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**CHAPTER 7**

Risk is associated with things that are unknown. More things are unknown at the beginning of a project, but risk must be considered in the initiation phase and weighed against the potential benefit of the project’s success in order to decide if the project should be chosen.

Risk analysis can be qualitative or quantitative. quantitative risk analysis is a further analysis of the highest priority risks during a which a numerical or quantitative rating is assigned in order to develop a probabilistic analysis of the project Provides a quantitative approach to making decisions when there is uncertainty.

Fault-tree analysis (not described here) and Ishikawa fishbone diagrams are methods commonly used by reliability and safety engineers to analyze faults in design and construction.

Risks can occur at any stage in a project. Some are associated with particular tasks and others originate from outside the project and can manifest themselves without warning. Generally speaking, a risk event that occurs late in a project can be more costly in terms of time and money than a similar event nearer the start of the project. Some projects, because they are small or similar to projects that the contractor has undertaken in the past, might not need special attention to risk management other than considering some of the insurance issues discussed later in this chapter. However, for any project that breaks new ground or is complex and large, a risk management strategy must be developed, first to identify as many potential risks as possible and then to decide how to deal with them. For very large projects it might be necessary to appoint a risk manager, who can devote all or most of his or her time to ensuring that a comprehensive risk strategy is put in place and then reviewed from time to time throughout the project to ensure that it remains valid. If a project support office exists that is a logical place for the risk management function to reside

Understanding where the risks occur on the project is important information for managing the contingency budget and managing cash reserves. Most organizations develop a plan for financing the project from existing organizational resources, including financing the project through a variety of financial instruments. In most cases, there is a cost to the organization to keep these funds available to the project, including the contingency budget. As the risks decrease over the length of the project, if the contingency is not used, then the funds set aside by the organization can be used for other purposes.

To determine the amount of contingency that can be released, the project team will conduct another risk evaluation and determine the amount of risk remaining on the project. If the risk profile is lower, the project team may release contingency funds back to the parent organization. If additional risks are uncovered, a new mitigation plan is developed including the possible addition of contingency funds.

Monte Carlo analysis can be used to attempt an assessment of the probability of the project finishing by its target completion date or of the intended return on investment being realized. However, those measures deal with uncertainty rather than with risk. Risks are unforeseen (and often unforeseeable) events that can result in a change of project plans or even total project failure.Risks events can occur in any kind of project and they can range from the ‘accident waiting to happen’ variety to the most unexpected and bizarre.Checklists, which grow in size and value as companies gain more project experience, are a good starting point for listing the foreseeable risks. Studying the history of similar projects can also highlight possible problems and help the project manager to learn from the mistakes and experiences of others.

Brainstorming is an effective technique for considering many aspects of risks. A brainstorming meeting of key staff is a particularly productive method for identifying all the possible risks along with many of the improbable ones. Much depends on how the brainstorming session is conducted. The leader or chairperson should encourage an atmosphere of ‘anything goes’, so that participants feel free to propose even the most bizarre risks without fear of ridicule. All suggestions, without exception, should be recorded for subsequent assessment and analysis.

Fishbone diagrams can easily be used without adaptation to examine failures or poor performance in organizations. The process generally starts by thinking about the effect, and then looking for the possible causes. However, project risk management is more often conducted from the opposite viewpoint, which means first listing all the possible causes (risks) first and then assessing their probable effects. Only three items are shown in Figure 7.2 but there might be hundreds of items in a large, complex project. Another column is sometimes added to show when in the project life cycle the risk is most likely to occur. The chart illustrates a qualitative process because the characteristics of each risk are considered, but there is no attempt to give each risk a priority ranking number or to quantify the effects if the risk should occur. Quantitative analysis methods attempt to assign numerical values to risks and their possible effects. They often examine the probable impact on project time and costs. Alternatively, the

evaluation process can produce a ranking number for every identiﬁed risk. Ranking numbers denote the priority that a risk should claim for management attention and expenditure on preventative measures. Although all quantitative methods produce actual numbers they can give a false sense of precision. It has to be remembered that the results are based on estimates, assumptions and human judgement. Those contributing assessments might be fundamentally ﬂawed, mistaken or simply too difﬁcult for any person to make with any degree of certainty. Some assessors use weighted parameters. For example, it might be considered that the severity of the risk should play a higher part in deciding ranking priority. So the severity column could be marked on a higher scale, say from 1–10. Item 2 in Figure 7.5 might then be marked 9 on this extended scale, which would increase the ranking factor for this item from 15 to 27. Although not usual practice, a case might be argued for allowing zero scores in the ‘Chance’ and ‘Severity’ columns. That could, of course, result in a total ranking factor of zero. That would be one way in which to dispose of some of the more outlandish risk events identiﬁed during an anything goes brainstorming session.

The ﬁnancial impact of many risks can be offset by insuring against them. The client pays the insurance company a premium for this service, and the insurer might itself choose to spread the risk by sharing it with one or more other insurance companies. Figure 7.7 shows that managers do not enjoy complete freedom of choice when deciding which risks should be included in their insurance portfolio. The FSA regulates and authorizes all insurance providers (insurance companies) and insurance intermediaries (brokers). It is illegal for someone or a ﬁrm to deal in insurance unless they are regulated and authorized by the FSA. Legal requirements oblige companies to obtain adequate insurance cover against some risks. These obligations arise either from various government laws and regulations or from conditions contained in a binding commercial contract.

**CHAPTER 9**

An effective organization will have clear lines of authority and every member of the project will know what he or she is expected to do to make the project a success. This is part of the management communication framework needed to motivate all the staff employed. A well-motivated group can be a joy to work with. A badly informed group, with vague responsibilities and ambiguous levels of status and authority, is likely to be poorly motivated, slow to achieve results, costly to run and extremely frustrating to work with.The complement of good management communications is the provision of adequate feedback paths through and across the organization. These facilitate cooperation and coordination. They allow progress to be monitored and difficulties to be reported back to executive management. They should also give all participants access to the relevant experts for advice or instruction on technical and commercial difficulties. Whenever an organization changes, or when a new project is opened, it is wise and customary to produce a new organization chart and distribute it. But that simple process, however innocently intended, can provoke strong and unexpected reactions.

There will be employees who feel aggrieved when they find that their names are not included on the chart, which they perceive as a personal insult. Those people will believe that they have been overlooked and that their roles and are not appreciated as being sufficiently important.

The issue of a new organization chart can also give rise to feelings of envy or injustice when individuals feel that their particular box should have been placed higher up in the hierarchical pecking order. At least one company has attempted to solve this problem by issuing circular charts, but that is a not a complete solution because those nearest the outer rim of the circle might feel that they should be nearer the centre.

The subject of project management organization can be introduced conveniently by considering the historical development of a small company. The organization invented for this example happens to be a manufacturing company, but many of the principles and arguments apply equally to all kinds of other projects. Work scheduling and control must take into account all the activities needed to bring the project to a successful conclusion (including all the software tasks, such as writing computer programs and preparing operating and maintenance instructions). Some of the items purchased by the company as part of the project must themselves be considered as special, and they too will have to be brought into the control function. Some of those purchased items might be sufﬁciently complex for their suppliers to manage their design and manufacture as projects in their own right. Cost control (a basic factor in achieving proﬁtability) has become more complex. Cost and management accountants are not the only contributors to this process; they must be helped by specialists who can deﬁne the total work content in detail and then report on achievement and cost implications as the project proceeds. As instructions are issued within departments and from one department to another, information must be fed back along the communication channels to signal the results obtained as each instruction is carried out. These feedback data are used to correct any errors discovered in the design drawings and for the essential task of controlling the general progress of the project. The weak matrix can encourage conﬂicts. For example, different project managers might compete with each other in claiming attention and resources for their own projects, and they can also come into conﬂict with the departmental managers over the allocation of people, machines and other facilities to project tasks. An additional complication is that functional departments usually have work, both routine and occasional, that is not connected with any current project. The departmental managers might decide, without agreement from the project managers, to give non project work priority over project tasks. The ‘balanced matrix’ (or overlay matrix) is very similar to a weak matrix and is sometimes described as such. In the balanced matrix, there is a declared balance of power and authority between the project managers and the functional department managers. Project and functional managers are expected to collaborate constructively and allocate personnel and other resources to tasks according to genuine priorities to ensure the successful outcome of all projects. This is perhaps the most common form of matrix. It is elegant in theory and has many advantages over other forms of organization. It is not however, as some have claimed, a universal solution for all projects. All organization forms have their advantages and disadvantages. In a ‘project matrix’ the authority of each project manager takes precedence over the authority of the functional managers, at least as far as the allocation and progressing of work is concerned. In a ‘secondment matrix’, which is the strongest form of the matrix, the functional managers must nominate and assign members of their departments to work full-time for the project managers. The people assigned report principally to their respective project managers for as long as each project manager needs them (although they might have to remain physically located in their home departments). The resulting task force should be a powerful and effective management team, with all the expertise and authority needed to give the project the best chance of success.