

RISK MANAGEMENT IN PROJECT – AN INSIGHT

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Abstract

Each & every project is associated with numerous risk elements, which can derail the project from its intended objective, especially with respect to time & cost. Therefore, while implementing any project, especially of larger magnitude, it is imperative that before execution of the project, risks are duly identified, effects are properly assessed and mitigation measures are put in place for delivery of the project in time and within the budgeted cost. The paper deals with various risks associated with the project, available techniques for analysis & assessment, risk mitigation strategy, role of project managers in managing risk, and the benefits derived out of project risk management.

INTRODUCTION:

Risk generally signifies an uncertain event, situation, or condition which may occur. It may have either a positive or negative effect on the project objectives. Some risks may pose a threat to the achievement of project objectives while some other risks may enhance achievement of objectives. Favourable risk events are called opportunity, whereas unfavourable risks are termed as threats. Factors that induce unfavourable risky situations are called hazards. Risk increases with Hazards but decreases with safeguard. In the project context, risk is defined as uncertainty inherent in plans and the possibility of something happening that can affect the prospect of achieving desired goals.

The projects often encounter unstable political climates resulting in strict regulatory issues and have to cater to unpredictable environmental changes. The resulting instability causes uncertainties and the same bring with them, elements of risk. The success or failure of a project largely depends upon the effectiveness and the efficiency with which the risks and uncertainties are managed. Thus, risk management has emerged, as the main function of project management. Project risk management is the art and science of managing risks caused by unforeseen changes (uncertainties), which may require deviation from the planned approach and may affect the achievement of the project objectives. It involves systematically identifying, analyzing, planning and controlling risks. It provides greater insight into risks and their impact for making suitable decisions to overcome them.

The generic structure of project risk management model is outlined below:

Project Risk Management Model		
Process	Tools and Techniques	Outcome
Risk identification	Work breakdown analysis Management process analysis System flow analysis Brain storming Check-list templates Knowledge experts Judgment	Source of risks Potential risks Project risks check list
Risk Assessment	Risk probability assessment Risk Impact assessments Risk Clarification Risk ranking	Time-overrun Risk contingency assessment
Risk Response Planning	Risk Mitigation Planning (or strategy)	Risk response plan/baseline Responsibility Allocation
Risk Response Control	Monitoring risks	Risk-related corrective action

RISK MANAGEMENT STRATEGY:

Project risk management strategy involves identifying, analyzing, planning and controlling risks, which might affect the performance of the project. If the project risks can be identified well in time, quantified in a logical manner, assigned roles and responsibilities among the stakeholders, allocated budget and managed effectively, then the likelihood of schedule and cost overruns significantly reduced.

The risk identification process involves researching the project to determine the sources of risk, and connected potential risk factors that lead to risk events and thereby reducing the chances of overlooking any potential risk event.

Risk analysis or risk assessment aims at quantifying risk exposures to enable mitigation and development of project risk response plans for managing risks during execution of the project.

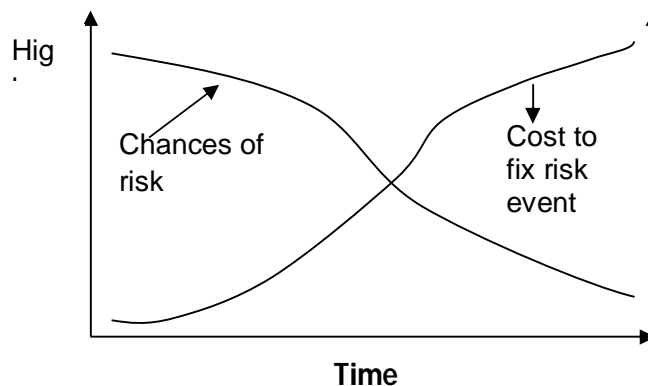
The risk response process considers risk transfer, reduction and avoidance possibilities. A response risk plan ensures that the appropriate risk warning tools are in place, to handle risks efficiently. A predetermined risk response plan can minimize the consequences of possible adverse future events and can maximize the benefits of positive future events.

Risk control aims at controlling deviations to cut down risks and maximize the project value. It handles risks in a manner that achieves project objectives

efficiently and effectively by monitoring and adjusting plans and evolving alternate plans to manage foreseeable risks.

Risk management enables greater certainty of achieving the project goals by making the project plan realistic, reducing costly surprises, minimizing losses and delay and enabling exploitation of beneficial opportunities. The instability in these risk-prone environments calls for a structured approach for managing risks to achieve the specified performance objectives of the project.

Every project manager understands that risks are inherent in project. Project risk events typically have a negative impact on the project objectives of schedule, cost and specification. Some of these possible undesirable events can be identified before the project starts, while a few may be unforeseen and beyond imagination. The goals of risk management are to identify, minimize and create contingency plan to tackle.



RISK MANAGEMENT PROCESS:

The above figure presents a graphical model of the risk management process. The chances of risk events occurring (e.g. an error in time estimate, cost estimate, or design technology) are greatest in the concept, planning, and start-up phases of the project. The cost impact of a risk event in the project is less if the event occurs earlier rather than later. The early stages of the project represent the period when the opportunity for minimizing the impact or working around a potential risk exists. Conversely, as the project passes the halfway mark, the cost of the risk event occurring increases rapidly. For example, the risk event of a design flaw occurring after a prototype has been made has a greater cost or time impact than if the event occurred in the start-up phase of the project.

Planning for project risk is a proactive approach rather than a reactive one. It is designed to ensure that surprises are reduced and that negative consequences are minimized. It also prepares the project manager to take risks when time, cost, and/or technical advantages are possible. Successful risk management gives the

project manager better control over the future and can be significantly improve the chances of reaching project objectives on time and within budget.

The sources of project risks are unlimited. There are external sources such as inflation, market acceptance, exchange rates, and government regulations. External risks are sometimes called threats because they are beyond the control of the project manager. Other risk sources are internal nature such as construction process, design flaw, software & system related issues, etc.

RISKS IDENTIFICATION:

The risk identification process involves researching the project to determine sources of risks, and connected potential risk events. The first step of the risk management process is to generate a list of all the possible risks that could affect the project. During the planning phase, the project manager pulls together a risk management team consisting of core team members and other relevant stakeholders. The team uses brainstorming and other problem identifying techniques to list possible risks. Participants are encouraged to keep an open mind and generate many risks as possible. Later, during the assessment phase, the team will analyze and filter out unreasonable risks.

The focus in the beginning should be on risks that can affect the whole project as opposed to a specific section of the project or network. After the macro risks have been identified, specific areas can be checked. An effective tool for identifying specific risks is the work breakdown structure (WBS). Using the WBS reduces the chance of a risk event to be missed. On large projects, multiple risk teams are organized around specific deliverables, and they submit their risk management reports to the project manager.

A risk profile is another tool that can help management teams identify and eventually analyze risks. A risk profile is a list of questions that addresses traditional areas uncertainty on a project. These questions have been developed and refined from previous, similar projects. Risk profile are usually generated and maintained by personnel from the project office. They are updated and refined during the post project audit. These profiles, when kept up to date, can be a powerful resource in the risk management process. The collective experience of the firm's past projects resides in their questions. Historical records can complement risk profiles or be used when formal risk profiles are not available. Project teams can investigate what happened on similar projects in the past to identify potential risks.

SOURCES OF RISKS:

1. Changes in the external environment, which can be caused by unstable political, legal, economic and financial conditions or natural disasters such as fire and floods. External risks can be further divided into external

unpredictable risks (unknown uncertainties) and external predictable risks (known risks).

2. Changes in the internal environment at the project site concern technology changes, quality considerations, legal problems, commercial dealings, internal safety and security of resources, accidents, errors in estimation, design alterations, labour strikes, materials wastage, equipment breakdown, project management internal conflicts, client holds, client-contractor disputes, corruption, and man-made catastrophes like burglary and fraud. These internal environments can be further divided into risks relating to project management objectives and project management practices.

RISKS CHECK-LIST

1. **Project Scope Risks** - High complexity, ill-defined project scope, frequently changing scope requirements, no project charter, no delegation of authority, ineffective control systems, no extra work control, no analysis of changes and problems in quality control.
2. **Design and Specifications Risks** - Inadequate design information, incorporation of new construction technology, unrealistic specifications, likelihood of design changes, difficulties in interaction of design with method of construction, non-standardization of resources, designer's delays, poor design and shop drawings, non-conformity with national and local specifications.
3. **Quality Risks** - No quality assurance plan, no soil investigation, no method statements, poor quality materials, untrained manpower, absence of approved soil and material testing laboratories, unachievable quality specifications, problems in quality control and re-working of defects during construction.
4. **Time Overrun Risks**- Inaccurate activity time estimates, unrealistic time schedules, incomplete work breakdown structures, no formal sequencing plan, poor allocation of resources, incomplete assessment of project time, cost, resources and quality implementation plans, no database, ineffective control system, inflexible and unrealistic project plans, unsatisfactory conduct of status review meetings, inability to take timely corrective action.
5. **Cost Overrun Risks** - Inaccurate cost estimates, inadequate cost planning and control, no extra work control and no analysis of changes, constantly changing market conditions, incomplete project closure.

6. **Leadership Risks** - No project vision, no team building, poor motivation of participants, high turnover of critical team members, indecisiveness, unreasonable stakeholders expectations, lack of senior management support, lack of team consensus over project plans, limited authority/ control of the project manager, poor communications, poor industrial relations, high rate of sickness and absenteeism, unsafe working conditions resulting in accidents and poor turnover, conflicts among staff and participating organizations, lack of co-ordination, insufficient liaison with public services, barriers in information communication.
7. **Organizational risks** - Inappropriate organization network; poor assignment/allocation of tasks and responsibilities, lack of competent persons, no project manual/documented procedures/processes, project being too complex for the resources available, inadequate communications infrastructure, wrong selection of project management, no database, inflexible and unrealistic project plans, poor quality control, unsatisfactory conduct of status review meetings, inability to take timely corrective action, incomplete project closure.
8. **Physical Resources Mobilization and Utilization Risks** - Inadequate and low quality procurement of resources, non-availability of spares parts, special equipment and materials; transshipment delays, low productivity, bad weather and working conditions, non-availability of suitable sub-contractors, damage during construction due to negligence, transportation or storage vandalism, accidents, wastage, theft and fraud, lack of safety and hygiene measures and local requirements.
9. **Technology Risks** - Inadequate information on new technology, non-replacement of old technology, non-availability of competent and professional staff to use new technology, lack of managerial skills.
10. **Contractual Risks** - Non-standard and inconsistent conditions of contract, insufficient time to prepare bid tenders, delay in possession of site, errors or omissions in bills of quantities, payment problems, extra work variations, unrealistic tendered amount, no credit worthiness of contractor, high cost of legal decisions, insufficient insurance and surety, incorrect documentation of claims and disputes, unfamiliarity with local laws.
11. **Force Majeure and Ecological Risks** - Acts of God such as earthquakes, floods, landslides, ecological damages, epidemics, etc.

12. **Political, Legal and Social Risks** - Changes in government, policies, regulations, rules, laws, war, revolution, civil disorder, risks under criminal law and the law of tort, pollution, waste treatment, local regulations, constraints on the availability of labour, import-export restrictions and procedures, joint venture rules, inconsistency of regulations within the country, requirements for licenses and permits, crime and insecurity, bribes and corruption, religious and cultural conflicts.
13. **Financial and Economic Risks** - Investment risk, inflation, escalation of prices, availability and exchange rate fluctuations, local and national taxes, inadequate sources and availability of funds, cash flow problems, effect of time and cost overruns, default of stakeholders and suppliers, demand scenario and constantly changing market conditions.

RISK ANALYSIS AND ASSESSMENT

Scenario analysis is the easiest and most commonly used technique for analyzing risks. Team members assess each risk in terms of:

1. The undesirable event
2. All the outcomes of the event's occurrence
3. The magnitude or severity of the event's impact
4. Chances/probability of the event happening
5. When the event might occur in the project

The ranking of risks using qualitative analysis approach enables:

- a) Identification of risks events/sources having high and medium value exposure for in-depth quantitative analysis.
- b) Identification of high and medium exposure risks that can be considered for mitigation.
- c) Segregation of low exposure events (non-critical) for placing in the watch list
- d) Those ranked in the low exposure group may not require proactive action as compared with those falling in medium and high exposure zones.

RISK MITIGATION STRATEGY

Risk mitigation measures aim at minimizing the loss, damage or disruption in a project due to unforeseen events. These mitigation measures are described as follows:

1. **Risk Transfers** — Project risks can be transferred to someone who is more capable of dealing with such problems, such as specialist subcontractors, designers, material suppliers or by passing the risk to insurance firms.

2. **Risk Deferred** — Certain project risks can be deferred by time. Activities can be moved to a later date in the project when the adverse effects of events may be minimized or reduced.
3. **Risk Reduction** —Project risk reduction aims to reduce either the probability of risk occurrence or of the adverse impact on the project or a combination of both. Risks related to change in the scope of the project can be reduced by:
 - Well-defined specifications
 - Detailed site survey
 - Detailed design
 - Completing design before execution
 - Minimizing client variation
 - Showing implication of changes
 - Determining logical cost contingency
 - Determining logical float
 - Early involvement of owner's trained/expert project group
 - Appropriate responsibility matrix
 - Implementing safety/loss control program
4. **Risk Acceptance**-Once the risks have been identified and their adverse effects assessed, a contingency plan to encounter them has to be organized, developed and implemented as part of a good risk management strategy. Such a risk will generally comply with one of several criteria, such as no alternative available, cost to transfer risk is very high, probability of occurrence of risk is low but it can have a heavy impact, etc. In such eventualities, a client may decide to accept these risks and resort to insurance, where feasible. Unidentified risks fall in the category of risks accepted by the client.
5. **Risk Avoidance** - Once project risks have been identified, they can be avoided in some cases, by taking appropriate action such as changing designs, materials, technology and construction methods that may involve additional costs.
6. **Risk Sharing**-Sharing a Risk may be resorted to when it is impractical for one party to control the risk. It may be better to manage such a risk with two or more parties. Alternately, the client can retain a part of the risk.
7. **Contingency Planning**: A contingency plan is an alternative plan that will be used if a possible foreseen risk event becomes a reality. The contingency plan represents preventive actions that will reduce or mitigate the negative impact of the risk event. The early contingency planning facilitates a smooth transition to the remedy or work-around plan. The availability of a contingency plan can significantly increase the chances for project success.

ROLE OF THE PROJECT MANAGER IN MANAGING RISKS

A project manager's capability to accomplish the mission in a large-sized, modern construction project is a prime requirement of professional skills in risk management. His role in managing risks calls for the following:

- Estimating cost and time contingency allowances, and allocating these in commensuration with major risks and uncertainties that are identified
- Regularly monitoring the risk response plan, and reviewing these with the concerned persons in order to reduce misunderstandings and ensure that the full spectrum of uncertainties is exposed
- Adopting methods for allocating the remaining risks to the various parties in a way, that will optimize project performance
- Recognizing that risks and rewards go hand-in-hand and, that the allocation of a risk to a party should be accompanied by a suitable incentive
- Keeping an open-minded approach to innovative solutions to problems
- Making appropriate timely decisions

THE BENEFITS OF MANAGING PROJECT RISK

The overall awareness of risk exposure and the methods of handling risk, add to the effectiveness and efficiency of project management. This is due to several reasons.

- The risk response development process gives an insight into the project management process. Accordingly, the issues/ problems of the project are clarified, understood and allowed for right from the start
- A pre-planned contingency plan provides clearer definitions of the specific risks associated with a project. It allows prompt, controlled and pre-evaluated responses to any risk that may materialize.
- The structure and definition of the project risk are continually and objectively monitored. This in turn reduces exposure to project risks
- Risk response decisions are supported by a thorough analysis of available data
- A fully documented risk management process, builds-up a profile of historical risk to allow better modeling for future projects.
- It encourages problem-solving and provides innovative solutions to the risk problems within a project
- A risk reporting framework avoids sudden risk shocks

SUMMARY

In proper perspective one should recognize that the essence of project management is risk management. Project selection systems try to reduce the likelihood that projects will not contribute to the mission of the firm. Project

scope statements, among other things, are designed to avoid costly misunderstandings and reduce scope creep. Work breakdown structures reduce the likelihood that some vital part of the project will be omitted or that the budget estimates are unrealistic. Team building reduces the likelihood of dysfunctional conflict and breakdowns in coordination. All of the techniques try to increase stakeholder satisfaction and increase the chances of project success.

From this perspective risk management compliments other project management processes. Managers engage risk management activities to compensate for the uncertainty inherent in project management and the reality that things never go according to plan. Risk management is proactive not reactive. It reduces the number of surprises and leads to a better understanding of the most likely outcomes of negative events.

Although many managers believe that in the final analysis, risk assessment and contingency depend on subjective judgment, some standard method for identifying, assessing, and responding to risks should be included in all projects. The very process of identifying project risks forces some discipline at all levels of project management and improves project performance.

Contingency plans increase the chance the project can be completed on time and within budget. Contingency plans can be simple "work around" or elaborate detailed plans. Responsibility for risks should be clearly identified and documented. It is desirable and prudent to keep a reserve as a hedge against project risks. Budget reserves are linked to the WBS and should be communicated to the project team. Control of management reserves should remain with the owner, project manager, and line person responsible. Use of contingency reserves should be closely monitored, controlled, and reviewed throughout the project life cycle.

Risk management can be handled before the project begins or when the risk occurs. Experience clearly indicates that using a formal, structured process to handle possible foreseen and unforeseen project risk events minimizes surprises, costs, delays, stress, and misunderstandings. When risk events occur or changes are necessary, using an effective change control process to approve and record changes quickly will facilitate measuring performance against schedule and cost. Ultimately successful risk management requires developing an attitude in which threats are embraced, not denied, and problems are identified not hidden.



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