



جامعة الجميع الذكية
EVERYONE'S SMART UNIVERSITY

Everyone's Smart University

Project (Spring 2021)

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Master

Date

Thursday

18 / 03 / 2021.

Course Code

(PMG510)

Project Risk Management

Managing Risk

A risk is defined as “an uncertain event or condition that, if it occurs, has a positive and negative effect on a project's objectives.” Risk is inherent with any project, and project managers should assess risk continually and develop plan to address them. The risk management plan contains an analysis of likely risks with both high and low impact, as well as mitigation strategies to help the project avoid being derailed should common problems arise. Risk management plans should be periodically reviewed by the project team in order to avoid having the analysis become stale and not reflective of actual potential project risks. Most critical, risk management plans include a risk strategy.

This module on Managing Risk discusses different type of risk that needs to be taken into account by the management while implementing a project. The other topics converged in this module include probability-impact matrix, Risk Quantification; Mitigating/Transferring risk; Risk audits/Review; Sample Risk plan and how to initiate Risk Management Planning.

Learning Objective

- Risk can be divided into four categories-based on time, probability and

business risk.

- A probability-impact Matrix maps out the risk, its probability and its possible

impact on the project. Risk qualification is done in order to create a contingency reserve to deal with an unexpected risk event. Transferring risk is the process by which the onus of the risk is shifted onto a third party, while mitigating risk is an attempt to reduce the impact of an expected risk. Risk Audits check the efficiency of a planned risk resource and Risk Reviews check the state of preparedness in case of a risk event. In order to initiate Risk Management Planning, a risk officer has be apponted to is responsible for dealing with the various aspects of risk management within the project.

Project Risk Management

Project Risk Management includes the processes of conducting risk management planning, identification, analysis, response planning, and monitoring and control on a project.

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 in the project.

Project Risk Management processes are as follows:

- Plan risk Management
- Identify Risks
- Perform Qualitative Risk Analysis

Perform Quantitative Risk Analysis

- Plan Risk Performance
- Monitor and control Risks

Project Risk Management

Project risk is always in the future. Risk is an uncertain event or condition that if it occurs, has an effect on at least one project objective. Objective can include scope, schedule, cost and quality.

Known risk are those that have been identified and analyzed, making it possible to plan responses for those risks. Specific unknown risks cannot be managed proactively, which suggests that the project team should create a contingency plan. Project Risk that has occurred can also be considered an issue.

Plan Risk Management

Plan risk management is the process of defining how to conduct risk management activities for a period. The Plan Risk Management process should begin as a project is conceived and should be completed early during project planning.

Outputs: Risk Management Plan The Risk Management plan includes the following:

- Methodology
- Roles and Responsibilities
- Budgeting

Timing Revised Stakeholder's tolerances Probability and impact matrix Risk Categories: Risk Breakdown Structure or RBS is a hierarchically organized depiction of the identified project risks arranged by risk category and subcategory that identifies the various areas and causes of potential risks.

Identify Risks

Identifying Risk is the process of determining which risk may affect the project and documenting their characteristics. Identify Risk is an iterative process because new **risks may evolve or become known as** the project progresses through its life cycle. Risk **management** plan is an input to this process.

Tools and Techniques 1. Documentation Reviews 2. Information Gathering Techniques

Brainstorming

Delphi Technique

- **Interviewing**

- Root cause Analysis 3. Checking Analysis 4. Assumptions Analysis 5. Risk Diagramming Techniques 6. SWOT Analysis

Identify Risks

Outputs: Risk Register The primary outputs are the initial entries into the risk register including list of identified risk and list of potential responses.

* Delphi Techniques: This is the way to reach a consensus of experts. Project risk experts participate in this technique anonymously. A facilitator uses a questionnaire to solicit ideas about the important project risks. The responses are summarized and are then re-circulated to the experts for further comment. Consensus may be reached in a few rounds of this process. * Risk Diagramming Techniques include cause and effect diagrams, process flow charts and influence diagrams.

Performance Qualitative Risk Analysis

Performance Qualitative Risk Analysis is the process of prioritizing risk for further analysis or action by assessing and combining their probability of occurrence and impact. Organizations can improve the project's by focusing on high-priority risk. Establishing definitions of the levels of probability and impact can reduce the influence of bias. Risk Register and Risk Management plan are inputs to the process.

Tools and Techniques

Probability and Impact Matrix Risk Categorization Risk Urgency Assessment: Risk requiring near term responses may be considered more

urgent address. Outputs: Risk Register updates

Priority list of project list Watch list of low priority risks.

Probability-Impact Matrix

Probability Impact Matrix: Each one of the identified risks is fed into probability impact matrix. The Matrix maps out the risk, its probability and its possible impact. The risks with higher probability and impact are a more serious threat to the project objectives than the risks with lower impact and consequences. Quantitative analysis is needed to assess risks that are major threats to the project to determine the root of the risks, the methods to control them and implement effective risk management.

It serves the project best if the probability scale and the impact scale are predefined prior to qualitative analysis.

For example, the probability scale rates the likelihood of an individual risk happening and can be on a linear scale (-1,3,5,7,9) or the scale can be the ordinal scale. The scale, however, should be defined and approved in the risk management plan. The impact scale, which measures the severity of the risk on the project's objectives, can be ordinal or cardinal.

Probability-Impact Matrix

A probability-impact matrix multiplies the value for the risk probability by the risk impact for a total risk score. These risk scores can be cardinal, and then a preset value can qualify the risk for a risk response. To take an example: an identified risk in a project is the possibility that the vendor may be late in delivering the hardware. The probability is rated .9, but the impact of risk on the project is rated at .10. This risk score is calculated by multiplying the probability times the impact—in this case, resulting in a score of 0.90.

The risk score is calculated by multiplying the probability times the impact—in this case resulting in a score of 0.09.

You can reference the scores within the probability-impact matrix against the performing organization's policies for risk reaction. Based on the risk score, the performing organization can place the risk in different categories to guide risk reason. The three common categories based on risk score are listed below:

Red Condition: This represents high risk. These risk scores are high impact and probability. **Amber Condition:** These risks are somewhat high in impact and probability. **Green Condition:** These risks are fairly low in impact probability or both

Probability-Impact Matrix

RISK SCORES					
Probability					
0.9	0.23	0.45	0.68	0.81	HIGH RISK
0.8	0.20	0.40	0.60	0.72	
0.6	0.15	0.30	0.45	0.54	
0.4	0.10	0.20	0.30	0.36	
0.2	0.05	0.10	0.15	0.18	MODERATE RISK
	0.25	0.5	0.75	0.9	
	Impact				LOW RISK

Calculating Risk:

Risk Probability x Risk Impact = Total Risk Score

Example:

In a project the risk of supplier delivering some material late is quite common, and could have a relatively serious impact on the project schedule. If the risk probability is 0.6 and the impact is quantified as 0.5, the total risk score is 0.30.

The total risk score can be referenced against the organization's risk management policies, and the risk reaction can be guided accordingly.

Probability-Impact Matrix

Calculating Risk:

Total Risk Score: Risk probability* Risk Impact

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Types of Risk

Organizations and stakeholders are willing to accept varying degrees of risks. This is called risk tolerance. Risks may be accepted if the risks are in balance with the rewards that may be gained by taking the risks. Risk exists the moment a project is conceived. Risk categories help organize, rank and isolate risks within the project. Different risk categories can be identified



Perform Quantitative Risk Analysis

Performance quantitative risk analysis is the process of numerically analyzing the effect of identified risks on overall project objectives. Performance quantitative Risk Analysis is performed on risks that have been prioritized by the perform Qualitative Risk Analysis process as potentially and substantially impacting the project's competing demands. Tools and Techniques 1. Data Gathering and Representation Techniques involving interviews

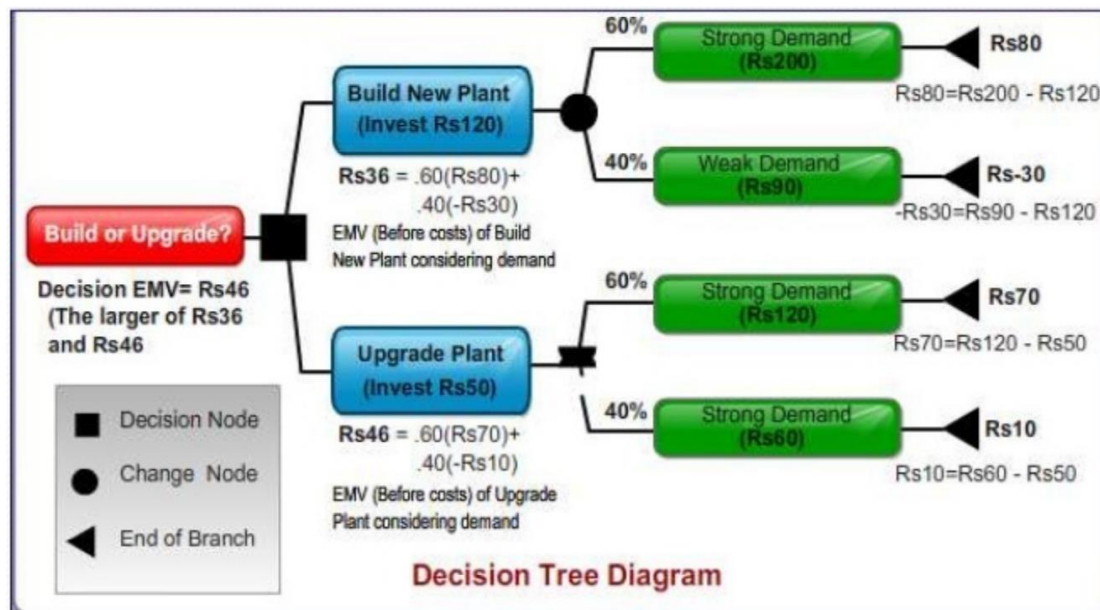
Quantitative Risk Analysis and modeling Techniques involving. 3. Sensitive Analysis: It helps to determine which risks have the most potential impact on

the project. One Typical display of sensitivity analysis is the tornado diagram. 4. 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. In a simulation, the project model is computed many times with the input values chosen at random for each iteration from the probability distributions of these variables. A probability distribution is calculated from the iterations.

Expected Monetary Value(EMV) Analysis

The EMV of opportunities will generally be expressed as positive values, while those of risks will be negative. EMV requires a risk-neutral assumption, neither risk averse, nor risk seeking. EMV for a project is calculated by multiplying the value of each possible outcome by its probability of occurrence and adding the products together. A common use of this type of analysis is decision tree analysis.



Risk Quantification

Accepting the Risks Risk acceptance can be defined as the process of accepting the risks because no remedial action is possible. It may be that the risks are of low probability, impact or both and that a methodical response is not required.

Passive acceptance calls no action; the project team deals with the risks as they happen. Active acceptance demands a contingency plan for dealing with the risks as they occur. Acceptance may be used for both positive and negative risks.

A contingency plan is a predefined set of actions the project team will take should certain risks occur. There is a need to track the risks that can trigger the contingency plan into action.

A fallback plan is a reaction to a risk that has occurred when the primary response proves to be inadequate. Most risk acceptance policies rely on a contingency allowance for the project.

Risk Quantification

A amount of money the project will likely need in the contingency reserve based on the impact, probability and expected monetary value of a risk even is known as contingency allowance. Let us consider an example: Risk A has a 25% char happening and an expected monetary value of negative Rs.

2000. Another risk, risk B, has a 40% chance of happening and expected monetary value of positive Rs. 1600. If the project can run only these risks, an ideal contingency reserve would be Rs. 400. This is calculated by adding the positive and negative risk values to predict the amount that the project is likely to be under-funded if the risk happens.

Risk Quantification

Risk	Probability	Impact Cost (+ve & -ve)	Expected Monetary Value	Contingency Reserve Calculations
A	10%	(-)Rs. 50000	(-)Rs. 5000	
B	50%	(-)Rs. 30000	(-)Rs. 15000	
C	25%	(+)Rs. 80000	(+)Rs. 20000	
D	60%	(-)Rs. 60000	(-)Rs. 36000	
		Contingency Reserve Fund	Rs. 36000	

In cases where risk has to be accepted (due to lack of any feasible action), a contingency allowance is cleared. Based on the impact, probability and expected monetary value of a risk event, the contingency reserve is maintained. The

contingency reserve may be used for both positive and negative risks.

For example, according to the figures in the table above an ideal contingency reserve should have Rs. 36000 in it.

Plan Risk Response

Plan Risk Responses is the process of developing options and actions to enhance opportunities and to reduce threats to project objectives. It includes the identification and assignment of one person ("risk response owner") to take responsibility for each agreed-to and funded risk response. Plan Risk addresses the risk by their priority. Inserting resources and activities into the budget, schedule and project management plan as needed.

Tools and Techniques: 1. Strategies for negative Risks or Threats 2. Strategies for positive Risk or Opportunities 3. Contingent Response Strategies: Some risks, it is appropriate for the project team to make a responses plan that will only be executed under certain predefined conditions.

Strategies for Negative Risk or Threats

Three of the following strategies typically deal with threats or risk that may be negative impacts on project objectives if they occur. The fourth strategy, accept, can be used for negative risks or threats as well as positive risks or opportunities.

Avoid: Risk avoidance involved changing the project management plan to eliminate the threat entirely. Examples of this include extending the schedule, changing the strategy, or reducing scope. The most radical avoidance strategy is to shut down the project entirely. **Transfer:** Risk transfer shifting the negative impact of a threat to a third party. Transferring the risk does not eliminate it. Transferring risk is most effective in financial risk exposure. Risk transference involved payment of a risk premium to the third party. Use insurance, performance bonds, warranties, guarantees, contracts may be used.

Mitigate:- Risk mitigation implies a reduction in the probability and/or impact of an adverse risk

event to be within acceptable threshold limits. Adopting less complex processes, conducting more tests, or choosing a more stable supplier are examples of mitigation actions. **Accept:-** This strategy is adopted because it is seldom possible to eliminate all threats from project. This strategy can be either passive or active. Passive acceptance requires no action except to document the strategy. The most common active acceptance strategy is establish a contingency reserve, including amounts of time, money or resources to handle the risks.

Strategies for Positive Risk or Opportunities

12 Three of the four responses are suggested to deal with risk with potentially positive impacts on the project objectives.

Exploit :- This strategy may be selected for risks with positive impacts where the organization wishes to ensure that the opportunity is realized. **Share:-** Sharing a positive risk involves 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. Examples of sharing actions include partnerships, teams,

special-purpose companies, or joint ventures.

- **Enhance:-** The strategy is used to increase the probability and/or the impacts of an

opportunity. Example of enhancing opportunities include adding more resources to an activity to finish early. **Accept:-** Accepting an opportunity is being willing to take advantage if it comes along, but not actively pursuing it.

Monitor and control Risks

Monitor and Control Risk is the process of implementing risk response plans, tracking identified risks, monitoring residual risk, identifying new risk, and evaluating risk process effectiveness throughout the project.

Monitor and Control Risks can involve choosing alternative strategies, executing a contingency or fallback plan, taking corrective action, and modifying the project management plan. Tools and Techniques

- Risk Audits: Risk Audit examine and document the effectiveness of risk responses in

dealing with identified risks management process. The project manager is responsible for ensuring that risk audits are performed at an appropriate frequency. Reserve Analysis:-Reserve Analysis compares the amount of the contingency reserves remaining to the amount of risk remaining at any time in the project in order to determine if the remaining reserve is adequate. Risk Reassessment Variance and Tread Analysis Technical Performance Measurement

Monitor and control Risks

Who is the risk management officer of your company? The first step towards initiating risk management planning is to assign an officer who will have the following duties:

ing meeting regularly (Maybe quarterly)

- Setting the agenda of the meeting, ensuring all potential areas of risk is covered

under it.

- Inviting the relevant people(head of different departments)

- Facilitating the meeting

Documenting the minutes of the meeting and circulating it to all parties concerned after the meeting is over Before the next meeting, ensuring that all tasks and actions discussed have been implemented within the stipulated time-frame.

Sample Risk Plan

A risk assessment chart helps to catalogue the probable risk from various sectors. Higher the risk of an event, higher the response on a scale of 1 to 5. A proposed action can be kept in mind in order to be prepared for the risk event in case it happens.

Any risk involved can disturb the project schedule, if a vendor has to deliver equipment needed for the project schedule. For instance, if a vendor has to deliver equipment needed for the project by a certain deadline and he fails to deliver it, it constitutes a risk and may update the project schedule and even trigger a chain reaction of delays. The delay of the equipment with the original vendor may throw the project off schedule, and the additional time to find, purchase and ship the needed equipment could also extra time to the project.

In order to manage such risk events, the project team may draw up a sample risk plan in order to be better prepared for it.

Sample Risk Plan

Consideration	Low Risk Assessment	Response (1 or 5)	Max Risk Assessment	Explanation/Proposed Action	A risk assessment chart helps to catalogue the probable risk from various sectors. Higher the risk of an event, higher the response on a scale of 1 to 5. A proposed action can be kept in mind in order to be better prepared for the risk event in case it happens.
Financial Forecasts	None	2	Reporting On or Compiling of Forecasts		
Regulatory Issues	No Issues	1	Creates Problem		
Scope of Practice	Within	1	Borderline		
Reliance by Third Parties	High Reliance on 3rd Parties	4	3rd Party Reliance	Be sure of their financial stability; Have contracts	
Integrity, Ethical or Professional Concerns	None	1	High		
Total Client Investment	Below Rs. 500000	3	Over Rs. 1000000	Client should have external funding	
Contact with Client	Direct Access Available	1	Detrimental Limitations		
Client Financial Status	Financially Strong	1	Serious Liquidity Problems		
Client Organization	Relatively Stable Workforce	1	High/ Unusual Turnover		
Contingency Plans Defined	Workable	1	Unrealistic/ Nonexistent		
Cost/Benefit Analysis	Detailed & Documented	5	Vague & unfavourable	Restructure cost management strategies	