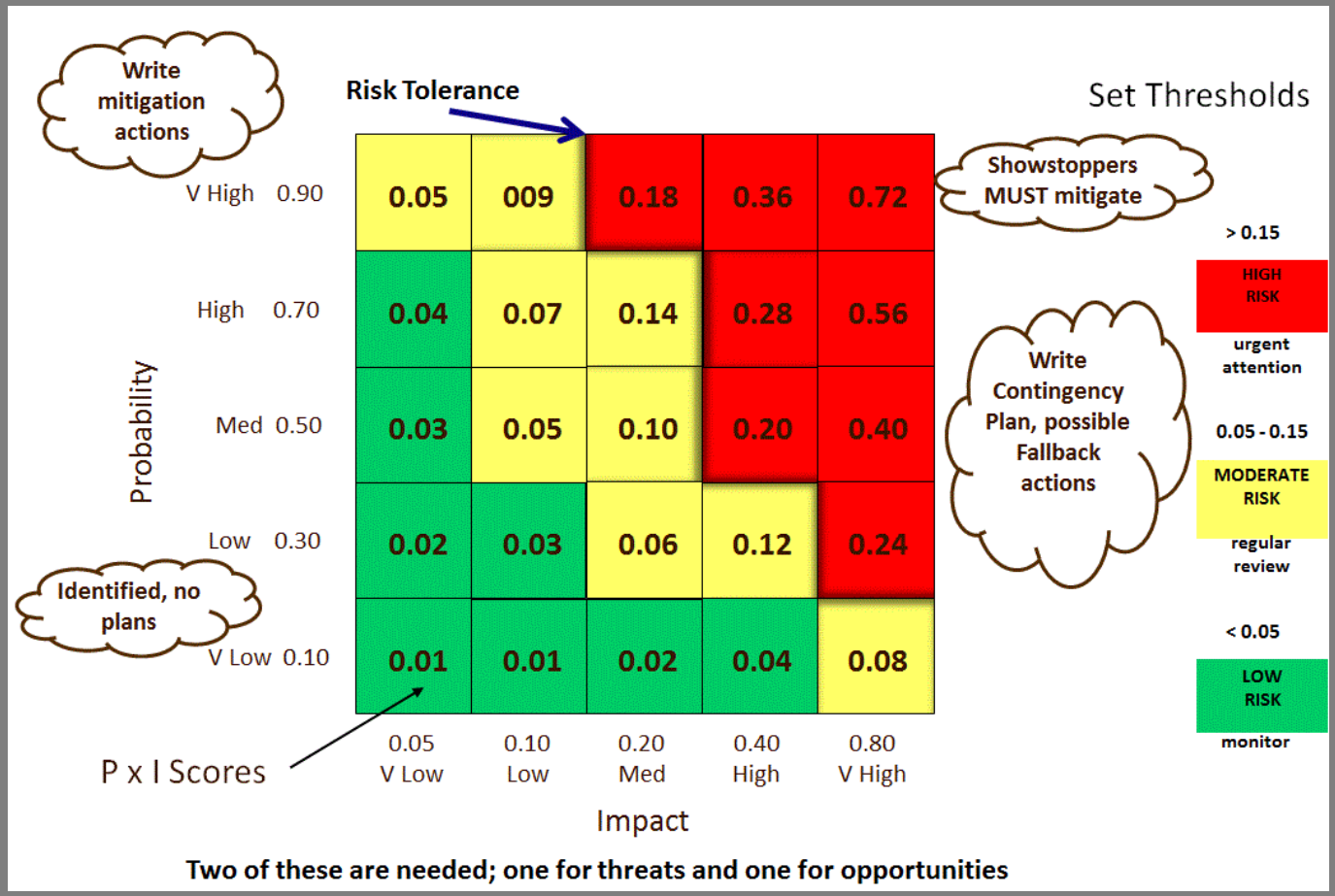
Probability and Impact Matrix

- Rate each risk on scales then plot on matrix



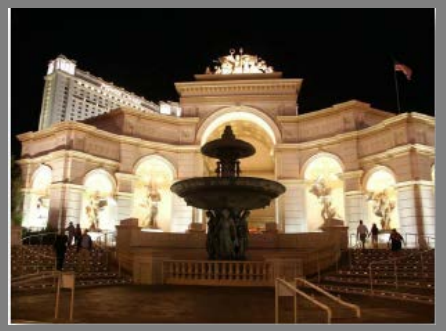
- Develop mitigation technique for risks above tolerance.

Quantitative Risk Analysis

Perform Quantitative Risk Analysis
1. Risk register
2. Project Management plan
3. Cost Management plan
4. Schedule Management plan
5. OPA
Tools & Techniques
1. Data Gatthering and Represantation Techniques
2. Quantitative Risk Analysis and Modeling Techiques
Outputs
1. Risk register updates
a. Probabilistic analysis of the project
b. Probability of achieving cost and time objectives
c. Prioritized list of quantified risks
d. Trends in quantitative risk analysis results

Characteristics

- **It follows** the Perform Qualitative Risk Analysis process.
- It may **not be possible to be executed** due to lack of sufficient data to develop appropriate models.
- Should be repeated, **as needed**, as part of the Control Risks process to determine any changes.



Quantitative Risk Analysis

- Analyze **numerically** the probability and consequence of each risk.
- **Monte Carlo Analysis** popular, as well as **Latin Hypercube Analysis**.
- **Decision Tree** analysis on test
  - Diagram that describes a decision and probabilities associated with the choices.
- **Expected Monetary Value Analysis** (EMV)

Quantitative Risk Analysis

Method	Description
Sensitivity analysis	Places a value on the effect of changing a single variable within a project by analyzing that effect on the project plan.
Expected monetary value (EMV) analysis	Assesses the average outcome of both known and unknown scenarios.
Decision tree analysis	Factors both probability and impact for each variable, indicating the decision providing the greatest expected value when all uncertain implications and subsequent decisions are quantified.
Modeling and simulation	Uses models that calculate potential impact of events on the project, based on random input values.

Plan Risk Responses

Plan Risk Responses
1. Risk register
2. Risk Management plan
Tools & Techniques
1. Strategies For Negative Risks or Threats
2. Strategies For Positive Risks Or Opportunities
3. Contingent Response Strategies
4. Expert Judgement
Outputs
1. Risk register updates
2. Risk-related contract decisions
3. Project Management plan updates
4. Project document updates

Characteristics

- It **develops Options and Actions** to enhance Opportunities and reduce threats.
- It address risks by **Priority**.
- **Inserts** Resources and activities.

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Response Strategies

		ACTIONS	EXAMPLE
Threats	**Avoid**	Usually involves changing the project management plan to eliminate the threat entirely.	Extend the schedule changing the strategy, reducing scope Shut down the project entirely.
	Mitigate	Actions to reduce the probability of occurrence or impact of a risk to the accepted thresholds.	Adopting less complex processes Conducting more tests, Choosing a more stable supplier Designing redundancy into a system. Prototype development
	Transfer	Shifts the impact of a threat to a third party together with	Use of insurance, performance bonds,warranties.
	Accept	Project team decides to acknowledge the risk and not take any action unless the risk occurs.	Active acceptance strategy is to establish a contingency reserve
Positive Risks	**Exploit**	Eliminate the uncertainty associated with a particular upside risk by ensuring the opportunity definitely happens.	Assigning an organization's most talented resources to the project. Using new technologies or technology upgrades to reduce cost and duration
	Enhance	Increase the probability and/or the positive impacts of an opportunity.	Adding more resources to an activity to finish early.
	Share	Allocating some or all of the ownership of the opportunity to a third party who is best able to capture the opportunity for the benefit of the project	Forming risk-sharing partnerships, teams, special-purpose companies, or joint ventures
	Accept		

Control Risks

Monitor and Control Risks
1. Risk register
2. Risk Management plan
3. Work performance information
4. Performance reports
Tools & Techniques
1. Risk Reassessment
2. Risk Audits
3. Variance and Trend Analysis
4. Technical Performance Measureme
5. Status Meetings
6. Reserve Analysis
Outputs
1. Change requests
2. OPA updates
3. Project Management plan updates
4. Project document updates
5. Work Performance Information
6. Risk register updates

Characteristics

- Implements risk response plans,
- Track identified risks,
- Monitor residual risks,
- Identify new risks,
- Evaluate risk process effectiveness.

Key Benefit:

Improves efficiency of the risk approach throughout the project life cycle to continuously optimize risk responses.

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Risk Register Final Form

	Risk Register
Start List	List of risks List of potential responses Root causes of risks Updated risk categories
Risk 1st Update	Risk ranking for the project compared to other projects List of prioritized risks and their probability and impact ratings Risks grouped by categories (As previously explained) List of risks requiring additional analysis in the near term List of risks for additional analysis and response (Quantitative) Watchlist (non-critical or non-top risks) Trends.
Risk 2nd Update	Prioritized list of quantified risks Amount of contingency time and cost reserves needed Possible realistic and achievable completion dates and project costs, The quantified probability of meeting project objectives Trends in quantitative risk analysis
Risk 3nd Update	Residual risks Contingency plans Risk response owners Secondary risks Risk triggers Contracts Fallback plans Reserves (contingency)
Risk 4th Update	Outcomes of the risk reassessments and risk audits Updates to previous parts of risk management, including the identification of new risks Closing of risks that are no longer applicable Details of what happened when risks occurred Lessons learned

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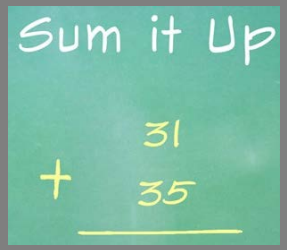
Risk Management - Summary



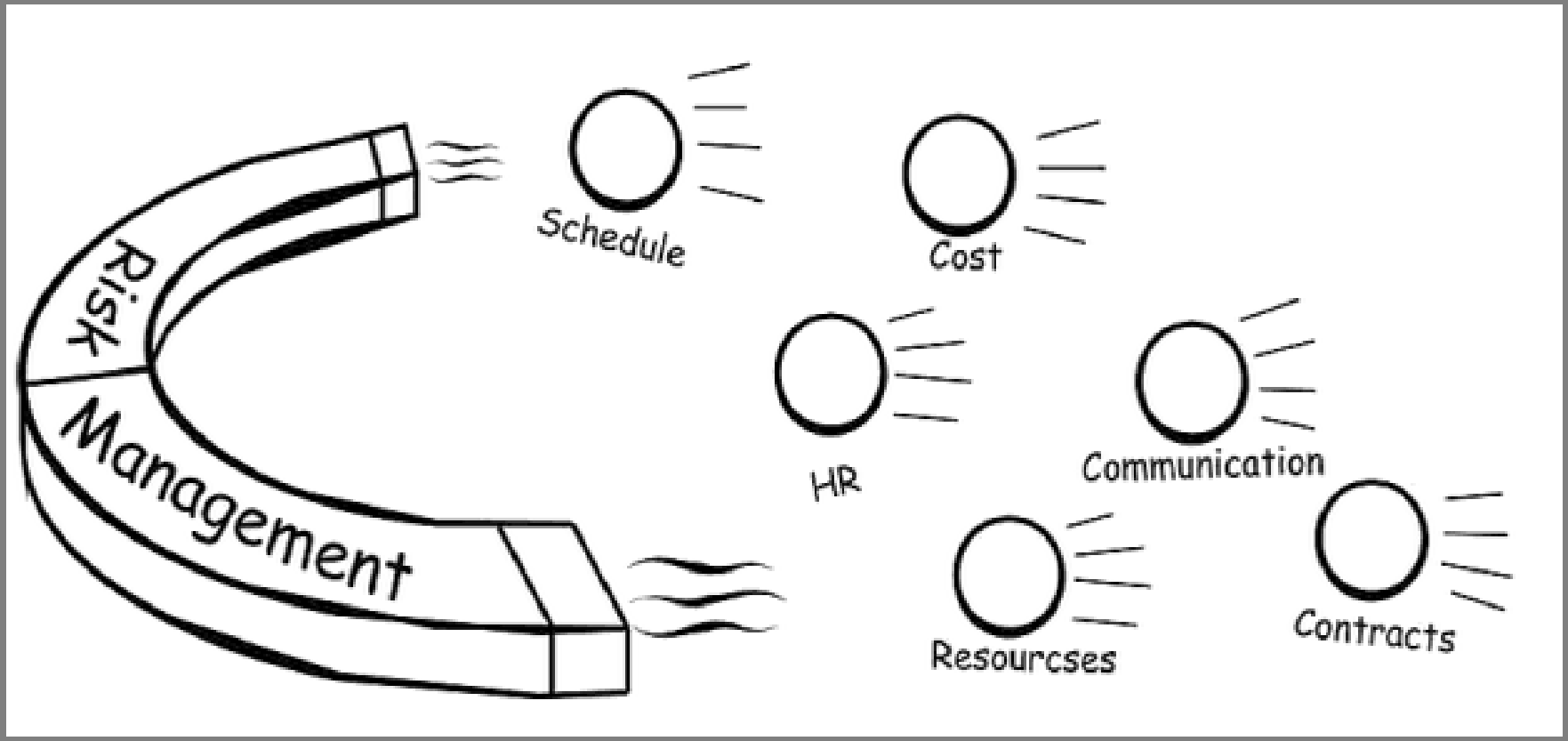
- Risk is **inherent** in all projects, and risks pose both threats and opportunities to the project.
- The Risk Management Plan, **details how you'll** define, monitor, and control risks throughout the project.
- The Identify Risks process seeks **to identify and document** the project risks using information-gathering techniques. Thus the Risk Register is created.
- Perform Qualitative Risk Analysis and Quantitative Risk Analysis **involve evaluating risks and assigning probability** and impact values to the risks.

Risk Management – Summary (cont.)

- **Monte Carlo and Latin Hypercube** simulations are techniques used to quantify schedule or cost risks.
- **Decision trees** graphically display decisions and their various choices and outcomes and is typically used in combination with **EMV**.
- The Risk Response plans detail the **strategies** you'll use to **respond to risks** and **assign individuals** to manage each risk response.
- **Contingency planning** involves planning alternatives to deal with risk events should they occur.

But…

Risk Management never occurs in isolation!!!!



“ The only alternative to risk management is crisis management --- and crisis management is much more expensive, time consuming and embarrassing. “

JAMES LAM, Enterprise Risk Management, Wiley Finance © 2003

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