

Advanced Project Management Techniques: Risk Management



Effective project management can dramatically reduce overall project costs. One key element to success is identifying and anticipating risk. This paper from Info-Tech shows you how to do it with style.

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Introduction

As a continuation of the Project Management white paper series, introduced in the last issue of the [Infotech Advisor](#), we introduce “Advanced Project Management Techniques: Risk Management.” “[An Introduction to Project Management](#)” offered a broad but thorough outline of the key steps involved in effective project management. In the second installment, we pursue one of the most important Project Management issues in greater depth: *Project Risk Management*.

Risk Defined:

“A risk is a combination of constraint and uncertainty”
Larry Krantz, CEO [Eurolog](#), UK

In “[An Introduction to Project Management](#)” we stated that Project Risk Management includes strategies and tactics used to identify, avoid, and control project risk.

To effectively manage project risks, one has to develop a deeper understanding of what risk is than we’ve previously defined. As project managers, we all know that constraints are a reality for any project, and after some consideration you will realize that all projects involve some degree of uncertainty. Risk minimization comes about through eliminating constraints (not usually possible) or reducing project uncertainties.

Effective Risk Management follows from the application of two principles:

- Risk Assessment
- Risk Control

These principles are covered in great detail within this article, providing the project manager with the tools to:

- Decide when to use project risk management
- Identify and analyze project risks
- Find risk exposure as a function of probability and impact
- Form action plans and emergency plans for specific risks
- Track and control project risks

For a Glossary of Risk Management Terms, see:

[Glossary of Risk Management Terms](#), by the Australian Agency for International Development

Project Risk Management

All project managers are aware that any project they are involved with will include at least some type of risk. IT implementation projects are especially risky because information system development is an evolving discipline and, as such, the risks arising from this must be assessed and managed carefully.

Risk Management Overview

What is Risk Management?

Risk management involves the development of plans to conduct activities and/or assign resources to mitigate the occurrence of risk, lessen the impact of risk if it occurs, and manage the impact of the risk within the project environment.

Why Is It Needed?

All organizations have some risk exposure. If you find that your organization or department is in a state of perpetual crisis, the entity is failing to manage its risks properly.

There are three primary symptoms of risk management failure:

- Inability to decide what to do
- Inability to decide when to do it
- Inability to decide when enough has been done

All project plans and estimates are developed based on certain assumptions. Such assumptions (known risks), if not carefully thought through, pose a risk to project success. The good news is that a project generally doesn't just fail because one thing went wrong; the bad news is that many, many things can go wrong. Identifying and addressing risks is therefore a critical task of a Project Manager.

Key Risk Management Tip:

The better you plan for contingencies, the better your chance of staying on track with your project, so develop a system that will identify likely snags and help you prepare for them.

Known Risk vs. Unanticipated Risk

Unanticipated problems create great strain not only within the business community, but also within the lives of all individuals. For this reason, spend some time in the planning stage thinking about possible risks, and how they might affect the project. Also, communicate with your project team(s) early to get feedback about possible project risks that you have not considered.

A few key risk areas to be considered:

1. Risks in the customer-project relationship
2. Content delivery risks
3. Technological risks

4. Market risks (new competitors, products etc)
5. Operational risks (i.e. sudden change of scope)
6. Risks in personnel acquisition, skill levels, and retention
7. Risks to schedule and budget
8. Risks in achieving customer acceptance of the deliverables

For more on an overview of Risk Management, see:

[When to use Project Risk Management](#), by Coblands Consulting

[Software Risk Management Practices](#), by KLCI Research Group (zipped PDF Document)

Risk Analysis

Prepare: Are You Ready To Talk About Risk?

Business practices at present place a high value on optimism, and expect managers in a business environment to display an optimistic attitude whenever possible. This is an important part of maintaining a pleasant work environment for everyone, and is essential to keeping customers satisfied. Not surprisingly, then, most managers are very uncomfortable discussing the negative consequences associated with risk.

Let's be honest: talking about risk can be hazardous to a career. Courage is needed by both parties before a manager can have any meaningful conversation with his/her work team. This is why it rarely happens.

The first step in any risk management effort, then, must be to create an environment where it is safe for these two groups to discuss their least favorite subject. Recognize the courage it takes for them to do so, and show sensitivity to the discomfort they may feel. Depersonalize the subject as much as possible. When discussing specific risks, avoid associating any risk with a specific person.

Analyze: Identify and Name Your Top Ten Risks

Start by brainstorming an exhaustive list of risks – these risks should be identified by small groups behind closed doors, with as little management interference as possible. The identified risks should be summarized for release; avoid releasing specific details of the discussion. If team members seem reluctant to openly identify risks, consider creating a mechanism for team members to identify risks anonymously.

Don't discard any risks at the brainstorm stage, even if they seem insignificant. Be sure to include any anticipated quality issues as well as requirements that will be difficult to achieve. You may find it helpful to review a "risk taxonomy" to jog your thinking; these are exhaustive, structured [lists](#) of common project risks. A more thorough source is found in a [book written by Steve McConnell](#).

Key Risk Listing Technique:

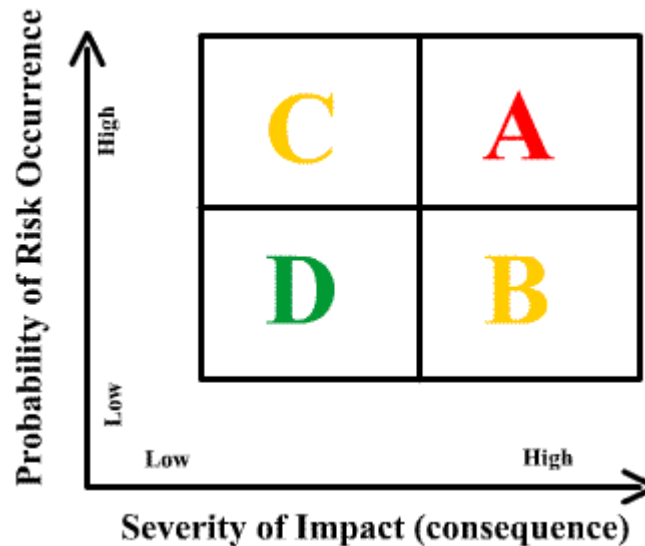
Pretend the project has already failed, and imagine the reasons why. Most project teams are able to identify 20-50 specific risks fairly quickly using these techniques.

Once you have established a list of risks, you must have an effective way to classify them. One method of classifying each of the potential risks in your list is by determining their risk exposure (RE).

Risk exposure has two dimensions - probability and consequence:

$$RE = (\text{Probability}) \times (\text{Consequence}).$$

To better illustrate the concepts of probability and consequence, and how to classify the items in your risk list, use the following risk classification chart:



Risk Classification Chart

The above chart plots the probability of occurrence of a risk against the impact of the identified occurrence. Impact relates to the severity of the effect on the budget, the timeline, and/or the stakeholders requirements.

Class Description

A High Probability, High Impact

- This is a dangerous area and must be neutralized as soon as possible.

B Low Probability, High Impact

- This is also a dangerous area, but can probably be avoided with care. Be perceptive and track these issues carefully, since multiple cases of this can easily overwhelm the project and impact it greatly.

C High Probability, Low Impact

- This is a common area for many project risks, but when managed carefully, the impact is controllable and not too significant.

D Low Probability, Low Impact

- When issues arise in this sector, make sure efforts aren't wasted – ensure it remains low risk then focus your attention on other issues.

Setting priorities based upon the Risk Exposure formula will keep you focused on dealing with risks of high consequence (not found in the “D” area on the chart). Consequence is usually measured in terms of cost, so risk exposure is often expressed in dollars. For example, a risk with 50/50 probability that would cost \$10,000 if it occurred has an RE=\$5000. Since deadlines and limited development time have a high priority in present-day projects, RE is often expressed in terms of schedule slippage, usually weeks or days.

Another method of risk analysis is to actually calculate a Risk Exposure for each item in your risk item listing. A Risk Exposure Calculation is derived by:

1. Assigning a numeric value to the probability of occurrence
2. Multiplying it by the potential impact in hours (or dollars)

This methodology is most suited for larger, more complex projects in which cost is a project driver.

The following table exemplifies the Risk Exposure Calculation:

Risk Event	Probability	Impact	RE
Change host operating system	.2	100 hours	20 hours
Redesign data model	.4	200 hours	80 hours
Data conversion is late	.7	300 hours	210 hours
Total Risk			310 hours

Now that you have an estimated RE for each risk, order the list, starting with highest RE. This list will help you focus your effort on the worst risks. Depending on the project, it may seem prudent to track the top five risks, or maybe the top twelve; at least using the RE assessment, you can get some quantitative handle on what your high risk exposure areas are.

For information on Risk Identification, see:

[Taxonomy-Based Risk Identification](#), by Carnegie Mellon University

Plan – Risk Response Development

Since the essence of project management is based upon estimation, nearly everything related to a project is uncertain. Thus, the process of risk assessment is to attempt to select areas of the project with the most constraints and the highest uncertainty. The exercises shown within the Risk Analysis section should give you a good idea about which uncertainties you should consider high priority. From each of these outlined risks you will now develop a risk response. Risk Responses generally fall into these three categories:

- Avoidance – eliminating a specific threat (usually done by eliminating the cause)
- Mitigation – reducing the probability of a specific risk occurrence or reducing the impact of the risk event
- Acceptance – accepting the consequences of specific risks if they happen

Tools and Techniques for Risk Response Development

Popular techniques used in the development of a risk response involve:

Procurement	The acquisition of goods and services from outside the organization. For example: The risk of implementation of a fiber-optic Intranet would be best minimized through contracting with an organization that has experience implementing that technology.
Contingency Planning	This involves creating of an action plan if the specific risk in question occurs. This explained further in the risk mitigation section.
Alternative Strategies	At times, specific risks can be avoided or minimized by changing the approach to the project. This could involve staff changes, relocation, changing the project start date, etc.
Insurance	This is an arrangement commonly found when dealing with certain categories of risk. Type of coverage and cost are dependent upon factors such as application area, duration of risk element, probability of risk occurring, etc.
Contractual Agreements	This is commonplace and appropriate wherever there is an expectation or provision of services or goods.

For more on Risk Response, see:

[Risk Response Planning](#), by Australian Government's overseas aid program

Risk Mitigation

Risk mitigation should be used for all risks categorized as “A” and “B” within the [Risk Classification Chart](#). Take whatever actions are possible in advance to reduce the effect of specific risks. If the risk is quite significant, and control will be difficult, create a plan. A good risk management plan will at least contain answers to the following questions:

- Why is the risk important (i.e. considered a risk)?
- What information do you need to track and monitor the risk?
- Who is responsible for dealing with the specific risk if it occurs?
- What resources are needed for your risk management activities?

Furthermore, the plan will contain:

- An action plan to resolve risk through an immediate response.
- A contingency plan that monitors risk and triggers a predetermined response when a potential risk is detected.

If project problems are dealt with upstream, the probability of a risk occurring can usually be reduced as well as its potential impact.

Plan for Emergencies

For high impact risks, have an emergency plan available before it happens. This way, when/if the issue arises, the team(s) will be able to quickly identify the risk and have an organized way of reducing the impact of this risk. As a minimum, this plan will name the person accountable for recovery from the risk, the nature of the risk and the action to be taken to resolve it, and the method by which the risk can be spotted.

Reserves

At times, it may be prudent to offset some risks with reserves. This is a provision in the project plan to mitigate cost and/or scheduling risk. Example:

1. Reserve 3 weeks of free time in Bill's schedule starting November 19th.
2. If Team Z has not completed Task X by November 19th, assign Bill to Team Z for the next three weeks to ensure task completion by that time.

The use of reserves is common and very open-ended. The term is sometimes used with a modifier (i.e. Contingency reserve, Management reserve) to provide greater detail with regard to application.

Track

How you deal with a particular risk depends a great deal on that specific risk. For example, if you have identified scope creep as a high-priority risk item, then you might want to use an iterative, staged delivery methodology in conjunction with strongly enforced change control measures. Or if outsourced contractor failure is high on your list, then you might want to consider enforcing strict code inspection and documentation requirements on your contractors.

Control

If you cannot measure a risk, you cannot control it. For any project, there are three things that can be measured:

1. Schedule
2. Cost
3. User Satisfaction

Therefore, the essence of risk management relates to the avoidance of anything that:

1. Extends the schedule
2. Increases project costs
3. Impairs the users' satisfaction with the end product of the project.

As your project progresses onto final release:

- Some of your risks will be eliminated, but some new risks may also occur
- Some of your risk resolution plans will work well, but others may not work out so well and you may have to make new plans to deal with the problems

- Some of your project priorities may change, and you may need to make new risk management plans.
- You may have to constantly identify new risks and, once you find them, go back to the risk assessment section and start the process again.

Risk – A Historical Overview

History is a great teacher and can teach even the most advanced project manager how to do their job more effectively. We can steer clear of “rocky shoals” by not only using formalized processes as outlined in this article, but also by:

1. A thorough analysis of past project failures
2. Taking advice from successful project managers

Statistically Common Causes of Failure

The Wall Street Journal estimates that 50 percent of all corporate technology projects don't meet expectations, and that 42 percent of software projects are abandoned before even getting off the ground. To minimize your risk of project failure, learn more about recently failed projects whenever it is possible.

Project Size

Experience tells us that project success is inversely proportional to project size. A study by [The Standish Group](#) reveals that projects costing less than \$750,000 succeed 55 percent of the time, those in the \$1 million to \$2 million range have an 18 percent success rate, and those in the \$5 million to \$10 million range succeed only 7 percent of the time.

Over-Optimism

Optimism makes project managers happy and brings a promise of big money. This is why it is such a common response from project teams and/or individuals. Many projects were (and are) implemented due solely to over-optimistic responses from involved parties.

From such projects come:

- **False expectations**
- **Missed deadlines**
- **Unreliable deliverables**

Changing Requirements

Changing project requirements on the fly is often a necessary evil in the fast-changing business world of present day, but it is essential to have a solid idea of your projects core requirements. Failures due to this problem are usually attributed to a complete or substantial alteration of the basic project requirements. It is important to note that this issue is not considered scope (or feature) creep.

SUMMARY

Risk Management and the Organization

Without an organized risk management process in place, an organization runs the risk of operating in a state of constant crisis. This problem may be overcome by committing the organization to a more formalized project development process with an emphasis on project risk detection, mitigation and contingency planning. Less unexpected risks during the project will reduce stress levels and facilitate the three main goals of all projects:

1. Finish the project on time.
2. Finish the project within the specified budget.
3. Finish the project to the satisfaction of the end user and/or stakeholders.

Risk Management and the Project Manager

Project managers have to do four things at once: keep the client happy, keep their colleagues happy, stay on time, and stick to budgets. It's a rare person who can do all those things well, requiring strict adherence to sound business practices and good communication skills.

The need to detect, document, prioritize, and plan for project risks is a major part of the project process and a requirement for all project managers that strive for success. Using processes outlined in this document, you can increase your next project's probability for success and escape the pitfalls that are common in the projects of present day.

Additional Resources for Consideration

- In the book "Death March", [Ed Yourdon](#) dismisses several software projects as exercises in futility. These "death march" projects are identified as having at least one key factor 50 percent off reasonable norms. Either the schedule is 50 percent too short, the staff is 50 percent too small, the budget is 50 percent too meager, or the scope of features is 50 percent too large.
- Paul Allen gives some good advice in [Things A Project Manager Should Never Say](#).
- Sometimes it is more cost-effective to pull the plug on a foundering project than to fund its completion. See [A Time to Kill](#).
- If you are looking for some good one-liners to keep your Project Teams thinking, see [Project Management Proverbs](#).
- A letter from software boot camp – great tips for creating (or fixing) great project teams are found in the article [Drop And Code Me Twenty](#).
- Want to be sure you are fulfilling your duties? See [One Hundred Rules for NASA Project Managers](#).



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