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 CHAPTER 7: RISK
Risk can happen at any phase in a venture. Some are related with specific assignments and others start from outside can show themselves abruptly. As a rule, a risks occasion that happens late in a task can be all the more expensive regarding time and cash than a comparable occasion closer the beginning of the undertaking. That is on the grounds that over the long haul there will be a more noteworthy estimation of work in progress and higher sunk expenses in danger of misfortune or harm. For huge ventures it may be important to designate a risks director, who can commit all or a large portion of their opportunity to guaranteeing that a thorough risks technique is set up and afterward inspected every once in a while all through the task to guarantee that it stays substantial.

**IDENTIFYING POSSIBLE RISKS**

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. A brainstorming meeting of key staff is a particularly productive method for identifying all the possible risks along with many of the improbable ones.

**RISK ANALYSIS**

Once identiﬁed and listed, risks can be ranked according to the probability of their occurrence and the severity of the impact if they should occur. This process will eliminate the most improbable risks arising from brainstorming. Risk analysis can be qualitative or quantitative.

A) **Qualitative cause and analysis**

i) Fault-trees and ﬁshbones

Fault-tree analysis and Ishikawa ﬁshbone diagrams are methods commonly used by reliability and safety engineers to analyze faults in design and construction. Fishbone diagrams can easily be used without adaptation to examine failures or poor performance in organizations.

ii) Failure mode and effect analysis (FMEA)

Failure mode and effect analysis has also been imported into project risk management from reliability and quality engineering, but this method is possibly more helpful because it starts by considering possible risk events (failure modes) and then proceeds to predict all their possible effects. As with failure mode and effect analysis, this again is a qualitative method, in which no attempt is made to evaluate any risk numerically. Each risk item is considered for its likelihood of occurrence (chance) and for the relative scale of the impact on the project should it occur.

B) Quantitative analysis

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 judgment.

**RISK REGISTER**

When all the known risks have been listed, assessed and ranked it is time to consider what might be done about them .That process requires that all potential risks be listed in a risk register (or risk log). The risk register has the following noticeable additions:

-an ID number for each risk listed;

 -space for writing in the proposed action that would be taken should the risk event materialize;

 -a column headed ‘Action by’ in which the name of the person or manager responsible for taking action for each risk can be entered.

The risk register should be reviewed and updated regularly throughout the life of the project. It is advisable to use the computer to sort the risks according to their ranking, with the highest ranked risks placed at the top.

**METHODS FOR DEALING WITH RISKS**

The project manager usually has a range of options:

1. Avoid the risk – The only way to avoid a risk is to abandon the possible causes, which could even mean deciding not to undertake a project at all.

2. Take precautions to prevent risk impact – This is a most important part of risk management, requiring the active participation of all managers and staff. It requires the creation of a risk prevention culture, covering all aspects of project tasks, health and safety, and consideration for the environment. Here are a few examples of the many possible practical measures, :

-high security fencing to reduce the chance of gatecrashers at an open air pop festival;

-double-checking to detect errors in design calculations for vital project components or structures;

-Provision of back-up electrical power supplies for vital operations,

- Essential services and computers;

3. Accept the risk – There are numerous small things that can go wrong during the course of any project, and most of these risks can be accepted in the knowledge that their effect is not likely to be serious, and that they can be overcome by corrective measures or replanning.

 4. Share the risk – If a project, or a substantial part of it, appears to carry very high risk, the contractor might seek one or more partners to undertake the work as a joint venture. Then the impact of any failure would be shared among the partners.

5. Limit the risk – There are occasions when project risks should only be accepted with safeguards in place to limit their potential effect.

6. Transfer the risk – Some risks, or substantial parts of them, can be transferred to another party on payment of a fee or premium. This leads to the important subject of insurance, which is discussed in the next section.

**INSURANCE**

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.

There are four main classes of insurance:

1. Legal liabilities.

 2.Protection against loss or damage to property, including temporary works and work in progress, owned construction plant, hired-in plant and employees’ effects;

3. Cover relating to personnel;

4. Pecuniary loss.

**OBTAINING INSURANCE**

Insurance can be sought directly from an underwriter, or through a broker; preferably one with a good reputation and experienced in the insured’s type of project activity. The insurer will need to be supplied with sufﬁcient information for the risk to be adequately deﬁned, and the contractor will be expected to inform the insurer of any change of circumstances likely to affect the risks insured.

Liability insurance is becoming expensive. Employer’s liability cover, even though a legal requirement, is becoming difﬁcult to obtain. It is, therefore, now more important than ever for a project manager to involve an insurance specialist at a very early planning stage, lest they should ﬁnd that no insurance cover is available at short notice.

**PLANNING FOR A CRISIS**

One cannot always say when or where a disaster will strike, but at least plans can be put in reserve to be implemented immediately when the need arises.

1. Organization

Once the possibility of a crisis has been established, the ﬁrst step in devising a contingency plan is to identify the key people who will take charge of the crisis management project. A team leader or steering committee must be appointed that will manage the project should it become live.

2. Contingency planning

Once the key people have been elected or selected to serve on the action committee, they must meet to design appropriate contingency plans, and then meet again at regular intervals to ensure that the plans are kept up to date.

CHAPTER 9: PROJECT ORGANIZATION STRUCTURES

Every company has its own ideas about how to organize itself and its work. It is highly probable that if three companies doing similar work could be compared, three different organization structures would be found.

**EFFECTIVE ORGANIZATION AND COMMUNICATIONS**

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. The complement of good management communications is the provision of adequate feedback paths through and across the organization.

**ORGANIZATION CHARTS**

It is not possible to discuss organizational structures in any depth of detail without the aid of charts (or ‘organograms’ as they are often unfortunately known). No organogram can adequately depict all the nuances and politics of a particular organization, but we all need to understand, as far as possible, the meanings of the charts that we encounter during our working lives.



Fig 1; Organogram conventions

**Shortcomings of organograms**

Organizations thrive on fast and effective communications, whether electronic or face to face. The only difﬁculty is that organograms cannot possibly show every communication channel, and they are certainly incapable of deﬁning every subtle inﬂuence that one person might be able to exert over another.. 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 center.

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**PROJECT MATRIX ORGANIZATIONS**

**1. Matrix organization for a single project**

This arrangement is fairly common. It allows the general line organization of the company and its departmental management structure to continue normally, but the project manager is asked to give undivided attention to the ‘intruding’ project. Here the project manager acts principally as a coordinator, and has no direct line authority over any other manager or their staff.

2. **Matrix organization for multiple projects**

This matrix is the multiple-project variant of the single-project functional matrix.

**DIFFERENT MATRIX STRENGTHS**

1. Weak matrix

In a ‘weak matrix’, each project manager’s degree of authority and control is less than that enjoyed by the managers of the functional departments. Thus every project manager in a weak matrix is entirely dependent on the departmental managers for the provision of people and equipment for project tasks.

2. Balanced matrix

In the balanced matrix, there is a declared balance of power and authority between the project managers and the functional department managers.. Like the weak matrix, the balanced matrix can also give rise to conﬂict between project managers and departmental managers.

3. Stronger forms of the matrix

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.

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**PROJECT TEAMS AND TASK FORCES**

The project manager is given direct line authority over the team and is responsible not only for planning, progress and work allocation but also for all technical aspects of the project. All members of the team identify with the project and can be strongly motivated towards achieving the project goals. It is best if the key members of the team can be located near each other in the same building but this is not always practicable.

**ADVANTAGES DEDICATED PROJECT TEAM**

1. Short-term leadership and motivation

An important aspect of motivation is the generation of a team spirit, in which everyone feels part of the team and strives to meet the common team goals. It is clearly easier to establish a team spirit when a project team actually exists, as opposed to the case where the people are dispersed over a matrix organization which is handling more than one project.

2. Good cross-functional communications

In a project team organization, the project manager can ensure that strong and fast communication links exist up, down and across the project organization. There should be no delays while information has to cross departmental boundaries.

3. Security and conﬁdentiality

The establishment of a project team greatly helps the organizers to contain all the work and its information within closed, secure boundaries.

**DISADVANTAGES**

1. Inﬂexibility and inefﬁciency in the use of resources

Unless a project is very big, the individual specialist subgroups set up to perform all the varied activities within the project team will be too small to allow sufﬁcient ﬂexibility of labour and other resources. Inﬂexibility associated with small groups can also be expected in some of the specialist administrative functions, where it is often more difﬁcult, if not impossible, to rectify matters at short notice using temporary employees

2. Isolation of specialists

Specialist engineers and other experts located in small project teams are deprived of the beneﬁts of working in a department with colleagues of their own specialist discipline. They are less able to discuss technical problems with their peers or to have access to the valuable fund of general historic technical and professional data plus current awareness that permanently organized specialist departments accumulate.

3. Administrative difﬁculties

Very often it might be found impossible to house all the participants under one roof, or even in the same locality. Although team organization might be logical and ideal for the project, it could be physically impossible to achieve in practice.

**ADVANTAGES OF THE MATRIX**

The matrix option allows the establishment of specialist functional groups which, in theory, have ‘eternal life’, independent of the duration of individual projects. An environment is created that facilitates the building of long-term trust and loyalty. Pooling specialist skills gives greater ﬂexibility in allocating resources to projects. Concentration of specialist skills enhances the organization’s collective technical ability and quality. Organizational continuity promotes the accumulation of knowledge, expertise and experience with the passage of time, both for individuals and for the group as a whole. This is more likely to result in a fair assessment and employee satisfaction.

**DISADVANTAGES OF THE MATRIX**

Too much reliance can be placed on the supposed eternal life of the matrix organization in modern times, when many businesses face sudden devastating changes as a result of mergers, takeovers, corporate re-engineering, downsizing or even failure. Most of the advantages connected with a project team are denied to the project manager in a weak matrix, but this situation is improved when the matrix is made stronger.

**COMPARISON OF TEAM AND MATRIX**

The arguments will no doubt continue as to which is the better of the two organizations.. As a general large projects of long duration will probably beneﬁt from the formation of project teams. The same applies to projects that are, by their nature, self-contained, such as work on a remote construction site. Matrix organizations are indicated for companies which handle a number of relatively small simultaneous projects in the same premises.

**HYBRID OPTION**

Sometimes companies adopt the solution of a hybrid organization, operating a matrix organization in general, but with teams set up for certain projects when the need arises. It is arranged principally as a matrix, with specialist groups under their respective highly qualiﬁed and experienced chief engineers. The project management group contains project managers and project engineers who draw on the resources of the specialist groups for the skilled engineering and expert advice needed for most projects.

**ORGANIZATIONS WITH MORE THAN ONE PROJECT MANAGER**

Any project of signiﬁcant size will probably have more than one project manager. These can usually be found spread throughout the overall project organization on the staffs of the customer, important subcontractors and the manufacturers of some specially purchased goods and equipment. Those project managers are important not only for the purposes of planning and control, but they also provide unambiguous and safe points of contact in the network of project communications.