Risk Management in Network Projects

What is a risk?
A risk is an event that has potential to damage a project

How do we identify a risk?

Internal
Internal risks are risks that come from the members of the project team. Some examples are as follows:

Human Resources
Despite the views of some project managers, project team members have lives outside of the project. Consequently there are risks of team members becoming ill, facing personal disaster (home burned down, divorce, accidents, illness/death of friends or family, etc.). These events diminish the time and effort team members can devote to a project and place the project at risk of falling behind schedule or at risk of having more errors.

Skilled team members are often poached by competitors, taking their skills and their understanding of the project.

Interpersonal conflict can also create problems within a project team. Some organisations will conduct personality tests (see http://www.personalitypage.com/info.html in order to create teams with a more compatible mix of personalities.

Technical Risks
Technical Risks result in the project falling behind schedule, blowing out cost, or reduced performance. Technical risks are more likely when the team are trying something new, team members are more likely to make mistakes in understanding the capabilities of new technology or errors in using the new technology.

Market Risks
Market risks occur when project team members misjudge the market value of the project. This is a significant risk when the project is creating a product that is to be sold when finished (e.g. a new computer game). Market risks can also occur when the customer is charged too little for the project, which can result in the project team making a loss.

Scope Risks
Scope risks arise when project team members under-estimate or over-estimate aspects of the scope. Some common examples are: under-estimating the time required to complete a project, under-estimating the complexity of a problem (and hence underestimating the resources required).

External
External risks are risks that come from outside the project team. In other words they are caused by others.

Financial
Financial risks arise where funding for the project can be reduced or removed. This can occur when a client becomes bankrupt and can no longer pay for the project to keep going.

In some situations when there has been a political change (e.g. a change of leadership) in the project team's company and the new leadership will not support the project any more.

Environmental Risks
This is a broad area of risk. It can include natural disasters that occur in the physical environment. It can also include the business environment and the legislative environment.

Examples of risks that come from the physical environment are blackouts, brownouts (where supply of electricity is too low for some equipment to work), electromagnetic interference, bush fires, floods, etc.

An example of risks from the legislative environment are when governments change laws. Recently the Australian Federal Government brought in the GST. Imagine how you would feel if you were about to complete a large software development project for a large accountancy firm only to find out that because of a new law your project had just been legislated.

Supply Risks
Project Managers rely on suppliers and contractors to deliver on time. Unfortunately this is not always the case. Sometimes it is wise to have alternative suppliers and contractors selected that can step in if those first chosen fail to deliver.
Techniques for Identifying Risks

Experience is the best tool for identifying risks. So the best technique to identify a risk is to speak to someone with experience.

Experience can be ‘concentrated’ by collective brainstorming with people of varying experience.

In critical projects the analogy

How can we assess a risk?

There are two main areas for risk analysis Impact and Likelihood

Impact

Impact assesses the amount damage that may come from a riskful event

An asteroid hitting the office building is likely to have a massive impact. A worker being sick for an afternoon is likely to have a small impact on the successful completion of a project

Likelihood

Likelihood assesses the probability of the risk eventuating. While the asteroid hitting the office is likely to have a massive impact, it is unlikely to happen, so it would be foolish of a project manager to devote many resources to preventing the event (i.e. stopping asteroid from hitting the earth). A member of the project team being sick for a while is quite likely for any project that has many team members or occurs over a prolonged period.

Project managers need to focus their efforts on those risks that have both a significant impact and a high likelihood.

Methodologies

Quantitative

EMV

Expected Monetary Value is a technique that combines the probability of a risk occurring with the expected monetary impact resulting from that risk occurring.

For example. If your power blacks out regularly about once every 6 months and is normally down for two hours, and you know the cost of the impact (eg. 8 workers at $40.00 per hour = $640 impact [of course there will be other costs but we’ll leave them out for now])

This means that for a 3 month project the EMV for a black out would be

Pr(Blackout) *(Monetary Impact).

Pr(Blackout) would be 0.5 as the probability of a blackout every 6 months is close to being a certainty (i.e.~1) and the project is going for half that time.

\[
\text{EMV} = 0.5 \times 640 = 320
\]

EMV’s can be combined with decision trees so alternative decisions can have their risks compared. (See Figure 11-4, p. 409 of Schwalbe, 3rd Ed)

The reality is that determining the probability of a risk is not an accurate science. Similarly quantifying a monetary impact is not an accurate science. The example above does not include the cost of redoing the work that is lost when the power goes out, neither does it include the cost of falling behind schedule, damage to HDD’s, etc.

Unless you can accurately calculate risk probabilities or monetary impact it is, in my opinion, better to use a qualitative technique.
**Qualitative**

With most qualitative techniques, the project manager uses expert opinion or experience to identify potential risks, rate the likelihood of the risk occurring and the negative impact to the project and organisation if the risk eventuates.

The simplest way of doing this is by listing the risks identified with an assessment of the likelihood and impact next to them.

For example

<table>
<thead>
<tr>
<th>Risk</th>
<th>Description</th>
<th>Likelihood</th>
<th>Impact</th>
<th>Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Asteroid hitting office</td>
<td>Unlikely – once every 100,000 years</td>
<td>Very High – No company functions will be able to occur, including breathing</td>
<td>Likelihood: We have no influence over the likelihood of this risk. Impact: Ensure backups of client sites are stored on other side of the world</td>
</tr>
<tr>
<td>2</td>
<td>Team member ill</td>
<td>Very Likely – about 5 days each month from a team of ten</td>
<td>Low – Schedule may fall behind a couple of days</td>
<td>Likelihood: Provide Flu shots for all workers Impact: Ensure flexibility in schedule Factor in an extra team member so that there is capacity for the team to carry the work</td>
</tr>
</tbody>
</table>

This technique demonstrates that we have identified the risks, but it does not help us to focus on the major risks.

A probability/impact matrix when used in conjunction with a table of risks helps.

A matrix is a grid. On one axis of the grid risks are grouped by probability. On the other axis they are grouped by impact.

For example

<table>
<thead>
<tr>
<th>Probability</th>
<th>Risk 2</th>
<th>Risk 5</th>
<th>Risk 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>VH</td>
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Low | Medium | High | Very High

Increasing Importance

According to the way we have laid out the matrix above, the risks at the top right of the matrix are the risks we need to focus on in strategies to minimise likelihood and minimise the impact.

Another way of achieving this is by using an XY scatter plot of the probability and impact.

**Resources**