

Fundamentals of Project Management

DMGT302

Edited by:
Neha Tikoo



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FUNDAMENTALS OF PROJECT MANAGEMENT

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SYLLABUS

Fundamentals of Project Management

Objectives: To provide the student with greater understanding of analytical skills for solving problems in project management. This course will help them learn mathematical models which aid in the decision-making process and to develop critical thinking and knowledge in project management's theory and practices.

Sr. No.	Description
1.	Introduction to Projects: Project management, Project manager and his responsibilities, PM as a profession, selection of a project manager, Fitting projects into the parent Organization project management team, project model, phases of Project management, Project environment, the 7S of Project management.
2.	Project Analysis and Selection: Project Initiation and resource allocation, Market analysis and Demand analysis, Technical Analysis.
3.	Project Planning: Time planning, Contents of Project plan, planning process, Work breakdown structure, process mapping.
4.	Project Budgeting: Financial Projections, time value of money, cost of capital, Appraisal criteria, Risk analysis in capital investment decisions.
5.	Environmental Appraisal of Projects: Meaning of Environment and pollution, pollution created by different industries, Methods of preventing pollution, Environmental regulations in India, Environmental impact assessment.
6.	Social Cost benefit Analysis: The rationale for Social cost benefit analysis, UNIDO approaches for Social Cost benefit analysis, Methods followed by Financial Institutions.
7.	Project Scheduling: PERT and CPM networks.
8.	Monitoring and Controlling: Plan monitor control cycle, data collection and reporting, Project control.
9.	Evaluation and termination: Evaluation, Project auditing, Project termination.
10.	Miscellaneous topics: Managing E-business Projects, Future of Project management, Regulatory framework of Projects.

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Unit 1: Introduction to Projects

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Introduction

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- 1.9 Project Environment
- 1.10 The 7s of Project Management
- 1.11 Summary
- 1.12 Keywords
- 1.13 Review Questions
- 1.14 Further Readings

Objectives

After studying this unit, you will be able to:

- Know project manager and his responsibilities;
- Understand selection of a project manager;
- Know about the phases of project management;
- Describe evolution of sales department.

Introduction

A project is a group of unique, inter-related activities that are planned and executed in a certain sequence to create a unique product or service, within a specific timeframe, budget and the client's specifications. Some of the characteristics of the tasks that qualify to be a project are: uniqueness, specificity of goal, sequence of activities, specified time and inter-relatedness. Projects are carried out under many resource constraints and their success depends on the ability of the manager to manage these constraints effectively. Project management is the application of the knowledge, skills, tools and techniques to project activities in order to meet or exceed stakeholder needs and expectations.

Notes

Every project has a set of activities that are unique, which means it is the first time that an organization handles that type of activity. These activities do not repeat in the project under similar circumstances i.e., there will be something different in every activity or even if the activity is repeated, the variables influencing it change every time.

1.1 Project Management

The successful project management is all about structure, control, sufficient attention to detail and continuously driving action. The role of the project manager is to understand enough project management to apply its structure and ensure that project is successfully completed within the time and cost required. The things you must do as a project manager are:

1. Ensure there is a clear understanding why a project is being done, and what it will produce?
2. Plan the project – to understand how long it will take and how much it will cost?
3. Manage the project – to ensure that as the project progresses, it achieves the objectives you have defined within the time and cost specified.
4. Complete the project properly – to make sure everything produced by the project is of the quality expected and works as required.

Project management has emerged because the characteristics of our turn-of-the-century society demand the development of the new methods of management. Of the many forces involved, three are paramount:

1. the exponential expansion of the human knowledge;
2. the growing demand for a broad range of complex, sophisticated, customized goods and services;
3. the evolution of worldwide competitive markets for the production and consumption of goods and services.

All three forces combine to mandate the use of terms to solve problems that used to be solvable by individuals. These three forces combine to increase greatly the complexity of goods and services produced plus the complexity of the process used to produced them and all this in turn leads to the need for more sophisticated systems to control both outcomes and processes.

As the techniques of project management were developed, the use of project organization began to spread. Private construction firms found that project organization was helpful on smaller projects, such as the building of a warehouse or an apartment complex. Automotive companies used project organization to develop new automobile models. Both General Electric and Pratt & Whitney used project organization to develop new jet aircraft engines for airlines, as well as the Air Force. Project management has even been used to develop new models of shoes and ships.

More recently, the use of project management by international organizations, and especially organizations producing services rather than products, has grown rapidly. Advertising campaigns, global mergers, and capital acquisitions are often handled as projects, and the methods have spread to the non-profit sector. Functions, weddings, fund drives, election campaigns, parties, recitals etc., all make use of the principles of project management. Most striking has been the widespread adoption of project management techniques for the development of computer software.



Caution Ensure there is a clear understanding why a project is being done, and what it will produce.

1.2 Project Manager and his Responsibilities

Notes

Definition

According to Project Management Institute (PMI), “*Project Management is the application of knowledge, skills, tools and techniques to project activities in order to meet or exceed stakeholder needs and expectations*”.

Project management is quite often the province and responsibility of an individual project manager. This individual seldom participates directly in the activities that produce the end result, but rather strives to maintain the progress and productive mutual interaction of various parties in such a way that overall risk of failure is reduced.

A project manager is often a client representative and has to determine and implement the exact needs of the client based on knowledge of the firm he/she is representing. The ability to adapt to the various internal procedures of the contracting party, and to form close links with the nominated representatives, is essential in ensuring that the key issues of cost, time, quality and above all client satisfaction, can be realized. Any type of product or service – buildings, vehicles, electronics, computer software, financial services, etc. – may have its implementation overseen by a project manager and its operations by a product manager.

The project manager needs to be an HRD expert who can motivate the workforce by training and promoting leadership among them, and boost their morale by incentives and promotions. He has to be conversant with the principles of organisation, and be a good judge of people who has the ability to place the right man in the right job at the right time.

Social issues: A project can only be successful when there is no conflict between the management and the local populace. Right from the acquisition of the project land to recruitment to organisation to infrastructural facilities, the management has to interact with the social fabric of the locale. It can only ensure a smooth functioning at the project site if there is a ‘co-operational’, and not a ‘confrontational’ environment. The management can display its cordiality to the locals by, for instance, recruiting ‘the sons of the soil’ in the workforce, which will not only be conducive to reciprocal cordiality of the populace, but might actually make good business sense in employing labour that is familiar with the locale and the conditions prevalent at the project site.

Functions of Project Manager

1. Developing a unique product or process and manage change.
2. Identification of the need for project.
3. Finding different alternatives of the project.
4. Developing a plan of action.
5. Training operators.
6. Establishment of quality assurance cell to control quality.
7. Incorporation of changes as and when needed while implementing project.
8. Selection of suitable equipment.
9. Finding suitable financial resources.
10. Assessment of alternatives and obtaining approval to proceed.
11. Measuring performance of the project.
12. Transfer of material, funds and settling all accounts after completion of project.

Notes

13. Monitoring progress and reporting to higher authorities.
14. Closing all records, submission of final report and transfer of responsibility after completion of specified project.



Notes A project can only be successful when there is no conflict between the management and the local populace.

Self Assessment

Fill in the blanks:

1. The successful is all about structure, control, sufficient attention to detail and continuously driving action.
2. A project can only be successful when there is no conflict between the and the local populace.
3. Project management is quite often the province and responsibility of an individual
4. The project manager needs to be an expert who can motivate the workforce by training and promoting leadership among them.
5. companies used project organization to develop new automobile models.

1.3 PM as a Profession

Not all project managers are equally competent. Not all project managers have the ability to run programs, establish PMO's, strategically align project portfolio's, recover big projects, or manage risk effectively. Not every doctor is capable of heart surgery. But doctor's get paid for being doctor's, have demonstrated considerable training and understanding, have spent thousands of hours mastering their jobs. Doctor's are professionals.

By any definition, Project Management is a profession

It should be obvious to the reader that project management is a demanding job. Planning and controlling the complexities of a project's activities, schedule, and budget would be difficult even if the project had the highest claim on the parent organization's knowledge and resources, and if the PM had full authority to take any action required to keep the project on course for successful completion. Such is never the case, but all is not lost because there are tools available to bring some order to the chaos of life as a PM—to cope with the difficulties of planning and the uncertainties that affect budgets and schedules. Also, as we have indicated, it is possible to compensate for missing authority through negotiation. Mastering the use of project management tools requires specialized knowledge that is often acquired through academic preparation, which is to say that *project management is a profession*. The profession comes complete with career paths and an excellent professional organization.

The Project Management Institute (PMI) was founded in 1969. By 1990, the PMI had 7500 members. It grew to 17,000 by 1995, but five years later membership had exploded to more than 64,000. By November 2009, the PMI had more than 300,000 members worldwide. The exponential growth of the PMI is the result of the exponential growth in the use of projects and PMs as a way of getting things done.



Example: A senior Vice President of an international chemical firm installed project management as a way of controlling the workloads on his technical specialists and on a few overloaded facilities—project management having tools to handle the allocation of scarce resources. In another instance, a new CEO of a large hospital mandated that all non-routine, one-time operations be managed as projects so that she could have information on the nature and status of all such activities.

1.4 Selection of a Project Manager

The selection of project manager depends on following points.

Problem Solving Skills

1. Does this person have a history of being able to solve complex problems?
2. Does this person have the attitude that a problem is an opportunity to learn?

Personal Leadership Style

1. Does this person have the communications and people skills appropriate for the mix of people who will be required on this project?
2. Will this person encourage project team members to bring up problems rather than play the blame game?
3. Does this person have excellent time management skills?

Organizational Experience

1. Does this person know how work gets done in this organization?
2. Is this person experienced in working in similar organizations and is that experience transferable to this project?
3. Does this person know the politics of our organization and have the savvy to navigate these situations?

Skills and Knowledge

1. Does this person have adequate knowledge about the subject of this project?
2. If some of these skills are weak is there support available in the organization to offset the problem?
3. Does this person have adequate technical skills for this project?
4. Does this person have the skills understand the root causes of potential problems and keep them from reoccurring?

Project Management Experience

1. Has this person led projects of similar scope, size, length, and priority?
2. Is this person on a growth track to lead more complex projects?

1.5 Fitting Projects into Parent Organisation

Earlier in this unit we referred several times to problems caused by the way projects are organized and fit in as a part of the parent organization. It is now time to deal with this subject. It would be most unusual for a PM to have any influence over the interface between the project and the parent organization. This arrangement is a matter of company policy and usually is decided by senior management. The nature of the interface, however, has a major impact on the PM's life, and it is necessary that the PM understand why senior managers make what appears to be the worst of all possible choices for the interface.

More on "Why Projects?"

Before examining the alternative ways in which a project can interface with the organization, it is useful to add to our understanding of just why organizations choose to conduct so much of their work as projects. We spoke above of project-oriented firms. In addition to the managerial reasons that caused the rapid spread of such organizations, there were also strong economic reasons. First, devising product development programs by integrating product design, engineering, manufacturing, and marketing functions in one team not only improved the product, it also allowed significant cuts in the time-to-market for the product.



Example: In the 1990s Chrysler Motors (now owned by Fiat) cut almost 18 months from the new product development time required for design-to-street and produced designs that were widely rated as outstanding. This brought new Chrysler models to market much faster than normal in the automotive industry. Quite apart from the value of good design, the economic value of the time saved is immense and derives from both reduced design labor and overhead, plus earlier sales and return on the investment—in this case amounting to hundreds of millions of dollars. The same methods were used to enable General Motors to redesign and reimage their Cadillac and Buick models in response to the sharp decline in demand during the steep business downturn of 2008. This same process also allows a firm to tailor special versions of standard products for individual clients.



Did u know? Are you doing a project? A project is a temporary endeavor with a specific result or objective. If your project has no end in sight and/or no clear scope, then whatever it is you're doing may be important, but it's not a project. You'll have a hard time showing your team that they're being successful.

1.6 Project Management Team

We have mentioned the project team several times in the foregoing sections. Effective team members have some characteristics in common. Only the first of these is usually taken into account.

1. They must be *technically competent*. This is so obvious that it is often the only criterion applied. While the functional departments will always remain the ultimate source of technological problem-solving for the project, it requires a technically competent person to know exactly when additional technical knowledge may be required by the project.
2. Senior members of the project team must be *politically sensitive*. It is rarely possible to complete a project of reasonable size and complexity without incurring problems that require aid from the upper echelons of executive row; that is, from a *project champion* (Pinto and Slevin, 1989). Getting such aid depends on the PM's ability to proceed without

threatening, insulting, or bullying important people in the functional groups. To ensure co-operation and assistance, there is a delicate balance of power that must be maintained between the project and the functional departments, and between one project and others.

3. Members of the project team need a strong *problem orientation*. This characteristic will be explained in more detail shortly. For now, take the phrase to mean that the team's members should be concerned about solving any problems posed by the project, not merely about those sub-problems that concern their individual academic or technical training.
4. Team members need a strong *goal orientation*. Projects are uncomfortable environments for people with a 9-to-5 view of work. In particular, neither project teams nor PMs can succeed if their focus is on activity rather than results. On the other hand, the project will not be successful if the project team dies from overwork. One project team member of our acquaintance was bemoaning a series of 60+ hour weeks. "They told me that I would work about 50 hours in an average week. I've been on this project almost 18 months, and we haven't had an average week yet."
5. Project workers need *high self-esteem*. Project members who hide mistakes and failure are disasters waiting to happen. Team members must be sufficiently self-confident and have sufficient trust in their fellow team members (Lencioni, 2002) that they can immediately acknowledge their own errors and point out problems caused by the errors of others. PMs should note that "shooting the messenger" who brings bad news will instantly stop the flow of negative information. The result is that the golden rule we stated above, "Never let the boss be surprised," will be violated, too.

1.7 Project Model

Of the two basic types of selection models, numeric and non-numeric, non-numeric models are older and simpler and have only a few sub-types to consider.

1.7.1 Non-numeric Models

The Sacred Cow: In this case the project is suggested by a senior and powerful official in the organization. Often the project is initiated with a simple comment such as, "If you have a chance, why don't you look into...." and there follows an undeveloped idea for a new product, for the development of a new market, for the design and adoption of a global data base and information system, or for some other project requiring an investment of the firm's resources. The immediate result of this bland statement is the creation of a project to investigate whatever the boss has suggested. The project is sacred in the sense that it will be maintained until successfully concluded, or until the boss, personally, recognizes the idea as a failure and terminates it.

The Operating Necessity: If a flood is threatening the plant, a project to build a protective dike does not require much formal evaluation, in an example of this scenario. Republic Steel Corporation (now a part of LTV Corp.) has used this criterion (and the following criterion also) in evaluating potential projects. If the project is required in order to keep the system operating, the primary question becomes: Is the system worth saving at the estimated cost of the project? If the answer is yes, project costs will be examined to make sure they are kept as low as is consistent with project success, but the project will be funded.

The Competitive Necessity: Using this criterion, Republic Steel undertook a major plant rebuilding project in the late 1960s in its steel bar manufacturing facilities near Chicago. It had become apparent to Republic's management that the company's bar mill needed modernization if the firm was to maintain its competitive position in the Chicago market area. Although the planning process for the project was quite sophisticated, the decision to undertake the project was based on a desire to maintain the company's competitive position in that market.

Notes

In a similar manner, many business schools are restructuring their undergraduate and MBA programs to stay competitive with the more forward looking schools. In large part, this action is driven by declining numbers of tuition paying students and the stronger competition to attract them. Investment in an operating necessity project takes precedence over a competitive necessity project, but both types of projects may bypass the more careful numeric analysis used for projects deemed to be less urgent or less important to the survival of the firm.

The Product Line Extension: In this case, a project to develop and distribute new products would be judged on the degree to which it fits the firm's existing product line, fills a gap, strengthens a weak link, or extends the line in a new, desirable direction. Sometimes careful calculations of profitability are not required. Decision-makers can act on their beliefs about what will be the likely impact on the total system performance if the new product is added to the line.

Comparative Benefit Model: For this situation, assume that an organization has many projects to consider, perhaps several dozen. Senior management would like to select a subset of the projects that would most benefit the firm, but the projects do not seem to be easily comparable.



Example: Some projects concern potential new products, some concern changes in production methods, others concern computerization of certain records, and still others cover a variety of subjects not easily categorized (e.g., a proposal to create a daycare center for employees with small children). The organization has no formal method of selecting projects, but members of the Selection Committee think that some projects will benefit the firm more than others, even if they have no precise way to define or measure "benefit."

The concept of comparative benefits, if not a formal model, is widely adopted for selection decisions on all sorts of projects. Most United Way organizations use the concept to make decisions about which of several social programs to fund. Senior management of the funding organization then examines all projects with positive recommendations and attempts to construct a portfolio that best fits the organization aims and its budget.

There are other, similar non-numeric models for accepting or rejecting projects. Although it is easy to dismiss such models as unscientific, they should not be discounted casually. These models are clearly goal oriented and directly reflect the primary concerns of the organization. The sacred cow model, in particular, has an added.

1.7.2 Numeric Models: Profit/Profitability

As noted earlier, a large majority of all firms using project evaluation and selection models use profit/profitability as the sole measure of acceptability. We will consider these models first, and then discuss models that surpass the profit test for acceptance.

Payback Period: The payback period for a project is the initial fixed investment in the project divided by the estimated annual cash inflows from the project. The ratio of these quantities is the number of years required for the project to repay its initiate fixed investment.



Example: Assume a project costs \$100,000 to implement and has annual net cash inflows of \$25,000. Then

$$\text{Payback period} = \$100,000 / \$25,000 = 4 \text{ years}$$

This method assumes that the cash inflows will persist at least long enough to payback the investment and it ignores any cash inflows beyond the payback period. The method also serves as an inadequate proxy for risk. The faster the investment is recovered, the less the risk to which the firm is exposed.

Average Rate of Return: Often mistaken as the reciprocal of the payback period, the average rate of return is the ratio of the average annual profit (either before or after taxes) to the initial or average investment in the project. Because average annual profits are usually not equivalent to net cash inflows, the average rate of return does not usually equal the reciprocal of the payback period. Assume, in the example just given, that the average annual profits are \$15,000:

$$\text{Average rate of return} = \$15,000/\$100,000 = 0.15$$

Neither of these evaluation methods is recommended for project selection though payback period is widely used and does have a legitimate value for cash budgeting decisions. The major advantage of these models is their simplicity, but neither takes into account the time value of money. Unless interest rates are extremely low and the rate of inflation is nil, the failure to reduce future cash flows or profits to their present value will result in serious evaluation errors.

Other Profitability Models: There are a great many variations of the models just described. These variations fall into three general categories: (1) those that sub-divide net cash flow into the elements that comprise the net flow; (2) those that include specific terms to introduce risk (or uncertainty, which is treated as risk) into the evaluation; and (3) those that extend the analysis to consider effects that the project might have on other projects or activities in the organization.

Several comments are in order about all the profit, profitability numeric models. First, let us consider their advantages:

1. The undiscounted models are simple to use and understand.
2. All use readily available accounting data to determine the cash flows.
3. Model output is in terms familiar to business decision-makers.
4. With a few exceptions, model output is on an "absolute" profit/profitability scale and allows "absolute" go/no-go decisions.
5. Some profit models account for project risk.

The disadvantages of these models are the following:

1. These models ignore all non-monetary factors except risk.
2. Models that do not include discounting ignore the timing of the cash flows and the time value of money.
3. Models that reduce cash flows to their present value are strongly biased toward the short run.
4. Payback type models ignore cash flows beyond the payback period.
5. The internal rate of return model can result in multiple solutions.
6. All are sensitive to errors in the input data for the early years of the project.
7. All discounting models are nonlinear, and the effects of changes (or errors) in the variables or parameters are generally not obvious to most decision-makers.
8. All these models depend for input on a determination of cash flows, but it is not clear exactly how the concept of cash flow is properly defined for the purpose of evaluating projects.

In our experience, the payback period model, occasionally using discounted cash flows, is one of the most commonly used models for evaluating projects and other investment opportunities. Managers generally feel that insistence on short payout periods tends to minimize the uncertainties associated with the passage of time. While this is certainly logical, we prefer evaluation methods that discount cash flows and deal with uncertainty more directly by

Notes considering specific risks. Using the payout period as a cash budgeting tool aside, its only virtue is simplicity, a dubious virtue at best.

Self Assessment

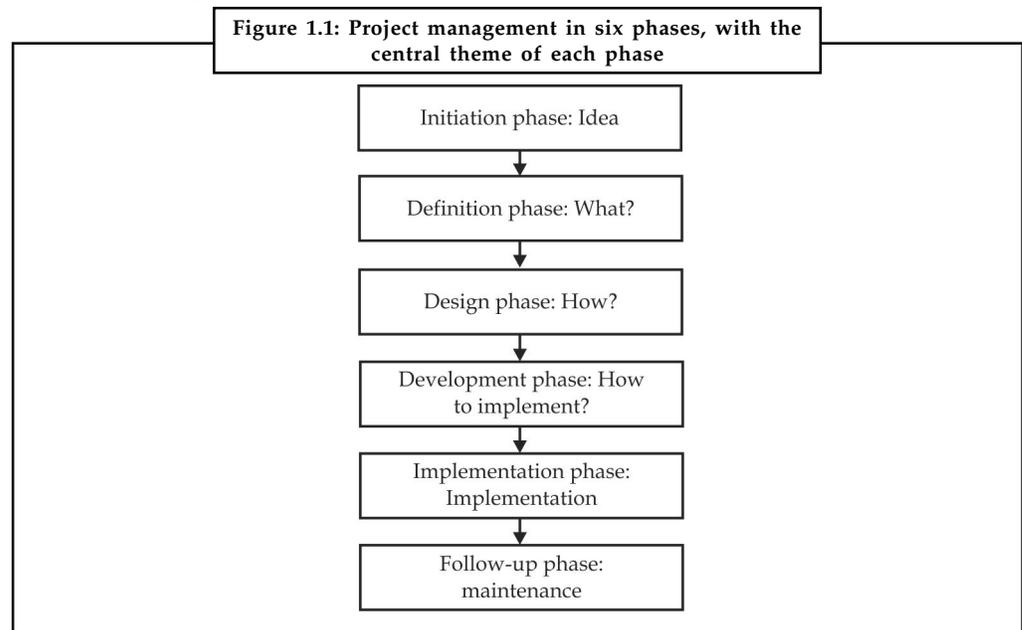
State whether the following statements are True or False:

6. The Project Management Institute (PMI) was founded in 1989.
7. Project Management Team must be physically competent.
8. Senior members of the project team must be *politically sensitive*.
9. The payback period for a project is the initial fixed investment in the project divided by the estimated annual cash inflows from the project.
10. Payback type models ignore cash flows beyond the payback period.
11. The external rate of return model can result in multiple solutions.

1.8 Phases of Project Management

Dividing a project into phases makes it possible to lead it in the best possible direction. Through this organisation into phases, the total work load of a project is divided into smaller Components, thus making it easier to monitor. The following paragraphs describe a phasing model that has been useful in practice. It includes six phases:

1. Initiation phase
2. Definition phase
3. Design phase
4. Development phase
5. Implementation phase
6. Follow-up phase



Initiation Phase

Notes

The initiation phase is the beginning of the project. In this phase, the idea for the project is explored and elaborated. The goal of this phase is to examine the feasibility of the project. In addition, decisions are made concerning who is to carry out the project, which party (or parties) will be involved and whether the project has an adequate base of support among those who are involved.

In this phase, the current or prospective project leader writes a proposal, which contains a description of the above-mentioned matters. Examples of this type of project proposal include business plans and grant applications. The prospective sponsors of the project evaluate the proposal and, upon approval, provide the necessary financing. The project officially begins at the time of approval.

Questions to be answered in the initiation phase include the following:

1. Why this project?
2. Is it feasible?
3. Who are possible partners in this project?
4. What should the results be?
5. What are the boundaries of this project (what is outside the scope of the project)?

In the initiation phase, the project partners enter a (temporary) relationship with each other. To prevent the development of false expectations concerning the results of the project, it makes sense to explicitly agree on the type of project that is being started:

1. a research and development project;
2. a project that will deliver a prototype or 'proof of concept';
3. a project that will deliver a working product.

The choice for a particular type of project largely determines its results.



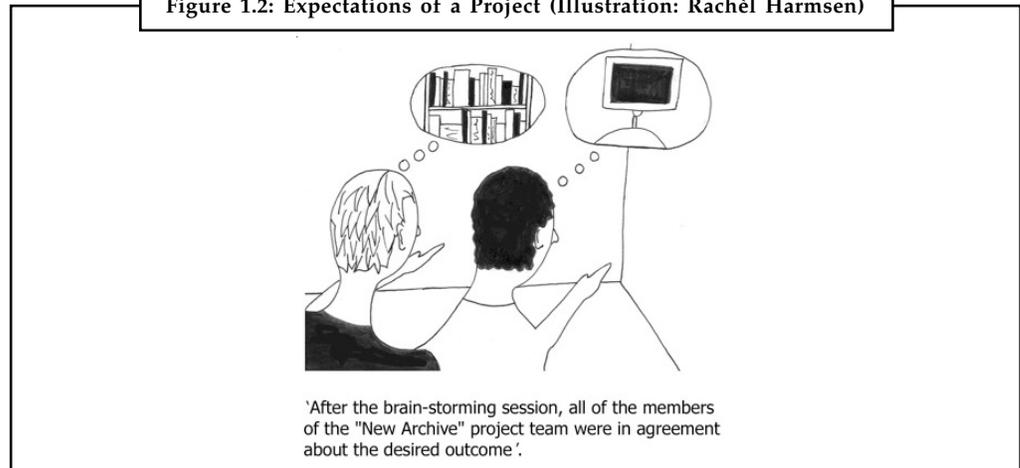
Example: A research and development project delivers a report that examines the technological feasibility of an application. A project in which a prototype is developed delivers all of the functionalities of an application, but they need not be suitable for use in a particular context (e.g. by hundreds of users). A project that delivers a working product must also consider matters of maintenance, instructions and the operational management of the application.

Definition Phase

After the project plan (which was developed in the initiation phase) has been approved, the project enters the second phase: the definition phase. In this phase, the requirements that are associated with a project result are specified as clearly as possible. This involves identifying the expectations that all of the involved parties have with regard to the project result. How many files are to be archived? Should the metadata conform to the Data Documentation Initiative format, or will the Dublin Core (DC) format suffice? May files be deposited in their original format, or will only those that conform to the Preferred Standards be accepted? Must the depositor of a dataset ensure that it has been processed adequately in the archive, or is this the responsibility of the archivist? Which guarantees will be made on the results of the project? The list of questions goes on and on.

Notes

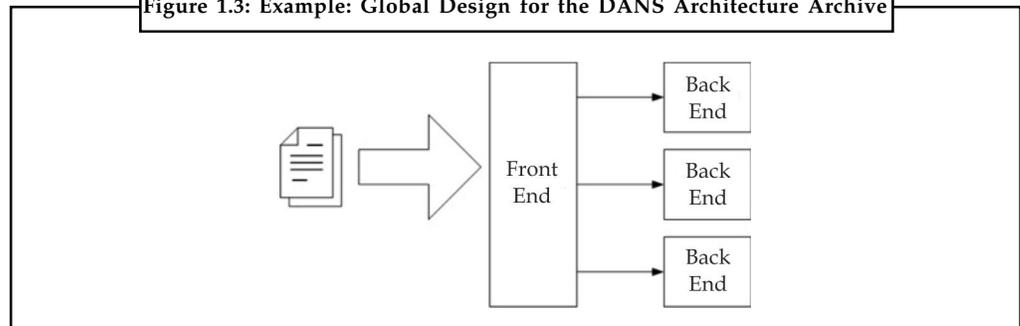
Figure 1.2: Expectations of a Project (Illustration: Rachèl Harmsen)



Design Phase

The list of requirements that is developed in the definition phase can be used to make design choices. In the design phase, one or more designs are developed, with which the project result can apparently be achieved. Depending on the subject of the project, the products of the design phase can include dioramas, sketches, flow charts, site trees, HTML screen designs, prototypes, photo impressions and UML schemas. The project supervisors use these designs to choose the definitive design that will be produced in the project. This is followed by the development phase. As in the definition phase, once the design has been chosen, it cannot be changed in a later stage of the project.

Figure 1.3: Example: Global Design for the DANS Architecture Archive



In a young, very informal company, the design department was run by an artist. The term design department was not accurate in this case; it was more a group of designers who were working together. In addition, everyone was much too busy, including the head of the department.

One project involved producing a number of designs, which were quite important to the success of the project. A young designer on the project team created the designs. Although the head of the design department had ultimate responsibility for the designs, he never attended the meetings of the project team when the designs were to be discussed. The project leader always invited him, and sent him e-mails containing his young colleagues sketches, but the e-mails remained unanswered. The project leader and the young designer erroneously assumed that the department head had approved the designs. The implementation phase began. When the project was nearly finished, the result was presented to the department head, who became furious and demanded that it be completely redone. The budget, however, was almost exhausted.

Development Phase

Notes

During the development phase, everything that will be needed to implement the project is arranged. Potential suppliers or subcontractors are brought in, a schedule is made, materials and tools are ordered, and instructions are given to the personnel and so forth. The development phase is complete when implementation is ready to start. All matters must be clear for the parties that will carry out the implementation.

In some projects, particularly smaller ones, a formal development phase is probably not necessary. The important point is that it must be clear what must be done in the implementation phase, by whom and when.

Implementation Phase

The project takes shape during the implementation phase. This phase involves the construction of the actual project result. Programmers are occupied with encoding, designers are involved in developing graphic material, contractors are building, the actual reorganization takes place. It is during this phase that the project becomes visible to outsiders, to whom it may appear that the project has just begun. The implementation phase is the doing phase, and it is important to maintain the momentum.

In one project, it had escaped the project teams attention that one of the most important team members was expecting to become a father at any moment and would thereafter be completely unavailable for about a month. When the time came, an external specialist was brought in to take over his work, in order to keep the team from grinding to a halt. Although the team was able to proceed, the external expertise put a considerable dent in the budget.

At the end of the implementation phase, the result is evaluated according to the list of requirements that was created in the definition phase. It is also evaluated according to the designs.



Example: Tests may be conducted to determine whether the web application does indeed support Explorer 5 and Firefox 1.0 and higher. It may be determined whether the trim on the building has been made according to the agreement, or whether the materials that were used were indeed those that had been specified in the definition phase. This phase is complete when all of the requirements have been met and when the result corresponds to the design.

Follow-up Phase

Although it is extremely important, the follow-up phase is often neglected. During this phase, everything is arranged that is necessary to bring the project to a successful completion. Examples of activities in the follow-up phase include writing handbooks, providing instruction and training for users, setting up a help desk, maintaining the result, evaluating the project itself, writing the project report, holding a party to celebrate the result that has been achieved, transferring to the directors and dismantling the project team.

The central question in the follow-up phase concerns when and where the project ends. Project leaders often joke among themselves that the first ninety per cent of a project proceeds quickly and that the final ten per cent can take years. The boundaries of the project should be considered in the beginning of a project, so that the project can be closed in the follow-up phase, once it has reached these boundaries.

It is sometimes unclear for those concerned whether the project result is to be a prototype or a working product. This is particularly common in innovative projects in which the outcome is

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not certain. Customers may expect to receive a product, while the project team assumes that it is building a prototype. Such situations are particularly likely to manifest themselves in the follow-up phase. Consider the case of a software project to test a very new concept.

There was some anxiety concerning whether any results would be produced at all. The project eventually produced good results. The team delivered a piece of software that worked well, at least within the testing context. The customer, who did not know much about IT, thought that he had received a working product. After all, it had worked on his office computer. The software did indeed work, but when it was installed on the computers of fifty employees, the prototype began to have problems, and it was sometimes instable.



Notes Initiation is the first phase of the Project Management Life Cycle. In the initiate phase you define the project objectives, purpose, scope and deliverables, and get people and other resources for your project.

1.9 Project Environment

Today, there is a growing awareness and concern for the impact of infrastructure and facility construction on the physical environment. Fortunately, today's technological disciplines responsible for such work are becoming attuned to the idea of mitigating the adverse impacts of their projects. Certainly the project manager needs to be similarly concerned about the project's technology, and manage accordingly. This applies to both the implementation and shorter term practical construction impacts of the project as well as its conceptual development and consequent long term impacts. However, today's project manager also needs to be attuned to the cultural, organizational and social environments of the project. Understanding this environment includes identifying the project stakeholders and their ability to affect its successful outcome. This means working with people to achieve the best results, especially in the highly technical and complex environments such as those involving modern day construction projects. Therefore, it is essential that the project manager and his or her project team are comfortable with, and sympathetic towards, their cultural, organizational and social surroundings.

This leads to the possibility of influencing the project environment in a positive way, for the better reception of the change which the project is designed to introduce.



Example: Peoples' typical resistance to change will no doubt be evident amongst some of the stakeholders. Others may have vested interests or personal or group agendas which are only indirectly related to the project. If these can be identified in good time, they may be dealt with proactively and in such a way that the corresponding risks, which are otherwise likely to undermine the success of the project, can be significantly reduced. Failure to take such an approach will inevitably lead to a less than optimum project outcome.

Dimensions of the Project Environment

For convenience, and working outwards, the project environment may be thought of in terms of the project time environment, the internal project culture, the original corporate culture, and the external social surroundings. For those who have not had experience of a construction project "in the trenches" so to speak, it is sometimes difficult to capture the feeling of pressure, stress and ultimate satisfaction of a project well.



Did u know? Did you know that Gantt Charts have been around for over a hundred years? Bet you didn't. The discipline of project management has evolved and been refined for longer than you might suspect.

1.10 The 7s of Project Management

A recent (2008) update on the McKinsey 7S model is a short podcast on the creation of McKinsey 7S model by Lowell Bryan, a director in McKinsey's New York office, involved in creating and applying the 7-S framework. He describes how it was introduced in the late 1970s to address the critical role of coordination, rather than structure, in organizational effectiveness.

We reference the McKinsey 7S model in the E-consultancy Managing an E-commerce team report as a method of reviewing the internal capabilities of an organisation to manage digital channels. Some of the key issues that require management are shown in the table below.

Element of 7S model	Application to digital marketing team	Key issues from practice and literature
Strategy	The significance of digital marketing in influencing and supporting organisations' strategy	Gaining appropriate budgets and demonstrating / delivering value and ROI from budgets. Annual planning approach. Techniques for using digital marketing to impact organisation strategy Techniques for aligning digital strategy with organisational and marketing strategy
Structure	The modification of organizational structure to support digital marketing.	Integration of team with other management, marketing (corporate communications, brand marketing, direct marketing) and IT staff Use of cross-functional teams and steering groups Insourcing vs. outsourcing
Systems	The development of specific processes, procedures or information systems to support digital marketing	Campaign planning approach-integration Managing/sharing customer information Managing content quality Unified reporting of digital marketing effectiveness In-house vs. external best-of-breed vs. external integrated technology solutions
Staff	The breakdown of staff in terms of their background and characteristics such as IT vs. Marketing, use of contractors/consultants, age and sex.	Insourcing vs. outsourcing Achieving senior management buy-in/involvement with digital marketing Staff recruitment and retention. Virtual working Staff development and training

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Style	Includes both the way in which key managers behave in achieving the organizations' goals and the cultural style of the organization as a whole.	Relates to role of digital marketing team in influencing strategy – it is it dynamic and influential or conservative and looking for a voice
Skills	Distinctive capabilities of key staff, but can be interpreted as specific skill-sets of team members.	Staff skills in specific areas: supplier selection, project management, Content management, specific e-marketing approaches (SEO,PPC, affiliate marketing, e-mail marketing, online advertising)
Superordinate goals	The guiding concepts of the digital marketing organisation which are also part of shared values and culture. The internal and external perception of these goals may vary	Improving the perception of the importance and effectiveness of the digital marketing team amongst senior managers and staff it works with (marketing generalists and IT)

Self Assessment

Fill in the blanks:

12. The of initiation phase is to examine the feasibility of the project.
13. The takes shape during the implementation phase.
14. There is a growing awareness and concern for the impact of infrastructure and facility construction on the environment.
15. The use these designs to choose the definitive design that will be produced in the project.



Case Study

How India's Largest Airport Project was Fast-tracked?

Collaboration has not caught up in India. Fraught with lack of transparency at all levels, both public and private projects languish in needless delays. Ashok Kumar informs us how one of the biggest exceptions in Indian project management flourished with the adoption of a technology that linked 70 organisations, 45 outside India, that worked on the project.

Delhi Airport's Terminal 3 (T3) is the world's second largest airport terminal. Approximately 3 km in length, the terminal features 160 check-in counters and is able to accommodate 34 million passengers each year. Spread over 4.4 million sq ft, T3 also features Asia's second longest runway, 74 aerobridges and 30 remote parking stands for aircraft.

When Larsen & Toubro (L&T) was awarded the ₹ 5,400 crore design and build contract in December 2006, they were faced with a significant challenge. To complete the project in time for the Commonwealth Games last year, the construction timetable was compressed to a challenging 39 months. Compared to similar projects, this was highly ambitious. Singapore's Changi Airport T3 project, for example, took 76 months and delivery of London Heathrow Airport's famed T5 and Beijing's Terminal 3 took 60 months each.

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Linking a Global Project Team

L&T identified that managing the flow of information between companies and project members would be crucial. To keep the project on track, it was essential that the right people received the right information at the right time.

On any project, this is a significant challenge; however, for L&T, the task was made more complex by the size and global spread of the project team. More than 70 organisations were engaged on the project and 45 of these firms were based outside of India, in locations as far apart as London, Dubai, Singapore and Sydney.

Key stakeholders included the client, Delhi International Airport Limited (DIAL)—a joint venture consortium comprising the GMR Group, Airports Authority of India, Fraport & Eraman Malaysia and IDF—and US-based project management firm Parsons Brinckerhoff.

Existing Tools and Processes were Inadequate

For the first few months of the project, the project team used a combination of File Transfer Protocol (FTP) systems, hard copies and email to communicate. However, with thousands of documents and files being exchanged, the team experienced bottlenecks and difficulties in meeting their turnaround targets. The bulky sizes of email meant that drawings sent to external stakeholders were bouncing back and slowing down the review cycle.

A Neutral Collaboration Platform

Following an extensive review of available solutions, L&T implemented an online collaboration platform to manage information and link the project team.

After the successful delivery of project, Shankar Narayanan, Head of Project Controls at L&T, observed the following advantages of using an online collaboration platform over traditional tools:

1. Rapid implementation and deployment;
2. Instant retrieval of information; and
3. Faster flow of communication.

Narayanan felt that these factors improved efficiency, controlled risk and help delivered the project on time.

Rapid implementation and roll-out: Initially, as there was no common platform, all the document were scattered and needed to be uploaded onto the collaboration platform. From then onwards, the platform was the default tool for managing all documents and mails.

Narayanan said, “There were challenges in initial implementation, as loading all our documents onto the system was a considerable task. Further, we had to get team members using it instead of FTP and e-mail. However, people quickly got into the routine of using it.”

To make the new technology successful, L&T needed all team members, internal and external, to quickly be adept in using the system. To help get users up to speed, onsite training sessions were provided followed by unlimited support. Narayanan commented that new participants also found the system comfortable. The collaboration platform provider developed the programme and met the required security, reliability and performance standards. Few of L&T’s in-house IT resources were also required for implementation and maintenance.

Instant retrieval of information: In an in-house document management tools, company becomes a silo of information. Keeping all its data under its own roof. But in collaborative

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environment information needs to be readily disseminated between firms. So, on the T3 project, the collaboration platform provided a neutral, third-party repository for storing and exchanging information.

To quickly retrieve drawings, Requests for Information (RFIs) and other items, the collaboration platform offered 'Google-tyle' searching capabilities. Shankar Narayanan, said, "The collaboration platform was an indispensable element of the project. Every document and mail distribution was searchable and accessible from remote locations.

The keyword search capabilities were powerful so people could instantly bring up what they needed. The time saved in locating documents was very important on the project and it's something we could do extremely quickly."

Faster flow of information: Easy sharing of documents and files made the 'review or approval' process easier. The status of the document can then be tracked and overdue actions, such as outstanding RFIs, are highlighted. It helped L&T promote accountability.

"Due to our timeline we had very strict review cycles and so the distribution of documents between parties had to be fast. We had a wide team of stakeholders, often about 1,200 engineers engaged on the project, and so distributing the right files to these people was a complex task," said L&T's Narayanan.

He added, "I'd receive between 400-500 mail and document actions a day, so it was crucial to stay on top of this. With the collaboration platform, I'd receive notification of new items and could browse my tasks and actions in one place. Also the fact that contractual correspondence was well documented and could be traced was of great value to us."

Improved Efficiency and Reduced Risk

During the project, L&T found that the collaboration platform increased the efficiency by streamlining several processes. At a management level, there was also reduced exposure to information- and communication-related risks.

The collaboration system helped reduce the risk of delays, increased visibility over document versions, and provided a complete audit trail of 'who did what and when'. The system also securely captured and permanently archived all project records for future reference. Because of this, risk management was perhaps the key benefit of adopting the technology.

Summary

By using online collaboration to streamline project communication and information management, L&T:

1. Improved efficiency to support on-time and on-budget completion.
2. Reduced risk associated with project complexity, team complexity, and information management.
3. Provided immediate value by getting team members working together quickly more productively.

The author is the Regional Head for ASEAN and India with Aconex, which provided the online collaboration solution to the DIAL project.

Question

Analyse the case and discuss the case facts.

1.11 Summary

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- A project is a group of unique, interrelated activities that are planned and executed in a certain sequence to create a unique product or service.
- The successful project management is all about structure, control, sufficient attention to detail and continuously driving action.
- Plan the project – to understand how long it will take and how much it will cost?
- Project management is quite often the province and responsibility of an individual project manager.
- A project manager is often a client representative and has to determine and implement the exact needs of the client based on knowledge of the firm he/she is representing.
- The Project Management Institute (PMI) was founded in 1969.
- The payback period for a project is the initial fixed investment in the project divided by the estimated annual cash inflows from the project.
- The initiation phase is the beginning of the project.
- The project takes shape during the implementation phase.

1.12 Keywords

Comparative Benefit Model: For this situation, assume that an organization has many projects to consider, perhaps several dozen. Senior management would like to select a subset of the projects that would most benefit the firm.

Definition Phase: In this phase, the requirements that are associated with a project result are specified as clearly as possible.

Implementation Phase: This phase involves the construction of the actual project result.

Initiation Phase: The initiation phase is the beginning of the project. In this phase, the idea for the project is explored and elaborated.

Payback Period: The payback period for a project is the initial fixed investment in the project divided by the estimated annual cash inflows from the project.

Social Issues: A project can only be successful when there is no conflict between the management and the local populace.

The Competitive Necessity: Using this criterion, Republic Steel undertook a major plant rebuilding project in the late 1960s in its steel bar manufacturing facilities near Chicago.

The Operating Necessity: If a flood is threatening the plant, a project to build a protective dike does not require much formal evaluation.

The Product Line Extension: In this case, a project to develop and distribute new products would be judged on the degree to which it fits the firm's existing product line.

1.13 Review Questions

1. Define the term "Project Management".
2. Explain the responsibilities of a project manager.
3. Discuss the project management as a profession.

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4. Describe the selection of a project manager.
5. Explain, in detail, fitting projects in the parent organisation.
6. Discuss the Project Management Team.
7. Explain Project Model.
8. What are the phases of project management?
9. Discuss the project Environment.
10. Describe the 7S of project management.

Answers: Self Assessment

- | | |
|-------------------------|---------------|
| 1. Project Management | 2. Management |
| 3. Project Manager | 4. HRD |
| 5. Automotive | 6. False |
| 7. False | 8. True |
| 9. True | 10. True |
| 11. False | 12. Goal |
| 13. Project | 14. Physical |
| 15. Project Supervisors | |

1.14 Further Readings



Books

Clements/Gido, *Effective Project Management*, Thomson

Clifford F. Gray and Erik W. Larson, *Project Management*, Tata McGraw Hill

Dennis Lock, *Project Management*, Ninth Edition, Publication: Gower

K. Nagarajan, *Project Management*, Third Edition, New Age International

P.C.K. Rao, *Project Management and Control*, Sultan Chand & Sons

Prasanna Chandra, *Projects–Planning, Selection, Financing, Implementation, and Review*, Sixth Edition, Tata McGraw Hill

Vasant Desai, *Project Management*, Second Revised Edition, Himalaya Publishing House



Online links

www.col.org/SiteCollectionDocuments/SuccessProjMgt.pdf

www.freelancer.com/jobs/Project-Management/

www.mindtools.com/pages/main/newMN_PPM.htm

www.mpug.com/Pages/WhatisProjectManagement.aspx

www.nickjenkins.net/prose/projectPrimer.p

www.pma-india.org/ - Trinidad and Tobago

Unit 2: Project Analysis and Selection

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Objectives

After studying this unit, you will be able to:

- Know about project initiation and resource allocation;
- Understand market analysis and demand analysis;
- Know about the technical analysis.

Introduction

A project should earn sufficient return on the investment. The very idea of promoting a project by an entrepreneur is to earn attractive returns on investment on the project. Projects sponsored/undertaken by Government may take into account social cost benefits of the proposed project and in such cases, financial return alone needs not be the criterion. But for such Government projects, all other projects have the prime motive of getting maximum return on investment. If there are many alternative projects, all of which, *prima facie*, appear to be more or less equal in profit earning capacity, the investor should make a comparative study of the return on the different alternative proposals before choosing one.

2.1 Project Initiation & Resource Allocation

The purpose of Project Initiation is to begin to define the overall parameters of a project and establish the appropriate project management and quality environment required to complete the project.

Development of the Project Charter is a pivotal starting point for the project, establishing the project definition that will serve as the foundation for all future efforts. The completion of this

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process is marked by the Project Kick-off Meeting, in which the Project Manager presents the Project Charter.

Successful projects begin with a detailed project definition that is understood and accepted by Stakeholders. Putting everything down in writing helps ensure a commitment among Project Team members and between the team and the Stakeholders. As part of Project Initiation, an initial Project Plan is developed, which comprises the Project Charter, Cost/Scope/Schedule/Quality (CSSQ) documents, and preliminary risk identification list. These documents, once approved, ensure a consistent understanding of the project, help to set expectations, and identify resources necessary to move the project to the next level of detailed planning. Potential problems are identified so that they can be addressed early in the project.

Also during Project Initiation, a high-level Project Schedule is developed as the roadmap to more detailed Project Planning and Project Execution and Control. This high-level schedule will be refined over time, and will serve as the primary source of information regarding project status and progress. An accurate, realistic, and complete schedule, rigorously maintained, is essential to the success of a project.

Sponsorship of the project must be confirmed or gained during Project Initiation. Having a Project Sponsor, and securing approval early in the project management lifecycle, helps to ensure a commitment to the project.

2.2 Resource Allocation

Resource allocation is the distribution of resources – usually financial – among competing groups of people or programs. When we talk about allocation of funds for healthcare, we need to consider three distinct levels of decision-making.

Level 1: Allocating resources to healthcare versus other social needs.

Level 2: Allocating resources within the healthcare sector.

Level 3: Allocating resources among individual patients.

Example of Resource Allocation



Example: A community receives a gift of \$100,000 from a wealthy donor to spend on healthcare, education and housing. The funds can be distributed among the three areas or dedicated to a single area, such as healthcare.

Level 1: At this level, community members consider how to distribute the funds among one, two or three of the competing programs.



Example: Should the funding be split in three equal portions or should one program, possibly under-funded in the past, get all or most of the money?

Level 2: Assuming that healthcare gets a portion of the \$100,000, the next decision community members face is how best to direct the spending among competing healthcare interests. Should most or all of the funds go to hospital care and medical equipment? What about the public education program that promotes healthy lifestyles and behaviors (like exercise or immunizations) that prevent disease? Or, community members could decide to spend the money to purchase health insurance for those who can't afford it.

Level 3: The next level of decision making involves distributing the financial resources among individuals. Most communities have policies and guidelines to insure fairness in these situations.

Decisions at this level include: Who gets the next available heart for transplant? And, who sees the doctor first when there are many people waiting in an emergency room?

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Did u know? Development of the Project Charter is a pivotal starting point for the project, establishing the project definition that will serve as the foundation for all future efforts.

2.3 Why is Resource Allocation needed?

Because of increasing demand for healthcare services and rising costs to provide those services, Americans must choose how to allocate healthcare dollars.

Rising Cost of Healthcare

Resources spent on healthcare have increased over the last century. Americans are spending far more resources on healthcare than do citizens of any other industrialized nation. Why?

1. Continued medical advances have lead to more accurate diagnoses and better treatments, but also have increased the cost of healthcare.
2. The aging population is growing. Nearly 36 million Americans (more than the entire population of Canada) are age 65 or older and account for a majority of healthcare expenditures.
3. More people are living with chronic disease and disabilities, including AIDS.

Healthcare Rationing

Rationing refers to the conscious decision to exclude certain people from a service or treatment that they need. Rationing takes many forms. Rationing occurs when a state determines who is eligible for Medical Assistance insurance. It also occurs when deciding which patient on the waiting list gets an organ transplant. Rationing is also utilized when prices are set for health insurance and health services that some people cannot afford.

Oregon Health Plan

Oregon has implemented an innovative health plan that rations health care by developing a prioritized list of treatments. A cut off line is then set to determine which services would be covered and which would not. The plan serves to increase access to health care for more Oregon residents but cuts down on the range of services covered

This plan allows Oregon to provide health care access to a greater percentage of its residents, but it raises a number of ethical considerations. If ranking health care services is based on improving quality of life rather than medical or biological outcomes, how do we evaluate quality of life? Is it ethical to refuse to medical care based on cost-effective rankings? Does the method of ranking by quality of life discriminate against people with disabilities?



Caution Successful projects begin with a detailed project definition that is understood and accepted by Stakeholders.

2.4 Market Analysis and Demand Analysis

Forecast vs. Prediction

Forecast is an estimate of future events and trends and is arrived at by systematically combining past data and projecting it forward in a predetermine a manner. Prediction is an estimate of future events and trends in a subjective manner without taking into account the past data. The subjective considerations may not emerge from any predetermined analysis or approach.

Time Horizon of Demand Forecasting

Market and demand analysis of various types are undertaken to meet specific requirements of planning and decision-making.

For example, short-term decisions in production planning, distribution etc and selling individual products would require short-term forecast, up to one year time horizon, which must be fairly accurate for specific product items. For long-term planning, time horizon being four to five years, information required from demand analysis would be for broad product groups for facilitating choice of technology, machine tools and other hardwares and their location.

Longer-term forecasting is also undertaken to determine trends in technology development so as to choose the technology for backing up and funding its research and development.

Need for Demand Forecasting

All business planning starts with forecasting capital investment, like procurement of raw materials and production planning, has to relate to demand forecasting. High volume high technology mass production systems have further highlighted the importance of accurate demand forecasts. Even in a batch type production, any major mismatch between forecast and manufacture will lead to higher capital tied up in finished products which are slow in selling.

Uncertainties in Demand Forecasting

Demand forecasting is the estimate of future demand. As the future is always uncertain, forecasting cannot be completely fool proof and correct. However, the very process of forecasting demand in future involves evaluating various forces and factors which influence demand. This exercise is very rewarding in itself as it enables the personnel to know about various market forces, currents, cross-currents and undercurrents relevant to the demand behavior.

Levels of Demand Forecasting

Demand forecasting can be at the level of a firm or an industry or at the national or national or international level:

1. **Firm Level:** If the exercise aims at forecasting demand of firms products locally at state, region or national level, it is a micro-level of demand forecasting. Sometimes, forecasts are required for company products in specific industry or market segment.
2. **Industry Level:** Such a demand forecasting exercise focuses on an industry as a whole for the region and/or national level. These forecasts may be undertaken by a group of companies or by industry/trade associations.
3. **National Level:** Demand forecasts at national level include parameters like national income, expenditure, index of industrial and/or agricultural production etc. Estimating aggregate

demand of products at national level facilitates governmental decisions for imports, exports, pricing policy etc.

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4. **International Level:** Companies operating in multinational markets would require similar forecasting of demands for its products, trends in consumption etc at international level. Managerial Economists play a leading role in masterminding these forecasts at firm, industry, national and international levels. Time horizon of these demand forecasts usually varies from 1 to 5 years and in rare instances up to 10 years.



Did u know? Longer-term forecasting is also undertaken to determine trends in technology development so as to choose the technology for backing up and funding its research and development.

Self Assessment

Fill in the blanks:

1. is also utilized when prices are set for health insurance and health services that some people cannot afford.
2. is also undertaken to determine trends in technology development so as to choose the technology for backing up and funding its research and development.
3. Rationing occurs when a state determines who is eligible for Assistance insurance.
4. and demand analysis of various types are undertaken to meet specific requirements of planning and decision-making.
5. exercise should not be expensive in terms of efforts and costs.

2.5 Criteria for a Good Forecasting Method

A good forecasting method should have the following attributes:

1. **Accuracy in forecast:** Accuracy in forecast is measured in terms of past forecasts against current sales and by the percentage of deviation from actual demand. It is important to not only check the accuracy of past forecasts but also the validity of assumptions in practice. Forecasts being future-oriented, cannot be always accurate although accuracy is the most important criterion.
2. **Plausibility of forecasts:** Forecasts of demand must be reasonable, consistent and plausible. Assumptions made should stand scrutiny and techniques adopted must be commensurate. Explanatory note on these aspects must be available in the write-up on methods and methodology employed in forecasting.
3. **Economy of forecasts:** Forecasting exercise should not be expensive in terms of efforts and costs. Additional costs of ways and means for improving the accuracy of forecasts should not exceed the extra gain expected.
4. **Quick Results:** Method of forecasting chosen should be capable of yielding quick and useful results, If method selected takes too long a time to yield accurate forecast, it may not be conducive for taking quick and effective decisions. Always remember not to make best enemy of 'good'.
5. **Availability and Timeliness:** Methodology of forecasting should be such that it can easily be updated when changes occur in the demand relationships.

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6. **Durability:** Demand forecasts should not be changed frequently. Durability of forecast is subject to the followings:
 - (a) Simple and reasonable relationship between price and demand, advertisement and sales, level of income and volume of sales etc
 - (b) Stability of relationship between the above variables
7. **Flexibility:** Flexibility of forecast is an added advantage. It is desirable to be able to adjust 'coefficient' of variables from time to time to cope with the changing conditions.

Methods of Forecasting Demand

To facilitate proper and reliable appraisal of investment proposal, we require a reasonably accurate forecast of demand. Starting with qualitative methods like survey of collective opinions, buyers' intention, Delphi approach and its variant, a number of quantitative methods are used for compiling and computing demand forecasts as detailed below:

1. **Collective Opinion Survey:** Sales personnel are closest to the customers and have an intimate feel of the market. Thus they are most suited to assess consumers reaction to company's products. Herein each salesperson makes an estimate of the expected sales in their respective area, territory, state and/or region, These estimates are collated, reviewed and revised to take into account changes in design/features of products, changes in selling prices, projected advertising and sales promotion campaigns and anticipated changes in competitors: marketing policies covering product, people, price, promotion and place. Opinions of all managers involved at various levels of sales organisation are also included in the survey. Thus collective opinion survey forms the basic of market analysis and demand forecasting.

Although this method is simple, direct, first hand and most acceptable, it suffers from following weaknesses:

- (a) Estimates are based on personal judgment which may not be free from bias.
- (b) Adding together demand estimates of individual salespersons to obtain total demand of the country maybe risky as each person has knowledge about a small portion of market only.
- (c) Salesperson may not prepare the demand estimates with the requisite seriousness and care.
- (d) Owing to limited experience, usually in their employment, salesperson may not have the requisite knowledge and experience.

This method may be useful for long-term forecasts. It is also used for new products or new variants of existing products.

2. **Survey of Customers Intention:** Another method of demand forecasting is to carry out a survey of what consumers prefer and intend to buy. If the product is sold to a few large industrial buyers, survey would involve interviewing them. If it is a consumer durable product, a sample survey is carried out for questioning a few representative consumers about what they are planning or intending to buy. It is neither realistic nor desirable to query all consumers either through direct contact or through printed questionnaire by mail.

These surveys serve useful purpose in establishing relationships between:

- (a) Demand and price;

(b) Demand and income of consumers;

(c) Demand and expenditure on advertisement; etc

This method is preferred when bulk of the sales is to institutions and industrial buyers and only a few of them have to be contacted.

Disadvantages are that customers may not know total requirements; in some cases they are not certain about quantity to be purchased. Besides during shortages there is a tendency to inflate their requirements. Survey method is not useful for households – interviewing them is not only difficult out but also expensive. They are not able to give precise idea about their intentions particularly when alternative products are available in the market.

3. **Delphi Method of Demand Forecasting:** Delphi method is a group process and aims at achieving a consensus of the members. Herein experts in the field of marketing research and demand forecasting are engaged in analyzing economic conditions carrying out sample surveys of market conducting opinion polls.

Based on the above, demand forecast is worked out in following steps:

- (a) Coordinator sends out a set of questions in writing to all the experts co-opted on the panel who are requested to write back a brief prediction.
- (b) Written predictions of experts are collated, edited and summarized together by the coordinator.
- (c) Based on the summary, coordinator designs a new set of questions and gives them to the same experts who answer back again in writing.
- (d) Coordinator repeats the process of collating, editing and summarizing the responses.
- (e) Steps (c) and (d) are repeated by the coordinator to experts with diverse backgrounds until consensus is reached.

If there is divergence of opinions and hence conclusions, coordinator has to sort it out through mutual discussions. Coordinator has to have the necessary experience and background as he plays a key role in designing structured 'questionnaires and synthesizing the data.

Direct interaction among experts is avoided nor their identify is disclosed. Procedure also avoids inter-personnel conflicts nor strong-willed experts are able to dominate the group. This method is also used for technology forecasting.



Task Discuss about Delphi Method or Demand Forecasting.

Self Assessment

State whether the following statements are True or False:

6. Indirect interaction among experts is avoided nor their identify is disclosed.
7. Delphi method is a group process and aims at achieving a consensus of the members.
8. Coordinator repeats the process of collating, editing and summarizing the responses.
9. Forecasts of supply must be reasonable, inconsistent and plausible.
10. Sales personnel are closest to the customers and have an intimate feel of the market.

2.6 Technical Analysis

For manufacturing a product/service often two or more alternative technologies are available. For example:

1. Steel can be made either by the Bessemer process or the open hearth process.
2. Cement can be made either by the dry process or the wet process.
3. Soda can be made by the electrolysis method or the chemical method.
4. Paper, using bagasse as the raw material, can be manufactured by the Kraft process or the soda process or the Simon Cusi process.
5. Vinyl chloride can be manufactured by using one of the following reactions: acetylene on hydrochloric acid or ethylene on chlorine.
6. Soap can be manufactured by the semi-boiled process or the fully boiled process.

Choice of Technology

The choice of technology is influenced by a variety of considerations:

1. **Plant Capacity:** Often, there is a close relationship between plant capacity and production technology. To meet a given capacity requirement perhaps only a certain production technology may be viable.
2. **Principal Inputs:** The choice of technology depends on the principal inputs available for the project. In some cases, the raw materials available influence the technology chosen.



Example: The quality of milestones determines whether the wet or dry process should be used for a cement plant.

3. **Investment Outlay and Production Cost:** The effect of alternative technologies on investment outlay and production cost over a period of time should be carefully assessed.
4. **Use by Other Units:** The technology adopted must be proven by successful use by other units, preferably in India.
5. **Product Mix:** The technology chosen must be judged in terms of the total product mix generated by it, including saleable by products.
6. **Latest Developments:** The technology adopted must be based on the latest developments in order to ensure that the likelihood of technological obsolescence in the near future, at least, is minimised.
7. **Ease of Absorption:** The ease with which a particular technology can be absorbed can influence the choice of technology. Sometimes a high-level technology may be beyond the absorptive capacity of a developing country which may lack trained personnel to handle that technology.

Appropriateness of Technology

Appropriate technology refers to those methods of production which are suitable to local economic, social, and cultural conditions. In recent years, the debate about appropriate technology has been sparked off mainly by Schumacher and others. The advocates of appropriate technology urge that the technology should be evaluated in terms of the following questions:

1. Whether the technology utilises local raw materials?

2. Whether the technology utilises local man power?
3. Whether the goods and services produced cater to the basic needs?
4. Whether the technology protects ecological balance?
5. Whether the technology is harmonious with social and cultural conditions?

Notes

Technical Arrangements

Satisfactory arrangements must be made to obtain the technical know how needed for the proposed manufacturing process. When collaboration is sought, inter alia, the following aspects of the agreement must be worked out in detail:

1. The nature of support to be provided by the collaborators during the designing of the project, selection and procurement of equipment, installation and erection of the plant, operation and maintenance of the plant, and training of the project personnel.
2. Process and performance guarantees in terms of plant capacity, product quality, and consumption of raw materials and utilities.
3. The price of technology in terms of one time licensing fee and periodic royalty fee.
4. The continuing benefit of research and development work being done by the collaborator.
5. The period of the collaboration agreement.
6. The assistance to be provided and the restrictions to be imposed by the collaborator with respect to exports.
7. The level of equity participation and the manner of sharing management control, especially if the technical collaboration is backed by financial collaboration.
8. Assignment of the agreement by either side in case of change of ownership.
9. Termination of the agreement or other remedies when either party fails to meet its obligation.
10. Approach to be adopted in *force majeure* situations.



Task Discuss about technical analysis in project management.

2.7 Material Inputs and Utilities

An important aspect of technical analysis is concerned with defining the materials and utilities required, specifying their properties in some detail, and setting up their supply programme. There is an intimate relationship between the study of materials and utilities and other aspects of project formulation, particularly those concerned with location, technology, and equipments.

Material inputs and utilities may be classified into four broad categories:

Raw Materials

Raw materials (processed and/or semi-processed) may be classified into four types:

1. **Agricultural Products:** In studying agricultural products, the quality must first be examined. Then, an assessment of the quantities available, currently and potentially, is required. The

Notes

questions that may be raised in this context are: What is the present marketable surplus? What is the present area under cultivation? What is the likely increase in yield per acre?

2. **Mineral Products:** In assessing mineral raw materials, information is required on the quantum of exploitable deposits and the properties of the raw materials. The study should provide details of the location, size, and depth of the deposits and the viability of open cast or underground mining. In addition, information should be generated on the composition of the ore, level of impurities, need for beneficiation, and physical, chemical and other properties.
3. **Livestock and Forest Products:** Secondary sources of data on livestock and forest products often do not provide a dependable basis for estimation. Hence, in general, a specific survey may be required to obtain more reliable data on the quantum of livestock produce and forest products.
4. **Marine Products:** Assessing the potential availability of marine products and the cost of collection is somewhat difficult. Preliminary marine operations, essential for this purpose, have to be provided for in the feasibility study.

Processed Industrial Materials and Components

Processed industrial materials and components (base metals, semi-processed materials, manufactured parts, components, and sub-assemblies) represent important inputs for a number of industries. In studying them the following questions need to be answered:

- In the case of industrial materials, what are their properties?
- What is the total requirement of the project?
- What quantity would be available from domestic sources?
- What quantity can be procured from foreign sources?
- How dependable are the supplies?
- What has been the past trend in prices?
- What is the likely future behaviour of prices?

Auxiliary Materials and Factory Supplies

In addition to the basic raw materials and processed industrial materials and components, a manufacturing project requires various auxiliary materials and factory supplies like chemicals, additives, packaging materials, paint, varnishes, oils, grease, cleaning materials, etc. The requirements of such auxiliary materials and supplies should be taken into account in the feasibility study.

Utilities

A broad assessment of utilities (power, water, steam, fuel, etc.) may be made at the time of the input study though a detailed assessment can be made only after formulating the project with respect to location, technology, and plant capacity. Since the successful operation of a project critically depends on the adequate availability of utilities, the following questions should be raised while conducting the inputs study.

- What quantities are required?
- What are the sources of supply?

- What would be the potential availability?
- What are the likely shortages/bottlenecks?
- What measures may be taken to augment supplies?

Notes



Did u know? Government of India recognizes that there are significant shortcomings in the availability of critical infrastructure in the country at central as well as state and local level and that this is hindering rapid economic development.

2.8 Basis of Government Regulatory Framework

Government of India recognizes that there are significant shortcomings in the availability of critical infrastructure in the country at central as well as state and local level and that this is hindering rapid economic development. In addition, the development of infrastructure requires very large investment that may not be possible out of the budgetary resources of Government of India alone. In order to remove these shortcomings and to bring in private sector resource as well as techno-managerial efficiencies, the government is committed to promoting Public Private Partnerships (PPPs) in infrastructure development.

It is also recognized that infrastructure projects have a long gestation period and may not all be fully financially viable on their own. On the other hand, financial viability can often be fully financially viable on mechanism that provides government support to reduce project costs. The Government of India therefore proposes to set up a special facility to provide such support to PPP projects. This support is generically termed as 'viability gap funding' throughout this document. This facility will be housed in the Department of Economic Affairs (DEA). Suitable budgetary provisions will be made on a year basis.

Self Assessment

Fill in the blanks:

11. The chosen must be judged in terms of the total product mix generated by it, including saleable by products.
12. sources of data on livestock and forest products often do not provide a dependable basis for estimation.
13. viability can often be fully financially viable on mechanism that provides government support to reduce project costs.



Case Study

UIDAIs Aadhaar Project: Challenges Ahead

Aadhaar previously called as the Unique Identification (UID) project was the 12 digit identification number provided by the Unique Identification Authority of India (UIDAI) on behalf of the GoI. The number served as proof of address and identity for citizens anywhere in India. In June 2009, Nandan Nilekani (Nilekani), former CEO of Infosys Technologies Limited was invited by Singh to head the Aadhaar project and was roped in with the rank of a Union Cabinet Minister as the Chairperson of the UIDAI. In September 2010, the Aadhaar project was launched by Singh and UPA Chairperson, Sonia

Contd...

Notes

Gandhi (Gandhi) in Tembali village in Maharashtra. The launch signified UIDAI's core initiative of giving the poor and marginalized in India an easily verifiable and mobile identity. Having invited Nilekani, Singh had given him full autonomy during the implementation of the Aadhaar project. Nilekani was also given a free hand by Singh to recruit good talent and form his core team. Nilekani initiated the Aadhaar project by launching a pilot project in Karnataka, in October 2010. The success of the pilot project prompted the UIDAI to roll out the Aadhaar project in other states of India.

Since the initiation of the Aadhaar, Nilekani received opposition from several quarters – mainly from cabinet colleagues, bureaucrats, policy experts, activists, and a few State Governments. The Finance Ministry of India opposed that the Aadhaar would result in duplication of expenditure since the National Population Register (NPR) led by the Home Ministry was also responsible for making a comprehensive identity database. The Home Ministry questioned the security of biometrics and expressed concerns over how the confidential data would be protected. The Planning Commission said that the UIDAI structure was against government procedures. On the positive side, some policy makers felt that Singh's decision to recruit Nilekani proved to be appropriate since Nilekani had retained immense goodwill amongst the stakeholders involved. Moreover, the autonomy given to Nilekani by Singh led him to prove the viability of the project.

The divided views over the Aadhaar project raised doubts whether the project would be trashed and Nilekani would step down from the post of the Chairman of the UIDAI. The debate over duplication of data and security concerns raised by the Home Ministry came to an end after Singh intervened. In January 2012, Singh in a meeting with Planning Commission Chairman, Montek Singh Ahluwalia (Ahluwalia), Home Minister, P Chidambaram, and Nilekani concluded that the Aadhaar would be given an extended mandate of collecting biometric data of another 400 million residents in India. While the UIDAI was instructed to enroll 600 million residents across 16 states and Union Territories, the remaining 600 million residents would be recorded by the Registrar General as part of the NPR. The NPR and the UIDAI would then share the biometric data and de-duplicate the data to form a comprehensive biometric database. Nilekani's performance in successfully steering this challenging project was being keenly watched as it was one of the rare instances where the Government had entrusted a project of this magnitude to a corporate leader. Having achieved the initial breakthrough and scored early successes it was to be seen how he would overcome the new challenges and scale up the project.

Issues

1. Analyze the efforts by UPA and Singh in launching the Aadhaar project.
2. Understand the initiatives undertaken by Nilekani in launching the Aadhaar project and making it a success.
3. Understand the issues and challenges faced by Nilekani during the implementation of the Aadhaar project.
4. Understand the dilemma faced by the GI in taking the Aadhaar project forward.

Source: <http://www.icmrindia.org/casestudies/catalogue/Project%20Management/PROM013.htm>

2.9 Summary

- A project should earn sufficient return on the investment.
- Rationing refers to the conscious decision to exclude certain people from a service or treatment that they need.

- Oregon has implemented an innovative health plan that rations health care by developing a prioritized list of treatments.
- Forecast is an estimate of future events and trends and is arrived at by systematically combining past data and projecting it forward in a predetermine a manner.
- Market and demand analysis of various types are undertaken to meet specific requirements of planning and decision-making.
- Demand forecasting is the estimate of future demand.
- Demand forecasting can be at the level of a firm or an industry or at the national or national or international level.
- Accuracy in forecast is measured in terms of past forecasts against current sales and by the percentage of deviation form actual demand.
- Forecasts of demand must be reasonable, consistent and plausible.

Notes

2.10 Keywords

Healthcare Rationing: Rationing refers to the conscious decision to exclude certain people from a service or treatment that they need. Rationing takes many forms.

Mineral Products: In assessing mineral raw materials, information is required on the quantum of exploitable deposits and the properties of the raw materials.

Oregon Health Plan: Oregon has implemented an innovative health plan that rations health care by developing a prioritized list of treatments.

Project Initiation: The purpose of Project Initiation is to begin to define the overall parameters of a project and establish the appropriate project management and quality environment required to complete the project.

Resource Allocation: Resource allocation is the distribution of resources – usually financial– among competing groups of people or programs.

2.11 Review Questions

1. Describe in brief, the project initiation and resource allocation.
2. Why is resource allocation needed?
3. What do you mean by healthcare rationing?
4. Explain te market analysis and demand analysis.
5. Describe, in detail the time horizon of demand forecasting.
6. Describe the need for demand forecasting.
7. What are the levels of demand forecasting.
8. Discuss the criteria for a good forecasting method.
9. What are the methods of forecasting demand?
10. Discuss the Delphi method of demand forecasting.

Notes

Answers: Self Assessment

- | | |
|----------------|--------------------------|
| 1. Rationing | 2. Long-term Forecasting |
| 3. Medical | 4. Market |
| 5. Forecasting | 6. False |
| 7. True | 8. True |
| 9. False | 10. True |
| 11. Technology | 12. Secondary |
| 13. Financial | |

2.12 Further Readings



Books

Clements/Gido, *Effective Project Management*, Thomson

Clifford F. Gray and Erik W., Larson, *Project Management*, Tata McGraw Hill

Dennis Lock, *Project Management*, Ninth Edition, Gower

K. Nagarajan, *Project Management*, Third Edition, New Age International

P.C.K. Rao, *Project Management and Control*, Sultan Chand & Sons

Prasanna Chandra, *Projects—Planning, Selection, Financing, Implementation, and Review*, Sixth Edition, Tata McGraw Hill

Vasant Desai, *Project Management*, Second Revised Edition, Himalaya Publishing House



Online links

www.col.org/SiteCollectionDocuments/SuccessProjMgt.pdf

www.freelancer.com/jobs/Project-Management/

www.mindtools.com/pages/main/newMN_PPM.htm

www.mpug.com/Pages/WhatisProjectManagement.aspx

www.nickjenkins.net/prose/projectPrimer.p

www.pma-india.org/ - Trinidad and Tobago

Unit 3: Project Planning

Notes

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Objectives

Introduction

3.1 Time Planning

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3.4 Work Break-down Structure

3.5 Process Mapping

3.6 Strategic Planning for Projects

3.7 Summary

3.8 Keywords

3.9 Review Questions

3.10 Further Readings

Objectives

After studying this unit, you will be able to:

- Understand 'Project Planning' and to make overview of various stages of project planning;
- Explain the main versions of strategic planning;
- Know the managing the planning process.

Introduction

Project planning is important for business decisions. This is emphasized here because there is wrong notion that planning is not essential for business projects. The same set of mechanisms or same models cannot win the market simply because they are the projects of a reputed manufacturer. There is not constant threat due to change in fashion as in the case of consumer projects. But the tempo of technological development increases certain machines do become obsolete. In order to avoid this obsolescence, the manufacturer has to provide built in arrangements to modernize the machinery at a minimum cost. Market research and analysis of business trends provide a good indication of the future market changes. Therefore, successful business must rely upon the very close relationship of marketing to specified requirements and engineering design and provide features and facilities within the technological art, and the manufacturing function to produce at a specified volume and cost. The project plan should include all functional requirements throughout the project cycle, such as performance, features price, finance, distribution etc., project elimination, if all required at a later stage, should also be foreseen. All the project mix elements should be carefully considered before the project actually goes into commercial time of project.

3.1 Time Planning

Accurate time estimation is a skill essential for good project management. It is important to get time estimates right for two main reasons:

1. Time estimates drive the setting of deadlines for delivery and planning of projects, and hence will impact on other peoples assessment of your reliability and competence as a project manager.
2. Time estimates often determine the pricing of contracts and hence the profitability of the contract/project in commercial terms.

Figure 3.1: Time Planning in Project Management



Often people underestimate the amount of time needed to implement projects. This is true particularly when the project manager is not familiar with the task to be carried out. Unexpected events or unscheduled high priority work may not be taken into account. Project managers also often simply fail to allow for the full complexity or potential errors and stuff ups, involved with a project. The 2004-2006 Wembley Stadium project in London is often used as an example, although there are countless others of less profile.

Time estimates are important as inputs into other techniques used to organise and structure all projects. Using good time estimation techniques may reduce large projects to a series of smaller projects.

Step 1 – Understand the Project Outcome

First you need to fully understand what it is you need to achieve. (Refer to my article; Project Management - Begin with the end in mind). Review the project/task in detail so that there are no “unknowns.” Some difficult-to-understand, tricky problems that take the greatest amount of time to solve. The best way to review the job is to just list all component tasks in full detail.

Step 2 – Estimate Time

When you have a detailed list of all the tasks that you must achieve to complete the project then you can begin to estimate how long each will take.

Make sure that you also allow time for project management administration, detailed project, liaison with outside bodies resources and authorities, meetings, quality assurance developing supporting documentation or procedures necessary, and training.

Also make sure that you have allowed time for:

1. Other high urgency tasks to be carried out which will have priority over this one.
2. Accidents and emergencies.

3. Internal/external meetings.
4. Holidays and sickness in key staff/stakeholders.
5. Contact with other customers, suppliers and contractors.
6. Break-downs in equipment.
7. Missed deliveries by suppliers.
8. Interruptions by customers, suppliers, contractors, family, pets, co-workers, etc.
9. Others priorities and schedules e.g. local government planning processes.
10. Quality control rejections etc.
11. Unanticipated events (e.g. renovating the bathroom finding white-ants/termites in the walls).

Notes

These factors may significantly lengthen the time and cost needed to complete a project.

If the accuracy of time estimates is critical, you will find it effective to develop a systematic approach to including these factors. If possible, base this on past experience. In the absence of your own past experience, ask someone who has already done the task or project to advise what can go wrong? what you need to plan for? and how long each task took previously.

You can lose a great deal of credibility, and money, by underestimating the length of time needed to implement a project. If you underestimate time, not only do you miss deadlines, you can also put other people under unnecessary stress.

Step 3 – Plan for it going Wrong

Finally, allow time for all the expected and unexpected disruptions and delays to work that will inevitably happen. Sickness, strikes, materials not available, poor quality work, bureaucratic bungling etc.



Notes A project is a temporary endeavor undertaken to produce a unique product, service, or result.

Self Assessment

Fill in the blanks:

1. planning is important for business decisions.
2. Market research and analysis of business trends provide a good indication of the market changes.
3. All the project mix elements should be carefully considered before the project actually goes into time of project.
4. estimates are important as inputs into other techniques used to organise and structure all projects.
5. Time estimates often determine the pricing of contracts and hence the profitability of the

3.2 Contents of Project Plan

- 1. Introduction**
 - 1.1 Scope
 - 1.2 Objectives
 - 1.3 References
 - 1.4 Definitions & acronyms
 - 1.5 Responsibilities
- 2. Standard description**
 - 2.1 Introduction (section 1)
 - 2.1.1 *Project objectives (section 1.1)*
 - 2.1.2 *Project deliverables (section 1.2)*
 - 2.1.3 *Evolution of the project (section 1.3)*
 - 2.1.4 *Reference materials (section 1.4)*
 - 2.1.5 *Definitions & acronyms (section 1.5)*
 - 2.2. Project organisation (section 2)
 - 2.2.1 *Life cycle model (section 2.1)*
 - 2.2.2 *Project organisational structure (section 2.2)*
 - 2.2.3 *Project organisational boundaries & interfaces (section 2.3)*
 - 2.2.4 *Project responsibilities (section 2.4)*
 - 2.3. Managerial process (section 3)
 - 2.3.1 *Management objectives & priorities (section 3.1)*
 - 2.3.2 *Assumptions, dependencies & constraints (section 3.2)*
 - 2.3.3 *Risk management (section 3.3)*
 - 2.3.3.1 Risk management plan (section 3.3.1)
 - 2.3.3.2 Result of analysis (section 3.3.2)
 - 2.3.4 *Monitoring & controlling mechanisms (section 3.4)*
 - 2.3.5 *Staffing plan (section 3.5)*
 - 2.4. Technical process (section 4)
 - 2.4.1 *Methods, tools & techniques (section 4.1)*
 - 2.4.1.1 Methodology (section 4.1.1)
 - 2.4.1.2 Techniques (section 4.1.2)
 - 2.4.1.3 Tools (section 4.1.3)
 - 2.4.2 *Software documentation plan (section 4.2)*
 - 2.4.3 *Project support functions (section 4.3)*
 - 2.4.3.1 Quality (section 4.3.1)
 - 2.4.3.2 Testing [verification & validation in IEEE] (section 4.3.2)
 - 2.4.3.3 Configuration management (section 4.3.3)
 - 2.4.3.4 Administration/other (section 4.3.4)

2.5. Work packages, schedule & budget (section 5)

Notes

2.5.1 Work packages (section 5.1)

2.5.2 Dependencies (section 5.2)

2.5.3 Resource requirements (section 5.3)

2.5.4 Budget & resource allocation (section 5.4)

2.5.5 Schedule (section 5.5)

2.6 Project training plan (section 6)

2.7 Index [Optional] (section 7)

2.8 Additional components

3.3 Planning Process

The following are crucial considerations for project planning:

1. **Demand:** No businessman can expect demand forecasting for products unless he is having strategic planning for the organizational development. Second world war created more demand for some products. Hence, long-range planning is necessary to meet the demand.
2. **Competition:** Business entities should always fight for survival. When there are new entrants in the market there will be more competition. Hence, project planning is necessary to face competition and to become successful project manager.
3. **Technology:** Changes in technology also necessitates project planning. Technological advancements are useful for the development of project manager. More opportunities will be available to manager.
4. **Scarcity:** Scarcity of the resources always forms as the basis for project management. When products are scarce and there will be increase in demand for the products.



Task Discuss about managing the planning process in Project Management.

Managing the Planning Process

First Stage: Definitions

1. **Preparation of Mission:** 'Mission' is the purpose for which organization is established. Mission includes both a statement of organizational philosophy and purpose. An organizational philosophy establishes the values, beliefs, and guidelines for the manner in which the organization is going to conduct its business. The first step of strategy formulation depends on well defined mission statement or purpose of the project. The mission may be described as the scope of the operation in terms of nature of project.
2. **Setting of Objectives:** Objectives are defined as ends which the project seeks to achieve by its existence and operation. Objectives may be internal or external objectives. Internal objectives are those which define how much is expected to be achieved with the resources that the organization commands.
3. **Fixation of Goals:** Goals are specific, and time-based points of measurement. Generally, goals are determined by the owner or entrepreneur of the organization. In case of large

Notes

scale projects, CEO (Chief Executive Officer) or COO (Chief Operating Officer) will determine the goals for its project.

4. **Policies:** A policy is a definition of common purposes or organization components. The process of strategic planning sometimes encompasses the formulation of important policies. Policies help to insure that all units of an organization operate under the same ground rules. They also facilitate coordination and communication between various organizational units. Policies of competitors also influence an organization's policies.
5. **Analysis of Environment:** Project environment always influencing factor for decision-making. There may external or internal factors that influence business. Buyers, Suppliers, government and competitors are likely to react in accordance with changes in environment. Thus business also should act in the same passion.

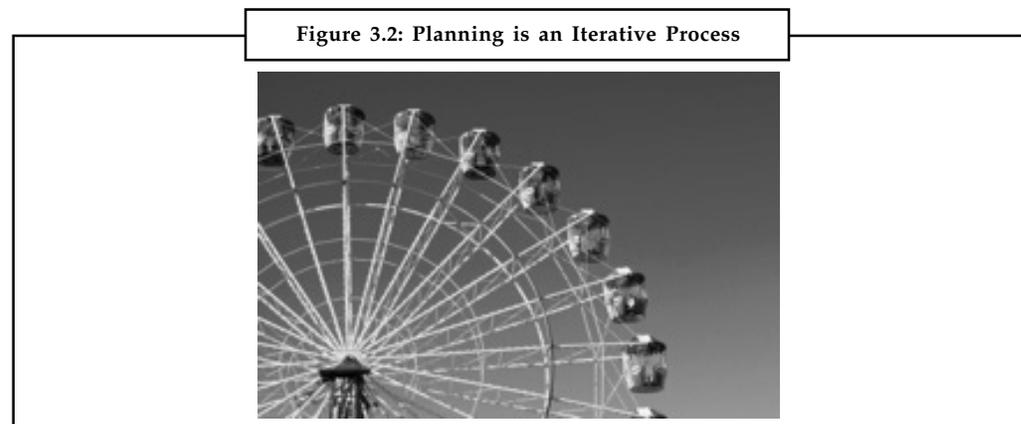
Second Stage: Formulation

1. **Formulation of Strategies:** Strategies can be formulated after clear diagnosing the environment. Each strategy with suitable sub-strategies and alternative strategies should be available to top management. Thus, top management always mentor the administration with strategies which can be adopted for time-to-time.
2. **Implementation of Strategies:** This is important stage in project management process. Well-designed strategies may be failed in implementation. Hence, adoptability of strategies and implementation process should be clearly mentioned while formulating project. It is the manager's responsibility to take care of implementing strategies in accordance with the requirements of organization.

Third Stage: Evaluation

1. **SWOT analysis:** Strengths, Weaknesses, Opportunities and Threats simply termed as SWOT. Every project should go through SWOT analysis. It is an important tool of evaluating capabilities of the project.
2. **Evaluation:** This can be stated as last stage of project management process. The manager should evaluate each project's strategy after implementing them. The strategy should evaluate whether there is profit maximization or cost minimization or achievement of long-term or short-term goal what ever it may be.

A Planning Process for Middle-sized Projects



Source: iStockphoto/djgunner

The Planning Cycle brings together all aspects of planning into a coherent, unified process.

Notes

By planning within this structure, you will help to ensure that your plans are fully considered, well focused, resilient, practical and cost-effective. You will also ensure that you learn from any mistakes you make, and feed this back into future planning and Decision-making.

Planning using this cycle will help you to plan and manage ongoing projects up to a certain level of complexity – this will depend on the circumstance. For projects involving many people over a long period of time, more formal methodologies and approaches are necessary.

How to use the Tool?

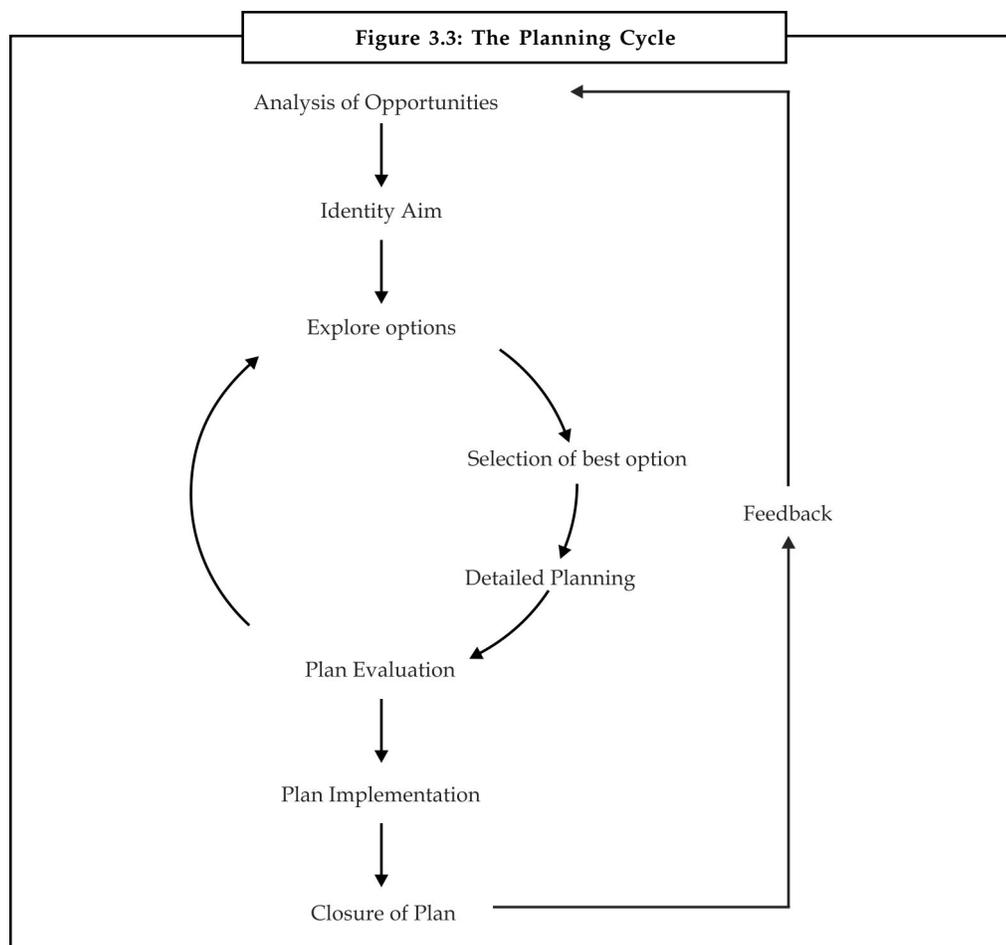
It is best to think of planning as a cycle, not a straight-through process.

Once you have devised a plan you should evaluate whether it is likely to succeed. This evaluation may be cost or number based, or may use other analytical tools. This analysis may show that your plan may cause unwanted consequences, may cost too much, or may simply not work.

In this case you should cycle back to an earlier stage. Alternatively you may have to abandon the plan altogether – the outcome of the planning process may be that it is best to do nothing!

Finally, you should feed back what you have learned with one plan into the next.

The Planning Cycle is shown in figure 3.3.



Notes

The stages in this planning process are explained below:

Stage 1 – Analysis of Opportunities

The first thing to do is to spot what needs to be done. You will crystallize this into a formal aim at the next stage in the process.

One approach to this is to examine your current position, and decide how you can improve it. There are a number of techniques that will help you to do this:

1. ***SWOT Analysis:*** This is a formal analysis of your strengths and weaknesses, and of the opportunities and threats that you face.
2. ***Risk Analysis:*** This helps you to spot project risks, weaknesses in your organization or operation, and identify the risks to which you are exposed. From this you can plan to neutralize some risks.
3. ***Understanding Pressures for Change:*** Alternatively, other people (e.g. clients) may be pressing you to change the way you do things. Alternatively your environment may be changing, and you may need to anticipate or respond to this. Pressures may arise from changes in the economy, new legislation, competition, changes in people's attitudes, new technologies, or changes in government.

A different approach is to use any of a whole range of creativity tools to work out where you can make improvements. These creativity tools culminate in the powerful Simplex process.

Stage 2 – Identifying the aim of your Plan

Once you have completed a realistic analysis of the opportunities for change, the next step is to decide precisely what the aim of your plan is. Deciding and defining an aim sharpens the focus of your plan, and helps you to avoid wasting effort on irrelevant side issues.

The aim is best expressed in a simple single sentence. This ensures that it is clear and sharp in your mind.

If you are having difficulty in formulating the aim of your plan, ask yourself:

1. What do I want the future to be?
2. What benefit do I want to give to my customers?
3. What returns do I seek?
4. What standards am I aiming at?
5. What values do I and my organization believe in?

You can present this aim as a 'Vision Statement' or 'Mission Statement'. Vision Statements express the benefit that an organization will provide to its customers.



Example: The vision statement for Mind Tools is: 'To enrich the quality of our customers lives by providing the tools to help them to think in the most productive and effective way possible'. While this is wordy, it explains what this site aims to do.

Mission statements give concrete expression to the Vision statement, explaining how it is to be achieved. The mission statement for this site is: 'To provide a well structured, accessible, concise survey of the best and most appropriate mind tools available'.

Stage 3 – Exploring Options

Notes

By this stage you should know where you are and what you want to do. The next thing to do is to work out how to do it. The Creativity Tools section of this site explains a wide range of powerful creativity tools that will help you to generate options.

At this stage it is best to spend a little time generating as many options as possible, even though it is tempting just to grasp the first idea that comes to mind. By taking a little time to generate as many ideas as possible you may come up with less obvious but better solutions. Just as likely, you may improve your best ideas with parts of other ideas.

Stage 4 – Selecting the Best Option

Once you have explored the options available to you, it is time to decide which one to use. If you have the time and resources available, then you might decide to evaluate all options, carrying out detailed planning, costing, risk assessment, etc. for each. Normally you will not have this luxury.

Two useful tools for selecting the best option are Grid Analysis and Decision Trees. Grid Analysis helps you to decide between different options where you need to consider a number of different factors. Decision Trees help you to think through the likely outcomes of following different courses of action.

Stage 5 – Detailed Planning

By the time you start detailed planning, you should have a good picture of where you are, what you want to achieve and the range of options available to you. You may well have selected one of the options as the most likely to yield the best results.

Detailed planning is the process of working out the most efficient and effective way of achieving the aim that you have defined. It is the process of determining who will do what, when, where, how and why, and at what cost.

When drawing up the plan, techniques such as use of Gantt Charts and Critical Path Analysis can be immensely helpful in working out priorities, deadlines and the allocation of resources.

While you are concentrating on the actions that need to be performed, ensure that you also think about the control mechanisms that you will need to monitor performance. These will include the activities such as reporting, quality assurance, cost control, etc. that are needed to spot and correct any deviations from the plan.

A good plan will:

1. State the current situation.
2. Have a clear aim.
3. Use the resources available.
4. Detail the tasks to be carried out, whose responsibility they are, and their priorities and deadlines.
5. Detail control mechanisms that will alert you to difficulties in achieving the plan.
6. Identify risks, and plan for contingencies. This allows you to make a rapid and effective response to crises, perhaps at a time when you are at low ebb or are confused following a setback.
7. Consider transitional arrangements – how will you keep things going while you implement the plan?

Notes

Stage 6 – Evaluation of the Plan and its Impact

Once you have worked out the details of your plan, the next stage is to review it to decide whether it is worth implementing. Here you must be objective – however much work you have carried out to reach this stage, the plan may still not be worth implementing.

This is frustrating after the hard work of detailed planning. It is, however, much better to find this out now than when you have invested time, resources and personal standing in the success of the plan. Evaluating the plan now gives you the opportunity to either investigate other options that might be more successful, or to accept that no plan is needed or should be carried out.

Depending on the circumstances, the following techniques can be helpful in evaluating a plan:

1. **PMI (Plus/Minus/Interesting):** This is a good, simple technique for ‘weighing the pros and cons’ of a decision. It involves listing the plus points in the plan in one column, the minus points in a second column, and the implications and points of uncertainty of the plan in a third column. Each point can be allocated a positive or negative score.
2. **Cost/Benefit Analysis:** This is useful for confirming that the plan makes financial sense. This involves adding up all the costs involved with the plan, and comparing them with the expected benefits.
3. **Force Field Analysis:** Similar to PMI, Force Field Analysis helps you to get a good overall view of all the forces for and against your plan. This allows you to see where you can make adjustments that will make the plan more likely to succeed.
4. **Cash Flow Forecasts:** Where a decision is has mainly financial implications, such as in business and marketing planning, preparation of a Cash Flow Forecast can be extremely useful. It allows you to assess the effect of time on costs and revenue. It also helps in assessing the size of the greatest negative and positive cash flows associated with a plan. When it is set up on a spreadsheet package, a good Cash Flow Forecast also functions as an extremely effective model of the plan. It gives you an easy basis for investigating the effect of varying your assumptions.
5. **“6 Thinking Hats”:** 6 Thinking Hats is a very good technique to use to get a rounded view of your plan and its implications. It provides a context within which you can examine a plan rationally, emotionally, optimistically, pessimistically and creatively.

Any analysis of your plan must be tempered by common sense.

If your analysis shows that the plan either will not give sufficient benefit, then either return to an earlier stage in the planning cycle or abandon the process altogether.

Stage 7 – Implementing Change

Once you have completed your plan and decided that it will work satisfactorily, it is time to implement it. Your plan will explain how! It should also detail the controls that you will use to monitor the execution of the plan.

Stage 8 – Closing the Plan

Once you have achieved a plan, you can close the project. At this point is often worth carrying out an evaluation of the project to see whether there are any lessons that you can learn. This should include an evaluation of your project planning to see if this could be improved.

If you are going to be carrying out many similar projects, it may be worth developing and improving an Aide Memoire. This is a list of headings and points to consider during planning. Using it helps you to ensure that you do not forget lessons learned in the past.



Did u know? Having the entire team participate in planning is one way to start the team-building process.

Self Assessment

State whether the following statements are True or False:

6. Every businessman can expect demand forecasting for products unless he is having strategic planning for the organizational development.
7. Business entities should always fight for survival.
8. Biological advancements are useful for the development of project manager.
9. Scarcity of the resources always forms as the basis for project management.
10. SWOT Analysis is a formal analysis of your strengths and weaknesses, and of the opportunities and threats that you face.
11. GMI is a good, simple technique for 'weighing the pros and cons' of a decision.

3.4 Work Break-down Structure

Once you have a clear understanding of the project, and have eliminated the vagaries of the numpties, you then describe it as a set of simpler separate *activities*. If any of these are still too complex for you to easily organise, you break them down also into another level of simpler descriptions, and so on until you can manage everything. Thus your one complex project is organised as a set of simple tasks which together achieve the desired result.

The reasoning behind this is that the human brain (even yours) can only take in and process so much information at one time. To get a real grasp of the project, you have to think about it in pieces rather than trying to process the complexity of its entire details all at once. Thus each level of the project can be understood as the amalgamation of a few simply described smaller units.

In planning any project, you follow the same simple steps: if an item is too complicated to manage, it becomes a list of simpler items. People call this producing a *work break-down structure* to make it sound more formal and impressive. Without following this formal approach you are unlikely to remember all the niggling little details; with this procedure, the details are simply displayed on the final lists.

One common fault is to produce too much detail at the initial planning stage. You should be stop when you have a sufficient description of the activity to provide a clear instruction for the person who will actually do the work, and to have a reasonable estimate for the total time/effort involved. You need the former to allocate (or delegate) the task; you need the latter to finish the planning.



Caution One common fault is to produce too much detail at the initial planning stage. You should be stop when you have a sufficient description of the activity to provide a clear instruction for the person.

3.5 Process Mapping

Hopefully, every project manager has been involved at one time or another with helping their customers map their business processes. Business process maps make work flow visible,

Notes

understandable, and measurable. An important consideration when mapping your business processes is to view them through the eyes of your customers.

Four steps you can take to begin process mapping are:

1. ***Identify your Organization's/Project's Business Processes:***
 - (a) What are the processes in your organization that your project will impact?
 - (b) What new processes will be created once your project is implemented?
 - (c) What are your customers understanding of your processes?
 - (d) What are the key trigger points of your processes?
2. ***Gather required information:***
 - (a) Who are the process owners?
 - (b) What are the processes you've identified trying to accomplish?
 - (c) What is the level of quality required risk?
 - (d) What are the control points?
3. ***Documenting the Processes:***
 - (a) What are all the steps of the processes?
 - (b) What are the objectives of the processes?
 - (c) What are the inputs and outputs?
 - (d) What tools or techniques are applied in each process step?
 - (e) Where does the process begin and end?
 - (f) Who owns the process?
 - (g) Who monitors the process?
 - (h) How we will know it is working?
4. ***Analysis (post mapping):***
 - (a) Is the process efficient?
 - (b) Does it make sense?
 - (c) What steps are unnecessary?
 - (d) Is the process in line with departmental or enterprise objectives?
 - (e) Are there too many approvals or too much rework?
 - (f) Are there too many delays or bottlenecks?
 - (g) Is the process efficient? How do you know?
 - (h) What measures will be put in place to ensure the process is as efficient as possible?

There are many opportunities for problems to occur when mapping processes, but getting started will help your organization to become more effective. Once you become good at mapping your business processes everyone in your organization will begin to understand their role in the organization, what the organization it trying to accomplish, and feel like they are part of the effort to help drive improvements and efficiencies.

Business process mapping is a procedure whereby the steps in a business process are clarified and documented in both written form and visually in a flow chart. Information about the

process is gathered and compiled and the steps in the process are laid out from left to right and top to bottom, with specific shapes used to denote specific process components.

Notes

3.6 Strategic Planning for Projects

Strategic planning may be defined as a systematic approach to formulate strategies for positioning the business in relation to its environment to ensure continued success and offer security from surprises. While no approach can guarantee continuous success and total security, an integrated approach to strategy formulation, involving all levels of management, can go some way in this direction. In simple words strategy can be defined as 'Strategy is Ideas and actions to conceive and secure the Future'. Strategic planning is that set of managerial decisions and actions that determines the long-run performance of a corporation. It includes environmental observation, strategic planning, formulation, implementation, evaluation and control. Strategic mission consists of a long-term vision of what an organization seeks to do and what kind of organization it intends to become. Development of organization completely rests on the efficiency of the decision-makers. They have to decision based on present policies for achievement of future goals. Strategic planning always concentrates on the anticipated aim.

Future is always uncertain. Hence, strategic decisions are always incomplete and sometimes they have been based on false information. It may lead to further problems. Further organizations have to work with brevity and variety. Thoughts should become actions. Actions will lead to results. Result oriented action is the need of hour. Strategic manager should always aim at achieving predetermined goal of the organization.

Self Assessment

Fill in the blanks:

12. may be defined as a systematic approach to formulate strategies for positioning the business.
13. Strategic planning is that set of decisions and actions that determines the long-run performance of a corporation.
14. process maps make work flow visible, understandable, and measurable.
15. oriented action is the need of hour.



Case Study

The Delhi Metro Project: Effective Project Management in the Indian Public Sector

With a 6.5 km section of Line 3 becoming operational in April 2006, Phase I of the Delhi Metro project was nearing completion. Of the total length of 65.16 km of the first phase, 62 km had been completed and opened for service. This phase was set to cost ₹ 98 billion. As of early 2006, around 450,000 passengers were traveling by the Delhi Metro every day.

The Delhi Metro was meant to solve Delhi's traffic problems, which had become almost unmanageable. The first steps to build a metro system in the city were taken in the early 1990s. In 1995, the Government of India (GoI) and the Government of the National Capital

Contd...

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Territory of Delhi (GNCTD) formed the Delhi Metro Rail Corporation Ltd. (DMRC) under the Companies Act to construct the Delhi Metro.

The Delhi Metro project gave Delhi a world-class mass rapid transit system. More importantly, it stood out from most other public sector projects in India in that it was completed on schedule and within the budgeted cost.

The case describes the organization and planning of the project and highlights the steps taken by the DMRC to ensure the successful completion of the project. It also explains how the DMRC managed the various stakeholders like the Central and State Governments, the contractors, and the citizens of Delhi, to ensure that the project was implemented smoothly. The case ends with a brief discussion on the future plans of the DMRC.

Issues

1. Understand the preliminary activities to be taken up before a large infrastructure project can be started.
2. Appreciate the significance of the role of a project manager in project execution.
3. Understand the importance of the right work culture in successful project management.
4. Recognize the importance of managing the various stakeholders in a project.
5. Appreciate the difficulties involved in the execution of large infrastructure projects in developing countries, and how these can be overcome.

Conceived as a social sector project, a significant portion of the project cost was funded through a soft loan provided by the Japanese government through Japan Bank International Corporation (JBIC). The rest was contributed by GoI and GNCTD through equity.

E. Sreedharan (Sreedharan) was appointed managing director (MD) of the DMRC and project manager for Phase I of the project in November 1997. Work on Line 1 of Phase I started in October 1998. DMRC formed consortiums to advise it on the project and to provide it with the latest technology. It also saw to it that the foreign companies worked with the Indian companies to ensure that the latter assimilated their expertise and technological know-how.

The DMRC faced any number of technical and systemic challenges during the construction of the metro.

Question

Analyse the case and discuss the case facts.

Source: <http://www.icmrindia.org/casestudies/catalogue/Project%20Management/PROM001.htm>

3.7 Summary

- In this unit we have discussed about the project planning process.
- The success of a project depends on the successful implementation of the project.
- The project plan should include all functional requirements throughout the project cycle, such as performance, features price, finance, distribution etc., project elimination, if all required at a later stage, should also be foreseen.
- All the project mix elements should be carefully considered before the project actually goes into commercial time of project.

- The planning cycle brings together all aspects of planning into a coherent, unified process.
- Mission statements give concrete expression to the vision statement, explaining how it is to be achieved.
- Detailed planning is the process of working out the most efficient and effective way of achieving the aim that you have defined.
- Goals are specific, and time-based points of measurement.
- Project environment always influencing factor for decision-making.
- Strategies can be formulated after clear diagnosing the environment.

Notes

3.8 Keywords

Competition: Business entities should always fight for survival. When there are new entrants in the market there will be more competition. Hence, project planning is necessary to face competition and to become successful project manager.

Evaluation: This can be stated as last stage of project management process.

Optimistic Time: It is the minimum possible time required to accomplish a task, assuming everything proceeds better than is normally expected.

Scarcity: Scarcity of the resources always forms as the basis for project management. When products are scarce and there will be increase in demand for the products.

SWOT Analysis: Strengths, Weaknesses, Opportunities and Threats simply termed as SWOT.

Technology: Changes in technology also necessitates project planning. Technological advancements are useful for the development of project manager. More opportunities will be available to manager.

3.9 Review Questions

1. What is meant by project planning process? Explain different stages of it.
2. What are the different dimensions of project planning process?
3. Describe, in brief, the importance of time planning in project planning process.
4. Explain, in brief, the project planning process.
5. Describe the ways of managing the planning process.
6. Discuss the planning process for middle sized projects.
7. Describe the strategic planning for projects.
8. Briefly explain the process mapping.

Answers: Self Assessment

- | | |
|---------------|-----------|
| 1. Project | 2. Future |
| 3. Commercial | 4. Time |
| 5. Contract | 6. False |
| 7. True | 8. False |

Notes

- | | |
|----------------|------------------------|
| 9. True | 10. True |
| 11. False | 12. Strategic Planning |
| 13. Managerial | 14. Business |
| 15. Result | |

3.10 Further Readings



Books

- Clements/Gido, *Effective Project Management*, Thomson
Clifford F. Gray and Erik W. Larson, *Project Management*, Tata McGraw Hill
Dennis Lock, *Project Management*, Ninth Edition, Gower
K. Nagarajan, *Project Management*, Third Edition, New Age International
P.C.K. Rao, *Project Management and Control*, Sultan Chand & Sons
Prasanna Chandra, *Projects Planning, Selection, Financing, Implementation, and Review*, Sixth Edition, Tata McGraw Hill
Vasant Desai, *Project Management*, Second Revised Edition, Himalaya Publishing House



Online links

- www.col.org/SiteCollectionDocuments/SuccessProjMgt.pdf
www.freelancer.com/jobs/Project-Management/
www.mindtools.com/pages/main/newMN_PPM.htm
www.mpug.com/Pages/WhatisProjectManagement.aspx
www.nickjenkins.net/prose/projectPrimer
www.pma-india.org/ - Trinidad and Tobago

Unit 4: Project Budgeting

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Objectives

After studying this unit, you will be able to:

- Know about financial projections;
- Understand Time value of money;
- Know about cost of capital;
- Understand about risk analysis in capital investment decisions.

Introduction

A budget is an important concept in microeconomics, which uses a budget line to illustrate the trade-offs between two or more goods. In other terms, a budget is an organizational plan stated in monetary terms.

In summary, the purpose of budgeting is to:

1. Provide a forecast of revenues and expenditures, that is, construct a model of how our business might perform financially if certain strategies, events and plans are carried out.
2. Enable the actual financial operation of the business to be measured against the forecast.
3. Establish the cost constraint for a project, program, or operation.

4.1 Financial Projections

Cost of Project

Conceptually, the cost of project represents the total of all items of outlay associated with a project which are supported by long-term funds. It is the sum of the outlays on the following:

1. Land and site development
2. Buildings and civil works
3. Plant and machinery
4. Technical know how and engineering fees
5. Expenses on foreign technicians and training of Indian technicians abroad
6. Miscellaneous fixed assets
7. Preliminary and capital issue expenses
8. Pre operative expenses
9. Margin money for working capital
10. Initial cash losses

Land and Site Development

The cost of land and site development is the sum of the following:

1. Basic cost of land including conveyance and other allied charges,
2. Premium payable on leasehold and conveyance charges,
3. Cost of levelling and development,
4. Cost of laying approach roads and internal roads,
5. Cost of gates, and
6. Cost of tube wells.

The cost of land varies considerably from one location to another. While it is very high in urban and even semi-urban locations, it is relatively low in rural locations. The expenditure on site development, too, varies widely depending on the location and topography of the land.

Buildings and Civil Works

Buildings and civil works cover the following:

1. Buildings for the main plant and equipment;
2. Buildings for auxiliary services like steam supply, workshops, laboratory, water supply, etc.;
3. Godowns, warehouses, and open yard facilities;
4. Non-factory buildings like canteen, guest houses, time office, excise house, etc.;
5. Quarters for essential staff;

6. Silos, tanks, wells, chests, basins, cisterns, hoopers, bins, and other structures necessary for installation of the plant and equipment;
7. Garages Sewers, drainage, etc.; and
8. Other civil engineering works.

Notes

The cost of the buildings and civil works depends on the kinds of structures required which, in turn, are dictated largely by the requirements of the manufacturing process. Once the kinds of structures required are specified, cost estimates are based on the plinth area and the rates for various types of structures. These rates, of course, vary with the location to some extent.



Notes The cost of land varies considerably from one location to another. While it is very high in urban and even semi-urban locations, it is relatively low in rural locations.

Plant and Machinery

The cost of the plant and machinery, typically the most significant component of the project cost, consists of the following:

Cost of imported machinery:

This is the sum of (i) FOB (free on board) value, (ii) shipping, freight, and insurance cost, (iii) import duty, and (iv) clearing, loading, unloading and transportation charges.

Cost of indigenous machinery:

This consists of (i) FOR (free on rail) cost, (ii) sales tax, octroi, and other taxes, if any, and (iii) railway freight and transport charges to the site.

Cost of stores and spares.

Foundation and Installation Charges

The cost of the plant and machinery is based on the latest available quotation adjusted for possible escalation. Generally, the provision for escalation is equal to the following product: (latest rate of annual inflation applicable to the plant and machinery) × (length of the delivery period).

Technical Know-how and Engineering Fees

Often it is necessary to engage technical consultants or collaborators from India and/ or abroad for advice and help in various technical matters like preparation of the project report, choice of technology, selection of the plant and machinery, detailed engineering, and so on. While the amount payable for obtaining the technical know-how and engineering services for setting up the project is a component of the project cost, the royalty payable annually, which is typically a percentage of sales, is an operating expense taken into account in the preparation of the projected profitability statements.

Expenses on Foreign Technicians and Training of Indian Technicians Abroad

Services of foreign technicians may be required in India for setting up the project and supervising the trial runs. Expenses on their travel, boarding, and lodging along with their salaries and

Notes allowances must be shown here. Likewise, expenses on Indian technicians who require training abroad must also be included here.

Miscellaneous Fixed Assets

Fixed assets and machinery which are not part of the direct manufacturing process may be referred to as miscellaneous fixed assets. They include items like furniture, office machinery and equipment, tools, vehicles, railway siding, diesel generating sets, transformers, boilers, piping systems, laboratory equipment, workshop equipment, effluent treatment plants, firefighting equipment, and so on. Expenses incurred for the procurement or use of patents, licences, trade marks, copyrights, etc. and deposits made with the electricity board may also be included here.

Preliminary and Capital Issue Expenses

Expenses incurred for identifying the project, conducting the market survey, preparing the feasibility report, drafting the memorandum and articles of association, and incorporating the company are, referred to as preliminary expenses.

Expenses borne in connection with the raising of capital from the public are referred to as capital issue expenses. The major components of capital issue expenses are: underwriting commission, brokerage, fees to managers and registrars, printing and postage expenses, advertising and publicity expenses, listing fees, and stamp duty.

Pre-operative Expenses

Expenses of the following types incurred till the commencement of commercial production are referred to as pre-operative expenses: (i) establishment expenses, (ii) rent, rates, and taxes, (iii) travelling expenses, (iv) interest and commitment charges on-borrowings, (v) insurance charges, (vi) mortgage expenses, (vii) interest on deferred payments, (viii) start-up expenses, and (ix) miscellaneous expenses.

Pre-operative expenses are directly related to the project implementation schedule. So, delays in project implementation, which are fairly common, tend to push up these expenses. Appreciative of this, financial institutions allow for some delay (20 to 25 per cent) in the project implementation schedule and accordingly permit a cushion in the estimate for pre operative expenses.

Pre operative expenses incurred up to the point of time the plant and machinery are set up may be capitalized by apportioning them to fixed assets on some acceptable basis. Pre-operative expenses incurred from the point of time the plant and machinery are set up are treated as revenue expenditure. The firm may, however, treat them as deferred revenue expenditure and write them off over a period of time.

Provision for Contingencies

A provision for contingencies is made to provide for certain unforeseen expenses and price increases over and above the normal inflation rate which is already incorporated in the cost estimates.

To estimate the provision for contingencies the following procedure may be followed: (i) Divide the project cost items into two categories, viz., 'firm' cost items and 'non-firm' cost items (firm cost items are those which have already been acquired or for which definite arrangements have been made). (ii) Set the provision for contingencies at 5 to 10 per cent of the estimated cost of non-firm cost items. Alternatively, make a provision of 10 per cent for all items (including the margin money for working capital) if the implementation period is one year or less. For every additional one year, make an additional provision of 5 per cent.

Margin Money for Working Capital

Notes

The principal support for working capital is provided by commercial banks and trade creditors. However, a certain part of the working capital requirement has to come from long-term sources of finance. Referred to as the 'margin money for working capital', this is an important element of the project cost.

The margin money for working capital is sometimes utilised for meeting over runs in capital cost. This leads to a working capital problem (and sometimes a crisis) when the project is commissioned. To mitigate this problem, financial institutions stipulate that a portion of the loan amount, equal to the margin money for working capital, be blocked initially so that it can be released when the project is completed.

Initial Cash Losses

Most of the projects incur cash losses in the initial years. Yet, promoters typically do not disclose the initial cash losses because they want the project to appear attractive to the financial institutions and the investing public. Failure to make a provision for such cash losses in the project cost generally affects the liquidity position and impairs the operations. Hence prudence calls for making a provision, overt or covert, for the estimated initial cash losses.

Self Assessment

Fill in the blanks:

1. A for contingencies is made to provide for certain unforeseen expenses and price increases over and above the normal inflation rate which is already incorporated in the cost estimates.
2. The principal support for working capital is provided by banks and trade creditors.
3. Most of the incur cash losses in the initial years.
4. The money for working capital is sometimes utilised for meeting over runs in capital cost.
5. expenses are directly related to the project implementation schedule.

4.2 Means of Finance

To meet the cost of the project the following means of finance are available:

1. **Share Capital:** There are two types of share capital equity capital and preference capital. Equity capital represents the contribution made by the owners of the business, the equity shareholders, who enjoy the rewards and bear the risks of ownership. Equity capital being risk capital carries no fixed rate of dividend. Preference capital represents the contribution made by preference shareholders and the dividend paid on it is generally fixed.
2. **Term Loans:** Provided by financial institutions and commercial banks, term loans represent secured borrowings which are a very important source (and sometimes, the major source) for financing new projects as well as for the expansion, modernisation, and renovation schemes of existing firms. There are two broad types of term loans available in India: rupee term loans and foreign currency term loans. While the former are given for financing land, building, civil works, indigenous plant and machinery, and so on, the latter are

Notes

provided for meeting the foreign currency expenditures towards the import of equipment and technical know how.

3. **Debenture Capital:** Akin to promissory notes, debentures are instruments for raising debt capital. There are two broad types of debentures: non convertible debentures and convertible debentures. Non-convertible debentures are straight debt instruments. Typically they carry a fixed rate of interest and have a maturity period of 5 to 9 years. Convertible debentures, as the name implies, are debentures which are convertible, wholly or partly, into equity shares. The conversion period and price are announced in advance.
4. **Deferred Credit:** Many a time the suppliers of the plant and machinery offer a deferred credit facility under which payment for the purchase of the plant and machinery can be made over a period of time.
5. **Incentive Sources:** The government and its agencies may provide financial support as an incentive to certain types of promoters or for setting up industrial units in certain locations. These incentives may take the form of seed capital assistance (provided at a nominal rate of interest to enable the promoter to meet his contribution to the project), or capital subsidy (to attract industries to certain locations), or tax deferment or exemption (particularly from sales tax) for a certain period.
6. **Miscellaneous Sources:** A small portion of the project finance may come from miscellaneous sources like unsecured loans, public deposits, and leasing and hire purchase finance. Unsecured loans are typically provided by the promoters to bridge the gap between the promoters' contribution (as required by the financial institutions) and the equity capital the promoters can subscribe to. Public deposits represent unsecured borrowings from the public at large. Leasing and hire purchase finance represent a form of borrowing different from the conventional term loans and debenture capital.



Task Discuss about incentive sources.

Planning the Means of Finance

We have described the various means of finance that can be tapped for a project. How should you go about determining the specific means of finance for a given project? The guidelines and considerations that should be borne in mind for this purpose are as follows:

Norms of Regulatory Bodies and Financial Institutions

In some countries, the proposed means of finance for a project must either be approved by a regulatory agency or conform to certain norms laid down by the government or financial institutions in this regard. The primary purpose of such regulations is to impart prudence to project financing decisions and provide a measure of protection to investors. In addition, the norms of financial institutions, which often provide substantial assistance to projects significantly shape and circumscribe project financing decisions.

Key Business Considerations

The key business considerations which are relevant for the project financing decision are: cost, risk, control, and flexibility.

1. **Cost:** In general the cost of debt funds is lower than the cost of equity funds. Why? The primary reason is that the interest payable on debt capital is a tax-deductible expense whereas the dividend payable on equity capital is not.

2. **Risk:** The two main sources of risk for a firm (or project) are: business risk and financial risk. Business risk refers to the variability of earnings before interest and taxes and arises mainly from fluctuations in demand and variability of prices and costs. Financial risk represents the risk arising from financial leverage. It must be emphasized that while debt capital is cheap it is also risky because of the fixed financial burden associated with it.
3. **Control:** From the point of view of the promoters of the project, the issue of control is important. They would ordinarily prefer a scheme of financing which enables them to maximise their control, current as well as potential, over the affairs of the firm, given their commitment of funds to the project.
4. **Flexibility:** This refers to the ability of a firm (or project) to raise further capital from any source it wishes to tap to meet the future financing needs. This provides maneuverability to the firm. In most practical situations, flexibility means that the firm does not fully exhaust its debt capacity. Put differently, it maintains reserve borrowing powers to enable it to raise debt capital to meet largely unforeseen future needs.



Did u know? In some countries, the proposed means of finance for a project must either be approved by a regulatory agency or conform to certain norms laid down by the government or financial institutions in this regard.

4.3 Working Capital Requirement and its Financing

In estimating the working capital requirement and planning for its financing, the following points have to be born in mind:

1. The working capital requirement consists of the following: (i) raw materials and components (indigenous as well as imported), (ii) stocks of goods-in-process (also referred to as work-in-process), (iii) stocks of finished goods, (iv) debtors, (v) operating expenses and (vi) consumable stores.
2. The principal sources of working capital finance are: (i) working capital advances provided by commercial banks, (ii) trade credit, (iii) accruals and provisions, and (iv) long-term sources of financing.
3. There are limits to obtaining working capital advances from commercial banks. They are in two forms: (i) the aggregate permissible bank finance is specified as per the norms of lending, followed by the lending bank, (ii) against each current asset a certain amount of margin money has to be provided by the firm.
4. The Tandon Committee has suggested three methods for determining the maximum permissible amount of bank finance for working capital. The method that is generally employed now is the second method. According to this method, the maximum permissible bank finance is calculated as follows:

Current assets as per the norms laid down by the Tandon Committee (0.75)	Non bank current liabilities like trade credit and provisions
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The implication of this norm is that at least 25 per cent of current assets must be supported by long-term sources of finance.

Notes

5. The margin requirement varies with the type of current asset. While there is no fixed formula for determining the margin amount, the ranges within which margin requirements for various current assets lie are as follows:

Current Assets	Margin
Raw materials	10-25 per cent
Work-in-process	20-40 per cent
Finished goods	30-50 per cent
Debtors	30-50 per cent

Profitability Projections (or Estimates of Working Results)

Given the estimates of sales revenues and cost of production, the next step is to prepare the profitability projections or estimates of working results (as they are referred to by term lending financial institutions in India). The estimates of working results may be prepared along the following lines:

1. Cost of production
 2. Total administrative expenses
 3. Total sales expenses
 4. Royalty and know-how payable
 5. Total cost of production (1 + 2 + 3 + 4)
 6. Expected sales
 7. Gross profit before interest
 8. Total financial expenses
 9. Depreciation
 10. Operating Profit (7 – 8 – 9)
 11. Other income
 12. Preliminary expenses written off
 13. Profit/loss before taxation (10 + 11 – 12)
 14. Provision for taxation
 15. Profit after tax (13 – 14)
 - Less Dividend on Preference capital
 - Equity capital
 16. Retained profit
 17. Net cash accrual (16 + 9 + 12)
1. **Cost of Production:** This represents the cost of materials, labour, utilities, and factory overheads as calculated earlier.
 2. **Total Administrative Expenses:** This consists of (i) administrative salaries, (ii) remuneration to directors, (iii) professional fees, (iv) light, postage, telegrams, and

- telephones, and office supplies (stationery, printing, etc.), (v) insurance and taxes on office property, and (vi) miscellaneous items.
3. **Total Sales Expenses:** The expenses included under this head are: (i) commission payable to dealers, (ii) packing and forwarding charges, (iii) salary of sales staff (which may be increased at 5 per cent per annum), (iv) sales promotion and advertising expenses, and (v) other miscellaneous expenses.
 4. **The selling expenses:** depend mainly on the nature of industry and the kind of competitive conditions that prevail. Typically, selling expenses vary between 5 and 10 per cent of sales. The experience of similar firms in the industry may be used as a basic guideline.
 5. **Royalty and Know how:** Payable Royalty and know how payable annually may be shown here. The royalty rate is usually 25 per cent of sales. Further, royalty is payable often for a limited number of years, say 5 to 10 years.
 6. **Total Cost of Production:** This is simply the sum of cost of production, total administrative expenses, total sales expenses, and royalty and know-how payable.
 7. **Expected Sales:** The figures of expected sales are drawn from the estimates of sales and production prepared earlier in the financial analysis and projection exercise.
 8. **Gross Profit before Interest:** This represents the difference between expected sales and total cost of production.
 9. **Total Financial Expenses:** Financial expenses consist of interest on term loans, interest on bank borrowings, commitment charges on term loans, and commission for bank guarantees. The principal financial expenses, of course, are interest on term loans and interest on bank borrowings.
 10. **Depreciation:** This is an important item, particularly for capital intensive projects. In figuring out the depreciation charge, the following points should be borne in mind:
 - (a) Contingency margin and pre operative expenses provided in estimating the cost of project should be added to the fixed assets proportionately to ascertain the value of fixed assets for determining the depreciation charge.
 - (b) Preliminary expenses in excess of 2.5 per cent of the project cost (excluding working capital margin) should be added to fixed assets proportionately to ascertain the value of fixed assets for determining the depreciation charge.
 - (c) The Income Tax Act specifies that the written down value method should be used for tax purposes. It further specifies the rate of depreciation applicable to different kinds of assets.
 - (d) For company law (financial reporting) purposes, the method of depreciation may be either the Written Down Value (WDV) method or the straight line (SL) method. From 1988 onwards the depreciation rates under the Companies Act have been delinked from those under the Income Tax Act.
 11. **Other Income:** This represents income arising from transactions not part of the normal operations of the firm. Examples of such transactions are: sale of machinery, disposal of scrap, etc. Except disposal of scrap, which can be reasonably anticipated and estimated, the effects of other non-operating transactions can hardly be estimated. Of course, when non-operating transactions result in a deficit, other income would be negative—put differently, there will, be a non-operating loss.

Notes

12. **Write-off of Preliminary Expenses:** Preliminary expenses up to 2.5 per cent of the cost of project or capital employed, whichever is higher, can be amortised in ten equal annual installments.
13. **Profit-Loss before Taxation:** This is equal to: Operating profit + Other income – Write-off of preliminary expenses.
14. **Provision for Taxation:** To figure out the tax burden, a sound understanding of the Income Tax Act a complicated legislation and relevant case laws is required. While calculating the taxable income, a variety of incentives and concessions have to be taken into account. Once the taxable income, as per the Income Tax Act, is calculated, the tax burden can be figured out fairly easily by applying the appropriate tax rates.
15. **Profit after Taxation:** This is simply profit/loss before taxation minus provision for taxation. A part of profit after tax is usually paid out as dividend – dividend on preference capital and dividend on equity capital.
16. **Retained Profit:** The difference between profit after tax and dividend payment is referred to as retained profit. It is also called ploughed back earnings.
17. **Net Cash Accrual:** The net cash accrual from operations is equal to: Retained profit + Depreciation + Write off of preliminary expenses + Other non cash charges.

Projected Balance Sheet

The balance sheet, showing the balance in various asset and liability accounts, reflects the financial condition of the firm at a given point of time. The format of a balance sheet as prescribed by the Companies Act is given below:

Table 4.1: Format of Balance Sheet

Liabilities	Assets
Share capital	Fixed assets
Reserves and surplus	Investments
Secured loans	Current assets, loans and advances
Unsecured loans	Miscellaneous expenditures and losses
Current liabilities and provisions	

The liabilities side of the balance sheet shows the sources of finance employed by the business. Share capital consists of paid-up equity and preference capital. Reserves and surplus represent mainly the accumulated retained earnings. They are shown in different accounts like the capital reserve, the investment allowance reserve, and the general reserve. Secured loans represent the borrowing; of the firm against which security has been provided. The important components of secured loans are debentures, term loans from financial institutions, and loans from commercial banks. Unsecured loans represent borrowings against which no specific security has been provided. The important constituents are fixed deposits from public and unsecured loans from promoters. Current liabilities are obligations which mature in the near future, usually a year. These obligations arise mainly from items which enter the operating cycle: payables from acquiring materials and supplies used in production, and accruals of wages, salaries, and rentals. Provisions include mainly tax provision, provision for provident fund, provision for pension and gratuity, and provision for proposed dividends.



Caution The liabilities side of the balance sheet shows the sources of finance employed by the business. Share capital consists of paid-up equity and preference capital.

4.4 Time Value of Money

Money has time value. A rupee today is more valuable than a rupee a year hence. Why? There could be several reasons:

1. Individuals, in general, prefer current consumption to future consumption.
2. Capital can be employed productively to generate positive returns. An investment of one rupee today would grow to $(1 + r)$ a year hence (r is the rate of return earned on the investment).
3. In an inflationary period a rupee today represents a greater real purchasing power than a rupee a year hence.

Future Value of Single Amount

The process of investing money as well as reinvesting the interest earned thereon is called compounding. The future value or compounded value of an investment after n years when the interest rate is r percent is:

$$FV_n = PV(1 + r)^n$$

In this equation $(1 + r)^n$ is called the future value interest factor or simply the future value factor.

To solve future value problems you have to find the future value factors. You can do it in different ways.



Example: Suppose you invest ₹ 5,000 for three years in a savings account that pays 10 percent interest per year. If you let your interest income be reinvested, your investment will grow as follows:

<i>First year</i>	Principal at the beginning	5,000
	Interest for the year	500
	(₹ 5,000 × 0.10)	
	Principal at the end	5,500
<i>Second year</i>	Principal at the beginning	5,500
	Interest for the year	550
	(₹ 5,500 × 0.10)	
	Principal at the end	6,050
<i>Third year</i>	Principal at the beginning	6,050
	Interest for the year	605
	(₹ 6,050 × 0.10)	
	Principal at the end	6,655

Notes

Compound and Simple Interest

So far we have assumed that the money is invested at compound interest which means that each interest payment is reinvested to earn further interest in future periods. By contrast, if no interest is earned on interest, the investment earns only simple interest. In such a case the investment grows as follows:

$$\text{Future value} = \text{Present value} [1 + \text{Number of years} \times \text{Interest rate}]$$

Doubling Period

Investors commonly ask the question: How long would it take to double the amount at a given rate of interest? To answer this question we have to calculate the future value interest and we find that when the interest rate is 12 percent it takes about 6 years to double the amount, when the interest is 6 percent it takes about 12 years to double the amount, so on and so forth. Is there a rule of thumb which dispenses with the use of the future value interest factor table? Yes, there is one and it is called the rule of 72. According to this rule of thumb the doubling period is obtained by dividing 72 by the interest rate. For example, if the interest rate is 8 percent, the doubling period is about 9 years (72/8). Likewise, if the interest rate is 4 percent the doubling period is about 18 years (72/4). Though somewhat crude, it is a handy and useful rule of thumb.

Present Value of a Single Amount

The process of discounting, used for calculating the present value, is simply the inverse of compounding. The present value formula can be readily obtained by manipulating the compounding formula:

$$FV_n = PV (1 + r)^n$$

Dividing both the sides of Eq. by $(1 + r)^n$, we get:

$$PV = FV_n [1 / (1 + r)^n]$$

The factor $1 / (1 + r)^n$ is called the discounting factor or the Present Value interest factor (PVIF_n).



Example: What is the present value of ₹ 1,000 receivable 6 years hence if the rate of discount is 10 per cent?

The present value is:

$$₹ 1,000 \times \text{PVIF}, 10\%, 6 = ₹ 1,000 (0.5645) = ₹ 564.5$$

Present Value of an Uneven Series

In financial analysis we often come across uneven cash flow streams.

For example, the cash flow stream associated with a capital investment project is typically uneven. Likewise, the dividend stream associated with an equity share is usually uneven and perhaps growing.

The present value of a cash flow stream uneven or even may be calculated with the help of the following formula:

$$PV_n = \frac{A_1}{(1+r)^1} + \frac{A_2}{(1+r)^2} + \frac{A_3}{(1+r)^3} + \dots + \frac{A_n}{(1+r)^n}$$

where,

Notes

PV_n = Present value of a cash flow stream

A_t = Cash flow occurring at the end of year t

r = Discount rate

n = Duration of the cash flow stream

Future Value of Annuity

An annuity is a stream of constant cash flow (payment or receipt) occurring at regular intervals of time. The premium payments of a life insurance policy,

For example, are an annuity.

In general terms the future value of an annuity is given by the following formula:

$$\begin{aligned} FVA_n &= A(1+r)^{n-1} + A(1+r)^{n-2} + \dots + A \\ &= A[1(1+r)^n - 1] / r \end{aligned}$$

Where,

FVA_n = Future value of an annuity which has a duration of n periods

A = Constant periodic flow

r = Interest rate per period

n = Duration of the annuity

When the cash flows occur at the end of each period, the annuity is called an ordinary annuity or a deferred annuity. When the cash flows occur at the beginning of each period, the annuity is called an annuity due. Our discussion here will focus on a regular annuity the formulae of course can be applied, with some modification, to an annuity due.

Self Assessment

State whether the following statements are True or False:

6. Akin to notes, debentures are instruments for raising debt capital.
7. margin and pre operative expenses provided in estimating the cost of project should be added to the fixed assets proportionately to ascertain the value of fixed assets for determining the depreciation charge.
8. expenses in excess of 2.5 per cent of the project cost
9. The liabilities side of the shows the sources of finance employed by the business
10. An is a stream of constant cash flow (payment or receipt) occurring at regular intervals of time.



Notes The items on the financing side of the balance sheet are called capital components. The major capital components are equity, preference, and debt.

4.5 Cost of Capital

Till now we have learnt that the cash flows of a capital investment may be viewed from various points of view and the discount rate applied to the cash flows must be consistent with the point of view adopted. We also mentioned that the standard practice in capital budgeting is to look at the cash flows from the point of view of explicit cost funds (referred to also as investor claims) and apply the weighted average cost of capital of the firm as the discount rate.

The items on the financing side of the balance sheet are called capital components. The major capital components are equity, preference, and debt. Capital, like any other factor of production, has a cost. A company's cost of capital is the average cost of the various capital components (or securities) employed by it. Put differently, it is the average rate of return required by the investors who provide capital to the company.

The cost of capital is a central concept in financial management. It is used for evaluating investment projects, for determining the capital structure, for assessing leasing proposals, for setting the rates that regulated organisations like electric utilities can charge to their customers, so on and so forth.

Now in this unit we will discuss how a company's cost of capital is calculated.

Concept of Average Cost of Capital

A company's cost of capital is the weighted average cost of various sources of finance used by it, viz. equity, preference, and debt.

Suppose that a company uses equity, preference, and debt in the following proportions: 50, 10, and 40. If the component costs of equity, preference, and debt are 16 per cent, 12 per cent, and 8 per cent respectively, the Weighted Average Cost of Capital (WACC) will be:

$$\begin{aligned} \text{WACC} &= (\text{Proportion of equity}) (\text{Cost of equity}) + (\text{Proportion of preference}) (\text{Cost of preference}) + (\text{Proportion of debt}) \times (\text{Cost of debt}) \\ &= (0.5)(16) + (0.10)(12) + (0.4)(8) = 12.4 \text{ per cent} \end{aligned}$$

For the sake of simplicity, we have considered only three types of capital (equity; non-convertible, non-callable preference; and non-convertible, non-callable debt). We have ignored other forms of capital like convertible or callable preference, convertible or callable debt, bonds with payments linked to stock market index, bonds that are puttable or extendable, warrants, so on and so forth. Calculating the cost of these forms of capital is somewhat complicated. Fortunately, more often than not, they are a minor source of capital. Hence, excluding them may not make a material difference.

Debt includes long term debt as well as short term debt (such as working capital loans and commercial paper). Some companies leave out the cost of short term debt while calculating the weighted average cost of capital. In principle, this is not correct. Investors who provide short term debt also have a claim on the earnings of the firm. If a company ignores this claim, it will misstate the rate of return required on its investments.

Non interest bearing liabilities, such as trade creditors, are not included in the calculation of the weighted average cost of capital. This is done to ensure consistency and simplify valuation. True, non interest bearing liabilities have a cost. However, this cost is implicitly reflected in the price paid by the firm to acquire goods and services. Hence, it is already taken care of before the free cash flow is determined. While it is possible to separate the implicit financing costs of non interest bearing liabilities from the cash flow, it will make the analysis needlessly more complex, without contributing to the quality thereof.

Rationale**Notes**

The rationale for using the WACC as the hurdle rate in capital budgeting is fairly straightforward. If a firm's rate of return on its investment exceeds its cost of capital, equity shareholders benefit. To illustrate this point, consider a firm which employs equity and debt in equal proportions and whose cost of equity and debt are 14 per cent and 6 per cent respectively. The cost of capital, which is the weighted average cost of capital, works out to 10 per cent ($0.5 \times 14 + 0.5 \times 6$). If the firm invests ₹ 100 million, say, on a project which earns a rate of return of 12 per cent, the return equity funds employed in the project will be:

$$\frac{\text{Total return on the project} - \text{Interest on debt}}{\text{Equity funds}} = \frac{100(0.12) - 50(.006)}{50} = 18 \text{ percent}$$

Since 18 percent exceeds the cost of equity (14 percent), equity shareholders benefit.

Company Cost of Capital and Project Cost of Capital

At the outset we must distinguish between the company cost of capital and the project cost of capital.

The company cost of capital is the rate of return expected by the existing capital providers. It reflects the business risk of existing assets and the capital structure currently employed.

The project cost of capital is the rate of return expected by capital providers for a new project or investment the company proposes to undertake. Obviously, it will depend on the business risk and the debt capacity of the new project.

If a firm wants to use its company cost of capital, popularly called the Weighted Average Cost of Capital (WACC), for evaluating a new investment, two conditions should be satisfied:

1. The business risk of the new investment is the same as the average business risk of existing investments. In other words, the new investment will not change the risk complexion of the firm.
2. The capital structure of the firm will not be affected by the new investment. Put differently, the firm will continue to follow the same financing policy.

Thus, strictly speaking the WACC is the right discount rate for an investment which is a carbon copy of the existing firm. This chapter assumes that new investments will be similar to existing investments in terms of business risk and debt capacity.

4.6 Cost of Equity**SML Approach**

A popular approach to estimating the cost of equity is the Security Market Line (SML) relationship. According to the SML, the required return on a company's equity is:

$$R_e = R_f + \beta_E (E(R_M) - R_f)$$

where,

R_e = Required return on the equity of company

R_f = Risk free rate

Notes

β_E = Beta of the equity of company

$E(R_M)$ = Expected return on the market portfolio

The SML is regarded by many as a fairly rigorous and objective approach to determining the required return on equity. This approach, however, is based on the assumption that investors eliminate unsystematic risk by efficient diversification and hence require compensation only for systematic risk which is reflected in beta. Market imperfections may impede efficient diversification by investors, exposing them to unsystematic risk. When this occurs, investors will require compensation for unsystematic risk, a factor which is not found in the security market line relationship. Another shortcoming of the SML relates to the instability of the betas of individual securities. Studies have shown that individual securities have unstable betas. This makes the use of a historical beta as a proxy for the future beta somewhat questionable. Notwithstanding these shortcomings, the SML approach is a useful approach for estimating the required rate of return of equity stocks.

Bond Yield Plus Risk Premium Approach

Analysts who do not have faith in the SML approach often resort to a subjective procedure to estimate the cost of equity. They add a judgmental risk premium to the observed yield on the long term bonds of the firm to get the cost of equity:

$$\text{Cost of equity} = \text{Yield on long-term bonds} + \text{Risk premium}$$

The logic of this approach is fairly simple. Firms that have risky and consequently high cost debt will also have risky and consequently high cost equity. So it makes sense to base the cost of equity on a readily observable cost of debt.

The problem with this approach is how to determine the risk premium. Should it be 2 percent, 4 percent, or n percent? There seems to be no objective way of determining it. Most analysts look at the operating and financial risks of the business and arrive at a subjectively determined risk premium that normally ranges between 2 percent and 6 percent. While this approach may not produce a precise cost of equity, it will give a reasonable ballpark estimate.

Earnings-Price Ratio Approach

According to this approach, the cost of equity is equal to:

$$E_1 / P_0$$

Where

E_1 = expected earnings per share for the next year

P_0 = current market price per share

E_1 may be estimated as: (Current earnings per share) \times (1 + Growth rate of earnings per share).

This approach provides an accurate measure of the rate of return required by equity investors in the following two cases:

1. When the earnings per share are expected to remain constant and the dividend payout ratio is 100 percent.
2. When retained earnings are expected to earn a rate of return equal to the rate of return required by equity investors.

The first case is rarely encountered in real life and the second case is also somewhat unrealistic. Hence, the earnings-price ratio should not be used indiscriminately as the measure of the cost of equity capital.

Determining the Proportions

Notes

For calculating the WACC we need information on the cost of various sources of capital and the proportions (or weights) applicable to them. So far we discussed how to calculate the cost of specific sources of capital. We now look at how the weights should be established.

The appropriate weights are the target capital structure weights stated in market value terms. What is the rationale for using the target capital structure? What is the logic for using market values?

The primary reason for using the target capital structure is that the current capital culture may not reflect the capital structure that is expected to prevail in future or the capital structure the firm plans to have in future. While it is conceptually appealing to rely the target capital structure, there may be some difficulties in using the target capital structure. A company may not have a well defined target capital structure. Perhaps the changing complexion of its business or the changing conditions in the capital market may be it difficult for the company to articulate its target capital structure. Further, if the target capital structure is significantly different from the current capital structure, it may difficult to estimate what the component capital costs would be. Notwithstanding these difficulties, finance experts generally recommend that the weights must be based on the target capital structure.

In calculating the weights for the target capital structure, should one use book (balance t) values or market values. It is tempting to use the book value weights because they easy to calculate, they are available for every company (whether it is traded or not), they are fairly stable.

Finance scholars, however, believe that market values, despite their volatility, are superior to book values, because in order to justify its valuation the firm must earn competitive returns for shareholders and debt holders on the current value (market value) their investments.

4.7 Weighted Marginal Cost of Capital

At the outset we assumed, inter alia, that the adoption of new investment proposals will not change either the risk complexion or the capital structure of the firm. Does it mean that the weighted average cost of capital will remain the same irrespective of the magnitude of financing? Apparently not. Generally, the weighted average cost of capital tends to rise as the firm seeks more and more capital. This may happen because the supply schedule of capital is typically upward sloping as suppliers provide more capital, the rate of return required by them tends to increase. A schedule or graph showing the relationship between additional financing and the weighted average cost of capital is called the weighted marginal cost of capital schedule.

Factors affecting the Weighted Average Cost of Capital

The cost of capital is affected by several factors, some beyond the control of the firm and others dependent on the investment and financing policies of the firm.

Factors Outside a Firm's Control

The three most important factors, outside a firm's direct control, that have a bearing on the cost of capital are the level of interest rates, the market risk premium, and the tax rate.

1. **Level of Interest Rates:** If interest rates in the economy rise, the cost of debt to firms increases and vice versa. Interest rates also have a similar bearing on the cost of preference and cost of equity. Remember that the risk free rate of interest is an important component of the CAPM, a model widely used for estimating the cost of equity. The general decline in interest rates in India from late 1990s to 2004 has lowered the cost of debt as well as the cost of equity.

Notes

2. **Market Risk Premium:** The market risk premium reflects the perceived risk of equity stocks and investor aversion to risk. A factor beyond the control of individual firms, market risk premium affects the cost of equity directly and the cost of debt indirectly (through a substitution effect).
3. **Tax Rates:** The tax policy of the government has a bearing on cost of capital. Corporate tax rate has a direct impact on the cost of debt as used in the weighted average cost of capital. The capital gains tax rate relative to the rate on ordinary income has indirect effect on the cost of equity relative to the cost of debt.

Factors within a Firm's Control

The cost of capital of a firm is affected by its investment policy, capital structure policy and dividend policy.

1. **Investment Policy:** To estimate the cost of capital, we start with the rates of required on the outstanding equity and debt of the firm. These rates reflect how risky firm's existing assets are. If a firm plans to invest in assets similar to those currently then its marginal cost of capital would be more or less the same as its current cash, capital. On the other hand, if the riskiness of its proposed investments is likely to be different from the riskiness of its existing investments, its marginal cost of capital should reflect the riskiness of the proposed investments.
2. **Capital Structure Policy:** To calculate the WACC we assumed a given target capital, structure. Of course, a firm can change its capital structure and such a change is to affect the cost of capital because the post tax cost of debt is lower than the cost equity and equity beta, an input for calculating the cost of equity, is a function of financial leverage.
3. **Dividend Policy:** The dividend policy of a firm may affect its cost of equity.

Misconception Surrounding Cost of Capital

The cost of capital is a central concept in financial management linking the investment and financing decisions. Hence, it should be calculated correctly and used properly in investment evaluation. Despite this injunction, we find that several errors characterize the application of this concept. The more common misconceptions, along with suggestions to overcome them, are discussed here.

1. **The concept of cost of capital is too academic or impractical:** Some companies do not calculate the cost of capital because they regard it as 'academic', 'impractical', 'irrelevant', or 'imprecise.' These misgivings about cost of capital appear to be unjustified. Such reservation can be dispelled by emphasising the following points:
 - (a) The cost of capital is an essential ingredient of discounted cash flow analysis. Since discounted cash flow analysis is now widely used, cost of capital can scarcely be considered 'academic' or 'impractical'.
 - (b) Out of the various inputs required for discounted cash flow analysis, viz. project life, project cash flows (consisting of initial investment, operating cash flows, and terminal cash flow) and cost of capital, the last one, viz. the cost of capital can perhaps be calculated most reliably and accurately. So a concern about its imprecision seems to be misplaced.
2. **Current liabilities (accounts payable and provisions) are considered as capital components:** Sometimes it is argued that accounts payable and accruals are sources of funding to be considered in the calculation of the WACC. This view is not correct because what is not provided by investors is not capital.

Current liabilities arise on account of an operating relationship of the firm with its suppliers and employees. They are deducted when the investment requirement of the project is determined. Hence, they should not be considered in calculating the WACC. Of course, current liabilities are not ignored in capital budgeting because they appear in the cash flows of the project. Put differently, current liabilities affect a project's cash flows, but not its WACC.

3. **The coupon rate on the firm's existing debt is used as the pre tax cost of debt:** The coupon rate on the firm's existing debt reflects a historical cost. What really matters in investment decision making is the interest rate the firm would pay if it issues debt today. Hence use the current cost of debt, not the historical cost of debt.
4. **When estimating the market risk premium in the CAPM method, the historical average rate of return is used along with the current risk free rate:** Consider the following information:
 - (a) Historical average return on common stocks = 19 percent
 - (b) Historical return on long term Treasury bonds = 10 percent
 - (c) Current expected return on common stocks = 14 percent
 - (d) Current return on long term Treasury bonds = 7 percent

Sometimes, the market risk premium is calculated as the difference between the historical average return on common stocks and the current return on long-term Treasury bonds. This is not correct.

To calculate the market risk premium, you can use the historical risk premium (19 percent 10 percent) or the current risk premium (14 percent 7 percent), but not the difference between the historical average return on common stocks and the current return on long-term Treasury bonds (19 percent 7 percent).

5. **The cost of equity is equal to the dividend rate or return on equity:** It appears that the cost of equity is often measured incorrectly. Sometimes it is measured as the current dividend rate (dividend per share as a percentage of face value per share) or as return on equity. Only by accident do these measures represent the cost of equity correctly.

It should be clearly understood that the cost of equity is the rate of return required by equity investors given the risk they are exposed to. It has nothing to do with the current dividend rate or return on equity, which are mere historical numbers.

6. **Retained earnings are either cost free or cost significantly less than external equity:** Often firms impute a negligible or low cost to retained earnings under the influence of wrong notions like "retained earnings have no cost because shareholders are satisfied with dividends" or "retained earnings are already with the firm and hence some nominal returns on them may suffice".

The error in such reasoning stems from ignoring the opportunity cost associated with retained earnings. When a firm retains a portion of its earnings, equity shareholders are denied dividends to that extent. If the same were distributed as dividends, equity shareholders can invest elsewhere to earn a rate of return comparable to the cost of equity. Hence the opportunity cost of retained earnings is more or less equal to the cost of equity funds.

7. **Depreciation has no cost:** Similar to the misconception that retained earnings are more or less cost free is the notion that depreciation generated funds are also virtually cost free. As one manager put it: "Depreciation is capital already in the company. Since it does not have to be raised, even in an indirect sense of retained earnings, it clearly has no cost."

Notes

To guard against such an error, invoke the opportunity cost principle once again. Theoretically, the firm can return the depreciation generated funds to its shareholders and lenders (the parties which provided the finance for asset acquisition) and they, in turn, can invest these funds elsewhere. Hence, the opportunity cost of depreciation generated funds is the average return the shareholders and lenders would earn on these funds by investing them elsewhere. And this would be more or less equal to the average cost of capital of the firm.

8. **Book value weights may be used to calculate the WACC:** Often firms use book value weights in the existing capital structure to calculate the WACC. This is not correct.

Weights should be based on market values, not book values. Ideally, the target capital structure (in market value terms) should determine the weights for the WACC. If the target capital structure is not specified, use the current market value weights.

9. **The cost of capital for a project is calculated on the basis of the specific sources of finance used for it:** If a firm raises debt when it is investing in some project, it may regard the post tax cost of debt as the relevant cost of capital. Likewise, if it happens to raise equity when it is investing in some other project, it may consider the cost of equity as the relevant cost of capital. In both these cases, the error stems from calculating the WACC on the basis of the immediate sources of finance tapped.

The immediate sources of funds used for a project do not necessarily determine the hurdle rate. What matters is the contribution made by the project to overall debt capacity of the firm and not which sources of funds happen to be tapped when the project is being undertaken.

10. **The project cost of capital is the same as firm's WACC:** Many firms apply a uniform WACC to all projects, irrespective of differences in their risk characteristics. This practice is based on the following reasoning: "While a project may not have the same risk as the firm, its relevant cost of capital is still the firm's WACC because the investors are paid from the cash flows of the firm, not the cash flows of the project."

The above reasoning is flawed. The return that the investors require from a project is the same as what they would get from an alternative investment with the same risk profile and it has nothing to do with the return that they are currently getting from the firm. For example, if a firm currently engaged in petrochemical business sets up a retailing business, investors will require a return from the retailing business that reflects its riskiness. Note that it is not the WACC of a firm that determines the cost of capital of a project. Rather, it is the other way. Each project has its own cost of capital which reflects its riskiness and its debt capacity. The cost of capital of the firm is the weighted average of the capital costs of various projects undertaken by the firm.



Task Describe how the cost of capital for a project is being calculated.

4.8 Appraisal Criteria

Project appraisal is an exercise, which is required before a project is sanctioned. Appraisal means the act of working out the value, quality and/or condition of the project. The appraisal using ex-ante feasibility analytical techniques is carried out at an early date in the pre-plan phase. At this time, the working life lies completely in the future. The future costs and benefit of the project are mere estimates based on certain technical relationship amongst the inputs. These estimates have to be brought back to the present time in order to take a decision on the worthiness of the

project. Hence, at the formulation stage, appraisal needs to be carried out in order to help recommend a project strategy to the sanctioning authorities.

Notes

Market Appraisal

Secondary information, though useful, often does not provide a comprehensive basis for market and demand analysis. It needs to be supplemented with primary information gathered through a market survey, specific to the project being appraised.

The market survey may be a census survey or a sample survey. In a census survey, the entire population is covered. (The word 'population' is used here in a particular sense. It refers to the totality of all units under consideration in a specific study. *Examples:* All industries using milling machines, all readers of the Economic Times). Census surveys are employed principally for intermediate goods and investment goods when such goods are used by a small number of firms. In other cases a census survey is prohibitively costly and may also be infeasible. For example, it would be inordinately expensive in fact almost impossible to cover every user of Lifebuoy or every person in the income bracket ₹ 10,000-15,000.

Due to the above mentioned limitations of the census survey, the market survey, in practice, is typically a sample survey. In such a survey a sample of population is contacted or observed and relevant information is gathered. On the basis of such information, inferences about the population may be drawn.

The information sought in a market survey may relate to one or more of the following:

1. Total demand and rate of growth of demand
2. Demand in different segments of the market
3. Income and price elasticities of demand
4. Motives for buying
5. Purchasing plans and intentions
6. Satisfaction with existing products
7. Unsatisfied needs
8. Attitudes toward various products
9. Distributive trade practices and preferences
10. Socio economic characteristics of buyers

Steps in a Sample Survey

Typically, a sample survey consists of the following steps:

Define the Target Population: In defining the target population the important terms should be carefully and unambiguously defined. The target population may be divided into various segments which may have differing characteristics. For example, all television owners may be divided into three to four income brackets.

Select the Sampling Scheme and Sample Size: There are several sampling schemes: simple random sampling, cluster sampling, sequential sampling, stratified sampling, systematic sampling, and non probability sampling. Each scheme has its advantages and limitations. The sample size, other things being equal, has a bearing on the reliability of the estimates – larger the sample size, the greater the reliability.

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Develop the Questionnaire: The questionnaire is the principal instrument for eliciting information from the sample of respondents. The effectiveness of the questionnaire as a vice for eliciting the desired information depends on its length, the types of questions, and the wording of the questions. Developing the questionnaire requires a thorough understanding of the product and service and its usage, imagination, insights into human behavior, appreciation of subtle linguistic nuances, and familiarity with the tools of descriptive inferential statistics to be used later for analysis. It also requires knowledge of psychological scaling techniques if the same are employed for obtaining information relating to attitudes, motivations, and psychological traits. Industry and trade market surveys, in comparison to consumer surveys, generally involve more technical and specialised questions.

Since the quality of the questionnaire has an important bearing on the results of the market survey, the questionnaire should be tried out in a pilot survey and modified in the light of problems/difficulties noted.

Recruit and Train the Field Investigators: Recruiting and training of field investigators must be planned well since it can be time consuming. Great care must be taken in recruiting right kind of investigators and imparting the proper kind of training to them. Instigators involved in industry and trade market surveys need intimate knowledge the product and technical background, particularly for products based on sophisticated technologies.

Obtain Information as per the Questionnaire from the Sample of Respondents: Respondents may be interviewed personally, telephonically, or by mail for obtaining information. Personal interviews ensure a high rate of response. They are, however, expensive likely to result in biased responses because of the presence of the interviewer. Mail surveys by snail mail or e-mail are economical and evoke fairly candid responses. The response rate, however, is often low. Telephonic interviews, common in western countries, traditionally were not popular in India because of high telephone tariffs and low tele-density. Things, however, are changing with telecom revolution.

Scrutinise the Information Gathered: Information gathered should be thoroughly scrutinised to eliminate data which is internally inconsistent and which is of dubious validity. For example, a respondent with a high income and large family may say that he lives in a one room tenement. Such information, probably inaccurate, should be deleted. Sometimes data inconsistencies may be revealed only after some analysis.

Analyse and Interpret the Information: Information gathered in the survey needs to be analysed and interpreted with care and imagination. After tabulating it as per a plan of analysis, suitable statistical investigation may be conducted, wherever possible and necessary. For purposes of statistical analysis, a variety of methods are available. These may be divided into two broad categories: parametric methods and non-parametric methods. Parametric methods assume that the variable or attribute under study conforms to some known distribution. Non-parametric methods do not presuppose any particular distribution.

Results of the data based on the sample survey will have to be extrapolated to the target population. For this purpose, appropriate inflationary factors, based on the ratio of the size of the target population to the size of the sample studies, will have to be used.

The statistical analysis of data should be directed by a person who has a good background in statistics as well as economics.

It may be emphasised that the results of the market survey can be vitiated by: (i) non-representativeness of the sample, (ii) imprecision and inadequacies in the questions, (iii) failure of the respondents to comprehend the questions, (iv) deliberate distortions in the answers given by the respondents, (v) inept handling of the interviews by the investigators, (vi) cheating on the part of the investigators, (vii) slip shod scrutiny of data, and (viii) incorrect and inappropriate analysis and interpretation of data.

Characterisation of Market

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Based on the information gathered from secondary sources and through the market survey, the market for the product/service may be described in terms of the following:

Effective Demand in the Past and Present

To gauge the effective demand in the past and present, the starting point typically is apparent consumption which is defined as:

$$\text{Production} + \text{Imports} - \text{Exports} - \text{Changes in stock level}$$

The figure of apparent consumption has to be adjusted for consumption of the product by the producers and the effect of abnormal factors. The consumption series, after such adjustments, may be obtained for several years.

In a competitive market, effective demand and apparent consumption are equal. However, in most of the developing countries, where competitive markets do not exist for a variety of products due to exchange restrictions and controls on production and distribution, the figure of apparent consumption may have to be adjusted for market imperfections. Admittedly, this is often a difficult task.

Breakdown of Demand

To get a deeper insight into the nature of demand, the aggregate (total) market demand may be broken down into demand for different segments of the market. Market segments may be defined by (i) nature of product, (ii) consumer group, and (iii) geographical division.

1. **Nature of Product:** One generic name often subsumes many different products: steel covers sections, rolled products, and various semi-finished products; commercial vehicles, cover trucks and buses of various capacities; so on and so forth.
2. **Consumer Groups:** Consumers of a product may be divided into industrial consumers and domestic consumers. Industrial consumers may be sub divided industry wise. Domestic consumers may be further divided into different income groups.
3. **Geographical Division:** A geographical breakdown of consumers is helpful, particularly for products which have a small value-to-weight relationship and for products which require regular, efficient after sales service.

Why is segmental analysis required? Segmental information is helpful because the nature of demand tends to vary from one segment to another. The demand from consumers in high income brackets may not be sensitive to price variations whereas the demand from consumers in low income brackets may be very sensitive to price variations and different marketing strategies may be appropriate for different market segments.

Price

Price statistics must be gathered along with statistics pertaining to physical quantities. It may be helpful to distinguish the following types of prices:

1. Manufacturer's price quoted as FOB (free on board) price or CIF (cost, insurance, and freight) price,

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2. Landed price for imported goods,
3. Average wholesale price, and
4. Average retail price.

Methods of Distribution and Sales Promotion

The method of distribution may vary with the nature of the product. Capital goods, industrial raw materials or intermediates, and consumer products tend to have different distribution channels. Likewise, methods used for sales promotion (advertising, discounts, gift schemes, etc.) may vary from product to product.

The methods of distribution and sales promotion employed presently and their rationale must be specified. Such a study may explain certain patterns of consumption and highlight the difficulties that may be encountered in marketing the proposed products.

Consumers

Consumers may be characterized along two dimensions as follows:

Demographical and Sociological	Attitudinal
Age	Preferences
Sex	Intentions
Income	Habits
Profession	Attitudes
Residence	Responses
Social background	

Supply and Competition

It is necessary to know the existing sources of supply and whether they are foreign or domestic. For domestic sources of supply, information along the following lines may be gathered:

1. Location, present production capacity,
2. Planned expansion,
3. Capacity utilisation level,
4. Bottlenecks in production, and
5. Cost structure.

Competition from substitutes and near substitutes should be specified because almost any product may be replaced by some other product as a result of relative changes in price, quality, availability, promotional effort, and so on.

Government Policy

The role of the government in influencing the demand and market for a product may be significant. Governmental plans, policies, and legislations, which have a bearing on the market and demand of the product under examination, should be spelt out. These are reflected in production targets in national plans, import and export trade controls, import duties, export

incentives, excise duties, sales tax, industrial licensing, preferential purchases, credit controls, financial regulations, and subsidies/penalties of various kinds.

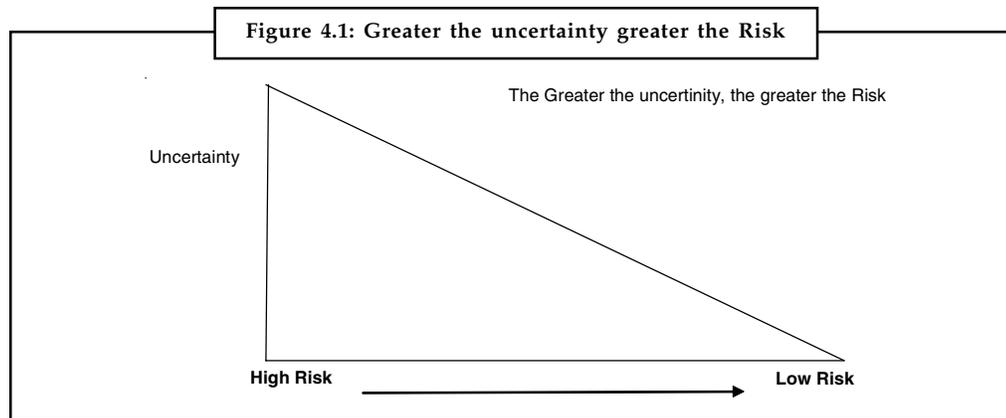
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Did u know? Competition from substitutes and near substitutes should be specified because almost any product may be replaced by some other product as a result of relative changes in price, quality, availability, promotional effort, and so on.

4.9 Risk Analysis in Capital Investment Decisions

Design projects are inherently risky. Every project is different in some way and this carries with it uncertainties. In project management parlance, risk is the term used to describe the amount of uncertainty and number of threats (elements that threaten the success of the project) that exist or potentially exist in a project. The greater the amount of uncertainty and number of threats, the greater the risk (see Figure below).



While it is not possible to alleviate all risks, some risks can be eliminated by thoughtful problem solving, while others can be successfully managed so their impact on the project is kept to a minimum.

When the coach of a football team relays the play to the quarterback and the quarterback calls the play in the huddle, a number of uncertainties exist. Will the play work? Will the center-quarter back exchange go smoothly? Will everyone block the way they are supposed to? Will the receiver get open? Will the quarterback throw the ball accurately? Will the receiver catch the ball? Will the pass receiver get tackled and fumble? Will the receiver or someone else on the team get hurt? There are many uncertainties. And there are many threats, too.

The defensive team might blitz. A linebacker might anticipate a pass, fall back and play pass defense. A defensive back might intercept the football. A pass rusher might evade a blocker, tackle the quarterback, and fall on top of him. The quarterback might end up flat on his back, injured.

To increase the likelihood of the football team winning, the team is, first of all, composed of talented players and coaches who then plan and practice in advance. Every team member knows his role and responsibilities to the team. Plays are practiced over and over. Various scenarios are rehearsed: if this happens, then do this; if that happens, then do that. In football, talented players and coaches who plan and practice are the keys to winning because they reduce the risks that prevent winning.

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Strategies for Controlling Risk

PMs must control the threats and uncertainties that could potentially adversely affect their projects. There are a number of strategies for doing this. They include:

1. **Prevention:** reduce the number of uncertainties and/or threats.
2. **Transference:** make some other party responsible for the uncertainties or threats.
3. **Mitigation:** lessen the impact of the uncertainties or threats should they occur.
4. **Contingency planning:** plan in advance for coping with uncertainties or threats should they happen.
5. **Assumption:** identify the uncertainties or threats and accept their potential impact on the project because the cost of prevention, mitigation, transference, and contingency planning are greater than their possible impact.

These strategies are implemented through a variety of risk management procedures. The obvious ones include:

1. Accept only project types with which the firm has a proven and positive track record.
2. Work only for past clients where the relationship was successful and avoid working with new clients.
3. Use the same design team(s) on all projects because the team has proven it can work together successfully.

These strategies, however, can lead to a stilted practice that becomes so risk-free that it becomes bland, uninteresting, and unchallenging. Most design firms and design professionals want or need challenges. Challenging projects stretch the portfolio of design firms, design professionals, and PMs. Many design firms actively seek out projects that present greater and more rewarding challenges. Many design professionals and PMs seek out design firms with just that attitude. Of course, new, interesting, and challenging projects present risks. Risks directly associated with the design itself can only be alleviated by good design. The PM and design team should produce the very best design possible to meet the client's and project's needs. But there are other risks design professionals face as well. Surprisingly, many of them are related to the agreement between the owner and the design professional. Design is a challenging and risky enough endeavor as it is without being compounded by natty contractual risks. Fortunately, these can be controlled by employing a few basic risk management strategies, such as:

1. Use standardized contract forms whenever possible.
2. Understand the provisions of the contract.
3. Avoid contract language that increases risk.
4. Avoid unacceptable risks.
5. Use fee types appropriate for services provided.
6. Provide more comprehensive services.
7. Identify excluded as well as included services.
8. Specify how disputes will be resolved.

How can business executives make the best investment decisions? Is there a method of risk analysis to help managers make wise acquisitions, launch new products, modernize the plant, or avoid overcapacity? "Risk Analysis in Capital Investment" takes a look at questions such as these and says "yes"—by measuring the multitude of risks involved in each situation.

Mathematical formulas that predict a single rate of return or “best estimate” are not enough. The author’s approach emphasizes the nature and processing of the data used and specific combinations of variables like cash flow, return on investment, and risk to estimate the odds for each potential outcome. Managers can examine the added information provided in this way to rate more accurately the chances of substantial gain in their ventures. The article, originally presented in 1964, continues to interest HBR readers. In a retrospective commentary, the author discusses the now routine use of risk analysis in business and government, emphasizing that the method can—and should—be used in any decision-requiring situations in our uncertain world.

Of all the decisions that business executives must make, none is more challenging—and none has received more attention—than choosing among alternative capital investment opportunities. What makes this kind of decision so demanding, of course, is not the problem of projecting return on investment under any given set of assumptions. The difficulty is in the assumptions and in their impact. Each assumption involves its own degree—often a high degree—of uncertainty; and, taken together, these combined uncertainties can multiply into a total uncertainty of critical proportions. This is where the element of risk enters, and it is in the evaluation of risk that the executive has been able to get little help from currently available tools and techniques.

There is a way to help the executive sharpen key capital investment decisions by providing him or her with a realistic measurement of the risks involved. Armed with this gauge, which evaluates the risk at each possible level of return, he or she is then in a position to measure more knowledgeably alternative courses of action against corporate objectives.

Need for New Concept

The evaluation of a capital investment project starts with the principle that the productivity of capital is measured by the rate of return we expect to receive over some future period. A dollar received next year is worth less to us than a dollar in hand today. Expenditures three years hence are less costly than expenditures of equal magnitude two years from now. For this reason we cannot calculate the rate of return realistically unless we take into account (a) when the sums involved in an investment are spent and (b) when the returns are received.

Comparing alternative investments is thus complicated by the fact that they usually differ not only in size but also in the length of time over which expenditures will have to be made and benefits returned.

These facts of investment life long ago made apparent the shortcomings of approaches that simply averaged expenditures and benefits, or lumped them, as in the number-of-years-to-pay-out method. These shortcomings stimulated students of decision making to explore more precise methods for determining whether one investment would leave a company better off in the long run than would another course of action.

It is not surprising, then, that much effort has been applied to the development of ways to improve our ability to discriminate among investment alternatives. The focus of all of these investigations has been to sharpen the definition of the value of capital investments to the company. The controversy and furor that once came out in the business press over the most appropriate way of calculating these values have largely been resolved in favor of the discounted cash flow method as a reasonable means of measuring the rate of return that can be expected in the future from an investment made today.

Thus we have methods which are more or less elaborate mathematical formulas for comparing the outcomes of various investments and the combinations of the variables that will affect the investments. As these techniques have progressed, the mathematics involved has become more and more precise, so that we can now calculate discounted returns to a fraction of a percent.

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But sophisticated executives know that behind these precise calculations are data which are not that precise. At best, the rate-of-return information they are provided with is based on an average of different opinions with varying reliability and different ranges of probability. When the expected returns on two investments are close, executives are likely to be influenced by intangibles—a precarious pursuit at best. Even when the figures for two investments are quite far apart, and the choice seems clear, there lurk memories of the Edsel and other ill-fated ventures.

Self Assessment

Fill in the blanks:

11. The of this approach is fairly simple. Firms that have risky and consequently high cost debt will also have risky and consequently high cost equity.
12. At the outset we assumed, inter alia, that the adoption of new investment proposals will not change either the risk complexion or the capital of the firm.
13. If interest rates in the rise, the cost of debt to firms increases and vice versa.
14. The risk premium reflects the perceived risk of equity stocks and investor aversion to risk.
15. Often firms use book value weights in the existing capital structure to calculate the
16. The cost of capital for a is calculated on the basis of the specific sources of finance used for it.



Case Study

Development of Aakash Tablet

Projects are different from processes in many ways. Projects are carried out in an uncertain environment and project managers have to manage many external and internal factors that are ignored while managing a process.

Caselet 1 highlights the need to adopt a **project management** approach to cater to the diverse needs of customers.

Caselet 2 focuses on the need to manage the interests of various stakeholders to implement a project successfully. This case also introduces the readers to various project roles and the reporting relationships that exist in a project organization.

Issues

1. The difference between a process and a project.
2. The need for management projects in a way that is different from managing processes.
3. The influence of a project's stakeholders on the success of the project.

"The Aakash is a ray of hope that India can leverage technology to get more of its 220 million students enough tools to escape poverty and poor teaching, but it's also a challenge to the West."

– Thomas L. Friedman, November 2011

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“Our goal was to break the price barrier for computing and Internet access. Working with IIT Rajasthan, and NME-ICT, we have created a product that will finally bring affordable computing and Internet access to the masses.”

– **Suneet Singh Tuli (Tuli), President & CEO, Datawind Ltd., November 2011**

“It will be a cool gadget that pushes boundaries in computing, and leaves education as moribund as before...While I agree that Suneet Singh Tuli’s business plan of selling tablets directly to consumers based on clear market advantages is more sound than Nicholas Negroponte’s idea of selling millions of laptop to governments based on a handshake with presidents, I do not see a better education plan. In fact, I see none.”

– **Wayan Vota, Senior Director, Inveneo, December 2011**

On October 5, 2011, the Ministry of Human Resources Development (MHRD), Government of India, launched the much awaited ultra low cost tablet ‘Aakash’. The Made in India Aakash tablet would be available in the retail market at a fraction of the price of Apple’s iPad, the popular tablet from Apple Inc. The Government of India was buying this device from Datawind Limited (Datawind) for US\$ 50 and providing it to students at a subsidized price of US\$ 35. The tablet was also to be made available at retail stores with some extra features at a maximum price of US\$ 60. On the successful launch of the Aakash tablet,

Kapil Sibal (Sibal), Telecom and Human Resource Development Minister, Government of India, said, “The rich have access to the digital world, the poor and ordinary have been excluded **Aakash** will end that digital divide.”

An industry observer noted that the launch of a low cost tablet was very important, especially in a country like India where there was a lack of proper education at all the levels and poverty was rampant. Kit Eaton wrote in his article published at FastCompany.com, “It’s of course admirable that the Indian government and technology companies wanted to develop their own low-cost educational machine. After all, this is a country that has orbital satellite launching capability where simultaneously 85% of the population was living on less than US\$ 2.50 per day (in 2005 at least.) And trying to improve the education of so many impoverished children is a wonderful goal.”

Some industry observers were rather skeptical about Aakash’s capability to transform education in India. Satish Jha (Jha), President and CEO, **One Laptop Per Child (OLPC)**, India project wrote in his article published in **Economics Times**, “It is unlikely **Aakash** will address the key demands of India’s education. It is designed to be an access device that can be used by someone already educated enough to use it. But 95% children of India need to get to a point where they can begin learning.”

Some analysts claimed that the **tablet** would not only have a positive impact on the education sector but would also lead to positive changes in the healthcare and other sectors besides improving internet penetration in the country. In his study, Rajat Kathuria (Kathuria), External Consultant at **Indian Council for Research on International Economic Relations (ICRIER)**, stated that the Indian economy could grow 10.08% faster with every 10% increase in the internet and broadband connections in the country. All this would become possible by the National Mission on Education through Information and Communication Technology (**NME-ICT**) under which the **Aakash tablet** had been developed to provide education to a vast majority of learners with ease, as and when they demanded it.

National Mission on Education Through Information and Communication Technology (NME-ICT)

NME-ICT was one of ambitious missions of the Ministry of Human Resources Development (MHRD), Government of India. The Mission document stated, “For India to emerge as a

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knowledge super power of the world in the shortest possible time it is imperative to convert our demographic advantage into knowledge powerhouse by nurturing and honing our working population into knowledge or knowledge enabled working population.”

MHRD believed that it could play a major role as human resource development would be the key in making India a knowledge superpower of the world. However, poor literacy rates (74% in census as per census, 2011), the slow growth of educational institutions, poor enrolment of students, and high dropout rates were some of the challenges which needed to be answered to make the country a knowledge superpower.

The mission statement further said, “Hence, the conventional approach must also be aided and supported by the technological interventions through ICT so as to make available the knowledge resources to every learner as per his/her convenience and just in time.” According to experts, the tablet, a relatively new entrant, would be the best solution for this.

Indian Tablet Industry

In 2012, the Indian tablet industry was in a nascent stage. According to Hindustan Times, there was a 0.6 million installed base of tablets at the end of 2011. The first entrant into the Indian tablet space was Olive pad from Olive Telecom, which was launched in October 2010

However, the device was unable to make much of an impact. In the same month, electronic major Samsung jumped into the Indian tablet market with the launch of Galaxy Tab 7. After that, in March, 2011, Apple officially launched the iPad in the Indian market. Experts considered this a late launch.

Development of Aakash Tablet

The search for a low cost computing device was not new. Way back in 2002, the first low cost computing device came into existence. In 2002, Simputer Trust developed and released a low cost, portable alternative to the personal computer under the name Simputer, a combination of the words SIMPLE compUTER which could further be expanded to Simple, Inexpensive Multilingual People’s compUTER. After three years, in 2005, One Laptop Per Child Association Inc., offered a US\$ 100 laptop to Indian children under the mission to provide inexpensive educational computers in developing nations across the world. Nicholas Negroponte (Negroponte) gave a presentation on the OLPC in New Delhi on April 7, 2006...

Challenges in Development of Aakash

According to experts, the development of a low cost tablet itself was a big challenge. When a good quality mobile phone was not available for under US\$ 10, then thinking about a full-fledged tablet and making it a reality was itself a big challenge. When the Ministry of MHRD decided to develop a computing and access device in the price range of US\$ 50 many tech and industry experts expected that it would turn out to be a nightmare for MHRD. During the process of making Aakash a reality, the MHRD had to face criticism from various sources. Jha wrote, “Exceptions apart, the US soil has remained the laboratory where new computing technologies get born. And China has refined the craft of manufacturing into its second nature, making the nation, the electronics factory of the world. Then, how would India make the “lowest cost” computer in a tablet form? It has never been known for creating computing technologies...

Looking Forward

According to various reports, the Aakash tablet got an unexpectedly good response from various state governments. Universities too placed big orders for the tablet. For example,

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University of Mumbai had received around 20,000 orders for the Aakash tablets by the end of January 2012. In the same way, the Andhra Pradesh Government had placed an order for 10,000 tablets. The retail version of Aakash received an overwhelming response. Within 20 days, the pre launch booking had reached 2 million from individuals. Tuli said, "While industry analysts were forecasting only 250,000 tablet computers for the Indian market in 2012, our pre-booking rate is now averaging over 100,000 individual end-user sales each day and have cumulatively exceeded over two million." Experts believed that the emergence of Aakash would not only benefit India but also hold out a ray of hope to other developing nations. Tuli said, "This is not only a concept that applies to India, but has ignited the imagination of governments around the world."

Question

Analyse the case and discuss the case facts.

Source: <http://www.icmrindia.org>

4.10 Summary

- A budget is an important concept in microeconomics, which uses a budget line to illustrate the trade-offs between two or more goods.
- Conceptually, the cost of project represents the total of all items of outlay associated with a project which are supported by long-term funds.
- The cost of land varies considerably from one location to another.
- The cost of the buildings and civil works depends on the kinds of structures required which, in turn, are dictated largely by the requirements of the manufacturing process
- Services of foreign technicians may be required in India for setting up the project and supervising the trial runs.
- Fixed assets and machinery which are not part of the direct manufacturing process may be referred to as miscellaneous fixed assets.
- Expenses of the following types incurred till the commencement of commercial production are referred to as pre-operative expenses.
- The principal support for working capital is provided by commercial banks and trade creditors.
- There are two types of share capital equity capital and preference capital.
- In general the cost of debt funds is lower than the cost of equity funds.
- The selling expenses depend mainly on the nature of industry and the kind of competitive conditions that prevail.

4.11 Keywords

Debenture Capital: Akin to promissory notes, debentures are instruments for raising debt capital.

Deferred Credit: Many a time the suppliers of the plant and machinery offer a deferred credit facility under which payment for the purchase of the plant and machinery can be made over a period of time.

Expected Sales: The figures of expected sales are drawn from the estimates of sales and production prepared earlier in the financial analysis and projection exercise.

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Incentive Sources: The government and its agencies may provide financial support as an incentive to certain types of promoters or for setting up industrial units in certain locations.

Miscellaneous Fixed Assets: Fixed assets and machinery which are not part of the direct manufacturing process may be referred to as miscellaneous fixed assets.

Preliminary Expenses: Expenses incurred for identifying the project, conducting the market survey, preparing the feasibility report, drafting the memorandum and articles of association, and incorporating the company are, referred to as preliminary expenses.

Pre-operative Expenses: Expenses of the following types incurred till the commencement of commercial production are referred to as pre-operative expenses.

Provision for Contingencies: A provision for contingencies is made to provide for certain unforeseen expenses and price increases over and above the normal inflation rate which is already incorporated in the cost estimates

Share Capital: There are two types of share capital equity capital and preference capital. Equity capital represents the contribution made by the owners of the business, the equity shareholders, who enjoy the rewards and bear the risks of ownership.

Term Loans: Provided by financial institutions and commercial banks, term loans represent secured borrowings which are a very important source (and sometimes, the major source) for financing new projects as well as for the expansion, modernization, and renovation schemes of existing firms.

4.11 Review Questions

1. Define financial projections.
2. What do you know about preliminary and capital issue expenses?
3. Describe, in brief, the pre-operative expenses.
4. Discuss, in brief, the norms of regulatory bodies and financial institutions.
5. Explain the working capital requirement and its financing.
6. Explain, in detail, the time value of money.
7. What are the factors affecting the weighted average cost of capital?
8. Discuss, in detail, the appraisal criteria in projects.
9. Discuss the risk analysis in capital investment decisions.
10. What are the strategies for controlling risk?

Answers: Self Assessment

- | | |
|------------------|----------------|
| 1. Provision | 2. Commercial |
| 3. Projects | 4. Margin |
| 5. Pre-operative | 6. promissory |
| 7. Contingency | 8. Preliminary |
| 9. balance sheet | 10. annuity |
| 11. Logic | 12. Structure |

13. Economy	14. Market	Notes
15. WACC	16. Project	

4.13 Further Readings



Books

- Clements/Gido, *Effective Project Management*, Thomson
- Clifford F. Gray and Erik W. Larson, *Project Management*, Tata McGraw Hill
- Dennis Lock, *Project Management*, Ninth Edition, Gower
- K. Nagarajan, *Project Management*, Third Edition, New Age International
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Unit 5: Environmental Appraisal of Projects

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Objectives

After studying this unit, you will be able to:

- Understand meaning of environment and pollution;
- Know about pollution created by different industries;
- Know about methods of preventing pollution;
- Understand about Environmental Impact Assessment;
- Know about environmental regulations in India.

Introduction

Environment means the surrounding under which someone or something exists. The aggregate of all conditions, events and influences that surround and affect it. The environment influences on organization in many ways, its understanding is of crucial importance. Environment may be broadly categorized into two types:

1. **External Environment:** It includes all the factors outside organization which provide opportunities or threats to the organization. It may be social, cultural, political, economical, market, technological environment.
2. **Internal Environment:** This environment in which an organization exists. It refers to all the factors within an organization, which impart strengths or cause weaknesses of a strategic nature.

5.1 Meaning of Environment and Pollution

Environmental analysis is nothing but identifying opportunities and threats affecting their business. In other words environmental analysis is nothing but SWOT– Strengths, Weaknesses,

Opportunities and Threats– analysis. Strategic management needs environmental analysis and appraisal. Environment may be broadly classified into two types viz., (1) Internal Environment and (2) External environment or both may be called as 'Environment in General'. This General environment is having different dimensions, as mentioned below:

Notes

Dimensions of General Environment

1. **Social and cultural environment:** Social and cultural environment refers to the influenced exercised by certain factors which are beyond the company's gate. Such factors include people's attitude to work and wealth, role of family, marriage, religion and education, ethical issues and social responsiveness of business. Social and cultural environment is highly relevant for a business unit as the variety of goods its produces, the type of employees it gets, and its obligation to society depend on the cultural milieu in which the business operates. Social and cultural environment is man-made. Man has created the social and cultural environment by using the natural environment with skill and culture. He has exploited natural resources in some regions of the world and developed a cultural environment, while in some other regions natural resources have not been exploited.
2. **Competitive environment:** Competitive markets exist in every economy, so long as two or more individuals are willing to undertake exchange transactions. Further, an economy, particularly, the capitalist economy cannot function without markets. Truly, speaking, the whole rationality of the capitalist economy is deeply rooted in the price or market mechanism. The consumers exercise their free choice in the market and the producers take decisions about the allocation of resources including time among competing ends in response to market demand. Decision making by the producers will become irrational.
3. **Economic environment:** Economic environment refers to all those economic factors which have a bearing on the functioning of business, like: economic policies, economic systems and economic reforms. Economic environment mostly influences business sector. Indian economic environment is influenced by several factors, which are mentioned below:
 - (a) Industrial policy
 - (b) Public sector
 - (c) Private sector
 - (d) Liberalisation, privatisation and globalisation
 - (e) Foreign Trade policies
 - (f) Per capita income levels of consumers
 - (g) Financial sectors
4. **Political environment:** Ruling party makes the policies of the government. Agenda of political party is most influencing factor for the business development. The political system prevailing in a country directs polices and controls business and industries. Political system under democratic comprises three vital institutions i.e. legislature, executive or government.
5. **Legal environment:** In India Legislature creates legal environment. It has more influence on business. The Government of India is now implementing several law for the monitoring and regulating business and industries. For example: Acts: (a) Monopolies and Restrict Trade Practices Act, (b) Companies Act, (c) Industrial Regulation Act, (d) Income tax Act , (e) Sales Tax Act, etc.,

Notes

6. *Policies* like Industrial policy, EXIM policy, Fiscal policy, Banking policy, Monetary policy etc.,
7. *Technological environment*: Technological environment is prevailing even before evolution of computers. The concept of computerisation and its application to decision-making process is a recent phenomenon, and it is also called as User-Machine system. It implies that some tasks are best performed by humans, while others are best done by machine. The user of an technological environment, is any person responsible for entering input data, instructing the system, or utilizing the information output of the system. Hence, this system is useful to solve many problems of the organization. User-machine interaction is facilitated by operations in which the user's input-output device (usually a visual display unit) is connected to the computer.



Notes Ruling party makes the policies of the government. Agenda of political party is most influencing factor for the business development.

The most appropriate definition of environmental pollution would be the introduction of different harmful pollutants into certain environment that make this environment unhealthy to live in. The most common pollutants are usually chemicals, garbage, and waste water. Environmental pollution is happening in many parts of the world, especially in form of air and water pollution. The best example for air pollution are some of China's cities, including capital Beijing, and the best example for water pollution is India with its Ganges river pollution problem.

Globally speaking environmental pollution problem is much bigger than we think it is, even in many our cities there are problems with dirty air, or sound pollution from traffic and different other disturbing noises. The most severe environmental pollution is happening in developing countries of the third world because not only to they lack any form of sustainable management but they also lack even the basic sanitation so you can imagine how bad is the environmental condition in these countries.

Pollution of the environment is causing great damage to ecosystem that depend upon the health of this environment. Air and water pollution can cause death of many organisms in given ecosystem, including humans. Water pollution according to some estimates cause 14.000 deaths each day in the world, most of them in India. This is really no surprise when you look at the data that says that 700 million Indians do not even have access to a proper toilet, whether alone clean water.

Many developed countries have introduced certain laws to not only regulate various types of pollution but also the laws to mitigate the adverse effects of pollution. Pollution levels need to be controlled all the time if we want to keep our environment safe and healthy. Without proper pollution control environment soon becomes unhealthy. Preventing introduction of pollutants into some environment is the best way to protect environment from pollution. To do so it is important to develop ecological conscience of nearby communities, and effective waste management in form of recycling.

Healthy environment is prerequisite of healthy life for us and our children, and fighting pollution is definitely the best way to keep our environmental healthy.

5.2 Pollution created by different Industries

Industrial pollution is pollution which can be directly linked with industry, in contrast to other pollution sources. This form of pollution is one of the leading causes of pollution worldwide; in

the United States, for example, the Environmental Protective Agency estimates that up to 50% of the nation's pollution is caused by industry. Because of its size and scope, industrial pollution is a serious problem for the entire planet, especially in nations which are rapidly industrializing, like China.

Notes

This form of pollution dates back to antiquity, but widespread industrial pollution accelerated rapidly in the 1800s, with the start of the Industrial Revolution. The Industrial Revolution mechanized means of production, allowing for a much greater volume of production, and generating a corresponding increase in pollution. The problem was compounded by the use of fuels like coal, which is notoriously unclean, and a poor understanding of the causes and consequences of pollution.

There are a number of forms of industrial pollution. One of the most common is water pollution, caused by dumping of industrial waste into waterways, or improper containment of waste, which causes leakage into groundwater and waterways. Industrial pollution can also impact air quality, and it can enter the soil, causing widespread environmental problems.

Because of the nature of the global environment, industrial pollution is never limited to industrial nations. Samples of ice cores from Antarctica and the Arctic both show high levels of industrial pollutants, illustrating the immense distances which pollutants can travel, and traces of industrial pollutants have been identified in isolated human, animal, and plant populations as well.

Industrial pollution hurts the environment in a range of ways, and it has a negative impact on human lives and health. Pollutants can kill animals and plants, imbalance ecosystems, degrade air quality radically, damage buildings, and generally degrade quality of life. Factory workers in areas with uncontrolled industrial pollution are especially vulnerable.

A growing awareness of factory pollution and its consequences has led to tighter restrictions on pollution all over the world, with nations recognizing that they have an obligation to protect themselves and their neighbors from pollution. However, industrial pollution also highlights a growing issue: the desire of developing nations to achieve first world standards of living and production. As these countries industrialize, they add to the global burden of industrial pollution, triggering serious discussions and arguments about environmental responsibility and a desire to reach a global agreement on pollution issues.

Self Assessment

Fill in the blanks:

- analysis is nothing but identifying opportunities and threats affecting their business.
- and cultural environment refers to the influenced exercised by certain factors which are beyond the company's gate.
- markets exist in every economy, so long as two or more individuals are willing to undertake exchange transactions.
- environment refers to all those economic factors which have a bearing on the functioning of business.
- party makes the policies of the government. Agenda of political party is most influencing factor for the business development.

5.3 Methods of Preventing Pollution

Pollution is the introduction of any contamination in the ecosystem that causes harmful changes within the organisms of the ecosystem. Pollution is mainly caused because of certain human activities that are not suitable for the environment. You can easily prevent the causes of pollution around by practicing the tips given in the article on how to prevent pollution.

Most of the countries are dealing with the problem of pollution. These problems are getting severe day by day. The main cause of pollution is lack of sufficient knowledge. Human activities are causing pollutions such as water pollution, air pollution, sound pollution and chemical pollution. You need to take some immediate preventive measures to prevent pollution and save our ecosystem.

How to prevent Water Pollution?

There are many reasons that are responsible for water pollution. Release of harmful chemical into the river or seas by the industries, certain house hold activities and many other reasons.

1. Never wash off any synthetic products into the water. Never dump garbage into the water.
2. Perform proper purification methods on the sewage that is released from the factories into the rivers and lakes.
3. Plant water hyacinth into the river, this will help in preventing the water from getting polluted from metallic pollutants.
4. Do not dump garbage in the nearby river, if you find any such cases around then immediately inform the pollution control bodies around you.
5. If possible recycle the products and make use of such products.
6. Do not carry out nuclear explosions under water. They release some dangerous pollutants in the water whose effects cannot be cured immediately.
7. Avoid making use of synthetic fertilizers in the farm. These synthetic fertilizers get washed away with the rain water and cause water pollution. Make use of natural fertilizers made from recycling wastes.

How to prevent Air Pollution?

Air pollution is caused due to release of harmful pollutants such as carbon dioxide, carbon monoxide, nitrous oxide, methane, sulfur dioxide and many other gases.

1. Minimize the level of smoke emission from factories, vehicles and home.
2. Do not burn the garbage. Dispose it in the garbage bins.
3. Use alternative pollution free sources of fuel. Renewable sources such as solar energy and tidal energy should be used instead of burning wood and fossil fuels.
4. Stop deforestation (cutting trees in the forest) and promote afforestation (planting trees).
5. Plant trees by the sides of the road and encourage your friends and colleagues to also plant trees.
6. Trees help in absorbing carbon dioxide from the atmosphere and purification of the air around us.
7. Proper maintenance of vehicles is also very important for preventing air pollution.

8. Look for the advanced smoke controlling appliances in the market and upgrade your vehicles with such appliances.
9. Limit the use of electricity, air conditioners, water heaters, coolers; they emit heat into the atmosphere that can also be a reason for air pollution.
10. Use ethanol in some amount along with petrol in your vehicles. This limits the emission of pollutants in the atmosphere.
11. Reduce the amount of pollutants released due to industrialization by using effective alternatives in the industries.
12. Reduce the amount of nuclear explosions. Nuclear explosions release harmful radioactive pollutants into the atmosphere.

Notes

Air pollution is the major cause of depletion of protective layer that prevents us from the harmful ultraviolet radiations

How to prevent Sound Pollution?

1. Keep the volume of your television and music system low.
2. Avoid continuous honking of horns.
3. Do not make use of loudspeakers in public places.
4. Impose rules on the frequency of sound that should be used in public places.
5. Check that your vehicles do not emit excessive sound. Upgrade them with sound controlling devices.

How to prevent Chemical Pollution?

1. Do not use harmful chemicals in the in the factories or if you use such chemicals then do not release them into the water bodies.
2. Use of organic manure should be preferred in the farms.
3. Do not use chemical fertilizers and avoid spraying of pesticides on the crops. This is the major cause of chemical pollution.
4. DDT is the most harmful pesticide used in the farms. Use of this pesticide was banned in most of the countries, but there are still some of the farmers that use DDT in their farms.
5. Avoid disposing plastic and polythene bags. Recycle them and make their proper use.

Reach the masses through various communication media and explain them the causes of pollution and help them understand and implement various preventive measures to stay safe from the increasing pollution.

Related Tags: ways of preventing pollution, how to prevent pollution, preventing pollution, methods of preventing pollution, ways to prevent pollution, how to prevent chemical pollution, measures of preventing pollution, ways to prevent chemical pollution.



Did u know? Air pollution is the major cause of depletion of protective layer that prevents us from the harmful ultraviolet radiations.

5.4 Environmental Regulations in India

Indian Constitution – Article 48a

In the Directive Principles of State Policy, Article 48-A was inserted which enjoins the State to make endeavor for protection and improvement of the environment and for safeguarding the forest and wildlife of the country (42nd amendment w.e.f. 3rd January 1977).

Indian Constitution – Article 51-A (G)

It shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures (42nd amendment w.e.f. 3rd January 1977).

Environmental Regulations in India

Year	Environmental Regulations
1974	Water (Prevention & Control of Pollution Act) Amendments, 1988
1975	The Water (Prevention & Control of Pollution) Rules
1977	The Water (Prevention & Control of Pollution) Cess Act
1978	The Water (Prevention & Control of Pollution) Cess Rules
1981	The Air (Prevention & Control of Pollution) Act, Amendments, 1987
1982/ 1983	The Air (Prevention & Control of Pollution) Rules
1986	The Environment (Protection) Act, Amendments (1989,1990,1993,1996,1997,1998,1999,2000,2001)
1986	The Environmental (Protection) Rules
1992	E (P) Act Notification – “Environment Statement”
1994	E (P) Act Notification – “Environmental Clearance”
1997	Amendments in the Environment Clearance, Notification – “Public Hearing” made mandatory
1989	The Hazardous Wastes (Management and Handling) Rules, Amendments, 2000, Draft Amendments 2002
1989	Manufacture, Storage and Import of Hazardous Chemical Rules, Amendments, 1994, 2000
1991	The Public Liability Insurance Act/Rules, 1992
1995	The National Environment Tribunal Act
1997	Prohibition on the Handling of Azo dyes
1997	The National Environment Appellate Authority Act
1998	The Bio-Medical Waste (M&H), Rules

Contd...

		Notes
1999	Notification for making 100% Utilization of Fly-ash made mandatory	
2000	Municipal Solid Waste (M&H) Rules	
2000	Ozone Depleting Substance (R&C) Rules	
1999	Regulation on recycling of Waste Oil and Non-ferrous scrape	
2000	Noise Pollution (Regulations and Control)	
2001	Batteries (M&H) Rules	

Jurisdiction of Environmental Legislation in India

1. The Water (Prevention and Control of Pollution) Act, 1974

- ❖ Provide information to the SPCB
- ❖ Provide access to the SPCB for taking samples
- ❖ Allow entry to the SPCB to ascertain that the provisions of the Act are being complied with.

Responsibilities:

- ❖ Obtain "Consent to Establish"
- ❖ Obtain "Consent to Operate"
- ❖ Apply for renewal of the "Consent to Operate" before the expiry of validity period
- ❖ Consent to be deemed as granted automatically and unconditionally after four months from the date of application already given or refused before this period
- ❖ Refusal of "Consent" to be recorded in writing
- ❖ Pay Water Cess as indicated in the assessment order
- ❖ Affix water meters of the prescribed standards
- ❖ Provide access to SPCB
- ❖ Pay interest in case of delay in paying the Water Cess
- ❖ Pay penalty for non-payment of Cess
- ❖ Industry is entitled to 25% rebate if meeting certain conditions

2. The Air (Prevention & Control of Pollution) Act, 1981

- ❖ Comply with the conditions in the "Consent to Establish" or "Consent to Operate"
- ❖ Not to discharge air pollutant(s) in excess of the prescribed standards
- ❖ Furnish information to the SPCB of any accident or unforeseen act or event
- ❖ Allow entry to the SPCB to ascertain that provisions of the Act are being complied with
- ❖ Provide information to enable SPCB to implement the Act
- ❖ Provide access to the SPCB for taking samples
- ❖ Comply with the directions issued in writing by the SPCB
- ❖ Obtain "Consent to Establish"

Notes

- ❖ Obtain “Consent to Operate”
 - ❖ Apply for the renewal of “Consent to Operate” before expiry of the validity period
 - ❖ Consent to be deemed as granted after four months from the date of receipt of application if no communication from the SPCB is received
 - ❖ A prior “Notice of Inspection” to be served by the SPCB
 - ❖ Industry to ensure that specified emission sampling procedure is being followed by the SPCB
 - ❖ Opportunity to file objections with the SPCB within 15 days from the date of service of notice
 - ❖ PCB to record reasons in writing in case it does not provide an opportunity to the industry to file objections
3. Environment (Protection) Act, 1986
- ❖ Comply with the directions issued by the Central Government. The direction may include:
 - ◆ closure, prohibition or regulation of any industry, or
 - ◆ stoppage or regulation of the supply of electricity, water or any other service
 - ❖ Prevent discharges or emissions excess of the prescribed standards
 - ❖ Furnish information of any accidental or unforeseen event
 - ❖ Allow entry and inspection to ascertain compliance
 - ❖ Allow samples to be taken
 - ❖ Submit an “Environmental Statement” every year before 30th September to the SPCB
 - ❖ Obtain prior “Environmental Clearances” from MoEF, in case of a new project or for modernization/expansion of the existing project
4. The Hazardous Waste (Management and Handling) Rules, 1989, Amendments 2000
- ❖ Check whether the waste(s) generated covered in Schedule 1 and 2 of the amendment rules, 2000
 - ❖ If covered, apply in the Prescribed Format to obtain an “Authorization” for proper treatment and disposal of hazardous waste(s) and comply with the conditions specified in the authorization
 - ❖ Take steps, wherever feasible for reduction, recovery and recycling of wastes
 - ❖ Ensure proper collection, reception, treatment, storage and disposal of hazardous wastes
 - ❖ Apply for renewal of authorization before expiry of the validity period
 - ❖ Maintain records of hazardous wastes handling (Form 3)
 - ❖ Submit “Annual Returns” to the SPCB (Form 4)
 - ❖ Report to the SPCB any accident
 - ❖ Labelling, Packaging, Transportation of HW as per Motor Vehicle Act, 1988 and Rules 1989

5. The Hazardous Waste (Management and Handling) Rules, 1989, Amendments 2000, Draft Amendments 2002 Notes
- Draft Amendments, 2002 (Dt. 21st May 2002)
- ❖ Clarification on the definition of Hazardous Wastes
 - ❖ List of hazardous waste according to schedule 1 is being modified
 - ❖ Procedure for registration of re-processors of non-ferrous scrap and waste oil
 - ❖ Schedule for hazardous wastes prohibited for import to and export from India
- Manufacture, Storage and Import of Hazardous Chemical (Amendment) Rules, 1994, 2000
- ❖ Identify whether the chemicals handled, used and stored or imported are covered in the Schedule 1 and/or 3 of the Rules, Schedule 2 for isolated storages.
- If covered in schedule 1:
- ❖ Occupier to identify hazards associated with industrial activity and take adequate steps for prevention and control
 - ❖ Occupier to provide relevant information to persons liable to be affected by a major accident
 - ❖ Occupier to develop information in the form of a safety data sheet
 - ❖ Occupier to notify the concerned authorities within 48 hours of the occurrence of a major accident
 - ❖ Occupier to label the specified information on every container of hazardous chemicals.
 - ❖ Occupier to submit an up-to-date safety report at least ninety days before making any modification.
 - ❖ Occupiers of new and existing industrial activities to carry out safety audit and submit report within 30 days.
 - ❖ Occupier to submit a safety audit update report once a year and forwarding a copy within 30 days.
 - ❖ Occupier to prepare up-to-date on-site emergency plan before commencing a new industrial activity involving specified chemicals.
 - ❖ Occupier shall conduct a mock drill of emergency plan every six months and submit a report.
 - ❖ Occupier to maintain records of imports of hazardous chemicals and to provide information to the concerned Authority.
 - ❖ Occupier to ensure the transportation of hazardous chemicals as per the provisions of the Motor Vehicles Act, 1988.
6. The Public Liability Insurance Act, 1991
- ❖ Owner to provide relief in case of death or injury or damage to property from an accident on the principle of no fault.
 - ❖ Owner to draw insurance policies more than the paid-up capital but less than ₹ 50 Crores.
 - ❖ 'Paid-up Capital' is the market value of all assets and stocks on the date of insurance.

- Notes**
- ❖ Owner to pay additional amounts as contribution to the 'Environmental Relief Fund'.
 - ❖ Owner to provide any information required for ascertaining compliance with the provisions of the Act.
 - ❖ Owner to allow entry and inspection to ascertain compliance with the provisions of the Act.
 - ❖ Owner to pay the amount of an award as specified by the Collector.
 - ❖ Comply with the directions issued in writing by the Central Government, directions may include;
 - ◆ prohibition or regulations of handling of any hazardous substances, or
 - ◆ stoppage or regulation of the supply of electricity, water or any other service.

Environmental Clearance

Grant of Environmental Clearance (1994)

If the industrial unit comes under the specified project, then environmental clearance would be required from the Ministry of Environment and Forests for new projects as well as for Expansion/modernisation of Existing projects if pollution load is increasing.

Public Hearing (1997)

Who requires Environmental Clearance?

The following project categories are required to obtain environmental clearance

- New Projects
- If investment is more than ₹ 100 crores
- Nuclear power plant and related projects, such as Heavy Water Plants, nuclear fuel complex, rare earths.
- River valley projects including hydro power, major irrigation projects and a combination, including flood control,
- Ports harbours, airports (except minor ports and harbours)
- Petroleum refineries including crude and product pipelines.
- Chemical fertilizers
- Exploration for oil and gas and their production transportation and storage
- Synthetic Rubber
- Primary metallurgical industries;
- Electric Arc Furnaces (Mini Steel Plants)
- Viscose staple fibre and filament yarn
- Storage batteries integrated with the manufacture of oxides of lead and lead antimony alloy,

- Thermal power plants
- Pulp paper and newsprint
- Cement
- Any project proposed to be located within twenty five Km of
 - ❖ Reserved forests
 - ❖ Ecologically sensitive areas which may include National Parks, Sanctuaries,
 - ❖ Biosphere Reserves,
- Critically polluted areas
- Or within fifty kms of interstate boundary shall require environmental clearance from the Central Government

The following project categories, irrespective of the investment :

- Pesticides
- Bulk drugs and pharmaceuticals
- Asbestos and asbestos products,
- All tourism projects between 200 – 500 meters of a High Tide Line and at locations with an elevation of more than 1,000 meters with investments of more than ₹ 5 crores.
- Mining projects (with leases of more than 5 hectares)
- Highway projects except projects relating to improvement work
- Petrochemical Complexes
- Tarred roads in the Himalayas and forest areas
- Distilleries
- Raw skins and hides
- Dyes
- Foundries
- Chlor-alkali industry
- Hydrocyanic Acid
- Electroplating
- Meta amine phenol
- Small scale industrial units in project categories mentioned above.
- With investments less than ₹ 1 crore and Which are on the reserved list

Are exempted from environmental clearance

For obtaining site clearance, application is to be submitted giving the location of the project along with requisite details, to the Ministry of Environment and Forests.

The Ministry of Environment and Forests will convey its decision about the suitability of the proposed site within a maximum period of 30 days.

Notes

Environmental Clearance

- Last Opportunity by MoEF for the defaulting project proponents
- To seek environment Clearance by 31st March, 2003
- Environmental Clearance can be taken for industrial estates.

The National Environment Tribunal Act, 1995

- To provide for strict liability for damages arising out of any accident occurring while handling any hazardous substance
- To establish a National Environment Tribunal for granting relief and compensation
- The Tribunal may if it thinks fit take up cases for claims for compensation suo moto (on its own)
- A claimant making an application may also make an application for immediate relief under the Public Liability Insurance Act.
- Biomedical Waste (Management & Handling) Rules, 1998
- Proper segregation of wastes & labelling as specified
- Install Pollution Control Systems like Incinerators, autoclaves or microwaves or adopt the burial and meet the prescribed limits of emissions
- Comply with the deadline stipulated to install the pollution control systems
- Transportation of waste as per the norms

Regulation on Recycling of Waste Materials, 1999, 2000

- The waste materials targeted: waste oils, lead – acid batteries, non-ferrous wastes
- The auction/sale of these materials to only authorised recyclers who are registered with the Ministry of Environment & Forests, Govt of India
- No trader can take such type of waste

Noise Pollution (Regulation & Control) Rules, 2000

- Aiming to regulate and control noise from sources like, industrial activity, construction activity, generator sets, loud speakers, public address systems, music systems, vehicular horns and other mechanical devices.
- The prescribed Ambient Noise Levels are to be complied.
- A loud speaker should not be used except after obtaining written permission from the authority
- If the noise level exceeds the ambient standards by 10d(B) A, complaint can be lodged to the authority.

Self Assessment

Fill in the blanks:

6. is the introduction of any contamination in the ecosystem that causes harmful changes within the organisms of the ecosystem

7. Pollution is mainly caused because of certain activities that are not suitable for the environment.
8. is the most harmful pesticide used in the farms. Use of this pesticide was banned in most of the countries, but there are still some of the farmers that use DDT in their farms.
9. A loud speaker should not be used except after obtaining written permission from the

Notes

5.5 Environmental Impact Assessment

Environmental Impact Assessment Process in India and the Drawbacks

EIA is an exercise to be carried out before any project or major activity is undertaken to ensure that it will not in any way harm the environment on a short term or long term basis. Any developmental endeavor requires not only the analysis of the need of such a project, the monetary costs and benefits involved but most important, it requires a consideration and detailed assessment of the effect of a proposed development on the environment.

The environment impact process was introduced with the purpose of identifying/evaluating the potential beneficial and adverse impacts of development projects on the environment, taking in to account environmental, social, cultural and aesthetic considerations. All of these considerations are critical to determine the viability of a project and to decide if a project should be granted environmental clearance.

An EIA concentrate on problems, conflicts and natural resource constraints which might affect the viability of a project. It also predicts how the project could harm to people, their homeland, their livelihoods, and the other nearby developmental activities. After predicting potential impacts, the EIA identifies measures to minimize the impacts and suggests ways to improve the project viability.

The aim of an EIA is to ensure that potential impacts are identified and addressed at an early stage in the projects planning and design. To achieve this aim, the assessment finding are communicated to all the relevant groups who will make decisions about the proposed projects, the project developers and their investors as well as regulators, planners and the politicians. Having read the conclusions of an environmental impact assessment, project planners and engineers can shape the project so that its benefits can be achieved and sustained with out causing adverse impacts.

In recent years, major projects have encountered serious difficulties because insufficient account has been taken of their relationship with the surrounding environment. Some projects have been found to be unsustainable because of resource depletion. Others have been abandoned because of public opposition, financially encumbered by unforeseen costs, held liable for damages to natural resources and even been the cause of disastrous accidents. Given this experience, it is very risky to undertake finance, or approve a major project without first taking in to account its environmental consequences and then siting and designing the project so as to minimize adverse impacts.

Due to public pressure on the government to accept accountability for the activities of its agencies the National Environmental Policy Act (NEPA) was formed in USA during 1970. This was the basis for the development of a mechanism which came to be known as Environmental Impact Assessment (EIA).

Notes

EIA Process in India

The role for EIA was formally recognized at the earth summit held at Rio conference in 1992. Principle of the Rio declaration states that –

“EIA as a national instrument shall be undertaken for the proposed activities that are likely to have significant adverse impact on the environment and are subject to a decision of a competent national authority”.

In India many of the developmental projects till as recently as the 1980s were implemented with very little or no environmental concerns. The environmental issues began receiving attention when a national committee on environmental planning and coordination was set up under the 4th five year plan (1969-1978). Till 1980, the subjects of environment and forests were the concern of the Dept of Science and Technology and Ministry of Agriculture respectively.

Later, the issues were formally attended by the Dept of Environment which was established in 1980. This was then upgraded to the Ministry of Environment & Forest in 1985. In 1980, clearance of large projects from the environmental angle became an administrative requirement to the extent that the planning commission and the central investment board sought proof of such clearance before according financial sanction.

Five year later, the Dept of Environment and Forests, Government of India, issued guidelines for Environmental Assessment of river valley projects. These guidelines require various studies such as impacts on forests and wild life in the submergence zone, water logging potential, upstream and down stream aquatic ecosystems and fisheries, water related diseases, climatic changes and seismicity.

A major legislative measures for the purpose of environmental clearance was in 1994 when specific notification was issued under section 3 and rule 5 of the Environment Protection Act, 1986 called the “Environment impact Assessment Notification 1994”.

The first step in seeking environmental clearance for a development project is to determine what statutory legislations apply to the particular project. The MoEF has brought out several notifications restricting the development of industries in specified ecologically sensitive areas. In addition there are also draft rules framed for the siting of industries.

Environmental clearance for development projects can be obtained either at the state level or at the central level depending on certain criteria concerning the characteristics of the project. However (regardless of where the final environmental clearance is obtained from), for most projects the consent must first be taken from the state pollution control board or pollution control committees in the case of union territories.

Responsibility of Preparation of EIA Statement

The project proponent is responsible for the preparation of the EIA statement, with the help of external consultant or institution.

The Impact Assessment Agency

The MoEF is the agency for environmental clearance. If necessary, it may consult a committee of experts with a composition specified in schedule III of notification.

Timing of EIA

Ideally EIA should provide information to decision makers at early stage of the project planning cycle. It should be initiated as early as possible before the commencement of projects. If the projects secure approval, EIA should include a provision to cover the audit of the project.

Cost**Notes**

The amount allocated and spent for preparation of EIA by the project proponents are usually abysmally low compared to the overall project costs (often less than 1% of over all projects).

Main EIA: After “scoping” the main EIA begins. The EIA attempts to answer five questions basically:

1. What will happen as a result of the project?
2. What will be the extent of the changes?
3. Do the changes matter?
4. What can be done about them?
5. How can decision makers be informed of what needs to be done?

The EIA becomes a cyclic process of asking and further asking the first four questions until decision makers can be offered workable solutions.

Identification: Identification means the answer to the first question, i.e. “what will happen as result of the project?” If a preliminary assessment has been done it will have broadly reviewed the projects effect, also scoping will have focused the study on the most important issues for decision makers. Taking these findings in to account the full EIA study now formally identifies those impacts which should be assessed in detail. This identification phase of the study may use these or other methods

1. Compile a list of key impacts (e.g. changes in air quality, noise levels, wild life habitats, species diversity, landscape views, social and cultural systems, settlement patterns and employment levels from other EIA s for similar projects).
2. Name all the projects sources of impacts (e.g. smoke emissions, water consumption, construction jobs) using checklists of questionnaires, then list possible receptors in the environment (e.g. crops, communities using same water for drinking, migrant of labour) by surveying the existing environment and consulting with interested parties.
3. Identify impacts themselves through the use of checklist, matrices, networks, overlays, models and simulations.

5.6 Drawback in the Indian System

1. The detail method used for the prediction and evaluation of the project is not mentioned in the report. Limited explanations are given both to quantitative estimation of magnitude of impact and to the assumptions and judgments used in the evaluation of impacts.
2. The limited coverage of scoping is confined mainly to direct impacts.

Evaluation: The third question addressed by the EIA – do the changes matter is answered in the next step. Evaluation is so called because it evaluates the predicated adverse impacts to determine whether they are significant enough to warrant mitigation. Thus judgment of significance can be based on one or more of the followings.

1. Comparison with laws, regulations or accepted standards.
2. Consultation with the relevant decision makers.
3. Reference to pre set criteria such as protected sites features of species.
4. Acceptability to the local community or the general public.

Notes

Mitigation: In this phase the study team formally analyses mitigation. A wide range of measures are proposed to prevent, reduce, remedy or compensate for each of the adverse impacts evaluated as significant. Possible mitigation measures include:

1. Changing project sites, routes, processes, raw materials, operating methods, disposal methods, disposal routes or locations, timing or engineering designs.
2. Introducing pollution controls, waste treatment monitoring, phased implementation, landscaping, personal training, special social services or public education.
3. Offering (as compensation) restoration of damaged resources, money to affected persons, concessions on other issues, or off site programmes to enhance some other aspects of the environment or quality of life for the community.

All mitigation measures cost something and this cost must be quantified too. These various measures are then compared, trade-offs between alternative measures are weighed, and the EIA study team proposes one or more action plans, usually combining a number of measures. The action plan may include technical control measures, an integrated management scheme (for a major project) monitoring, contingency plans, operating practices, project scheduling, or even joint management (with affected groups). The study team should explicitly analyze the implications of adopting different alternatives, to help make the choices clearer for the decision makers.

One of the biggest concerns with the environmental clearance process is related to the quality of EIA report that are being carried out. The reports are generally incomplete and provided with false data. EIA reports ignore several aspects while carrying out assessments and significant information is found to omitted. Many EIA report are based on single season data and are not adequate to determine whether environmental clearance should be granted. All this makes the entire exercise contrary to its very intent. As things stand today, it is the responsibility of the project proponent to commission the preparation of the EIA for its project. The EIA is actually funded by an agency or individual whose primary interest is to procure clearance for the project proposed. There is little chance that the final assessment presented is un biased, even if the consultant may provide an unbiased assessment that is critical of the proposed project.

Some times it is found that a consultancy which is working in the project area has no specialization in the concerned subject. For example for the preparation of EIA report of the proposed oil exploration in coast of Orissa by the reliance group has been given to the life science Dept of Berhampur university which has no expertise on the study of turtles and its life cycle. The EIA document in itself is so bulky and technical, which makes it very difficult to decipher so as to aid in the decision making process. There are so many cases of fraudulent EIA studies where erroneous data has been used, same facts used for two totally different places etc. This is due to the lack of a centralized baseline data bank, where such data can be cross-checked. There is no accreditation of EIA consultants, therefore any such consultant with a track record of fraudulent cases cannot be held liable for discrepancies. It is hard to imagine any consultant after being paid lakh of rupees, preparing a report for the project proponents, indicating that the project is not viable. In nearly every case, the consultants try to interpret and tailor the information looking for ways and means to provide their clients with a report that gives them their moneys worth.

Self Assessment

Fill in the blanks:

10. An concentrate on problems, conflicts and natural resource constraints which might affect the viability of a project.

11. The aim of an EIA is to ensure that potential impacts are identified and addressed at an early stage in the projects and design.
12. The role for EIA was formally recognized at the earth summit held at Rio conference in
13. The first step in seeking clearance for a development project is to determine what statutory legislations apply to the particular project.

Notes



Case Study

Reducing Project Duration

This case is about a software company in India. Though it had been providing quality service, the company's financial figures had not been encouraging over the past few years. The new CEO had sought information about the ongoing projects in the company. After going through the reports, he asked Sudheer Gupta (Gupta), Director (Planning), to develop a suitable project control mechanism in the organization. After making an in-depth analysis of the ongoing projects, Gupta identified some lacunas during project implementation. Gupta had to now develop a project control mechanism in order to control project delays and improve the profits of the company.

Issues

1. To understand the trade-off between project time duration and its costs.
2. To understand the issues involved in employing the popular network model Critical Path Method (CPM).
3. To understand the time-cost relationship of an activity.
4. To understand how CPM can be used to reduce project duration.

About the Company

TPL, located in Hyderabad, India, was considered one of the premier software companies in India. Started in 2002 by a small group of enthusiastic software engineers and management executives, this firm provided a range of project services in Information Technology (IT) to domestic and international clients.

Analyzing the Projects

In May 2010, Reddy joined TPL as CEO. On the day he assumed charge, he sought ongoing project information of the company in a specified format. The desired information - Project Information Status, estimated time delays in Project schedules, and penalty levied for delays in execution – was submitted by the concerned departmental heads.

Identifying the Critical Issues

The next day, Gupta along with the other members of the senior management team met with Reddy to analyze the information related to the projects...

Time to Arrive at a Solution

To address all these concerns, Reddy asked Gupta, to identify the existing issues and lacunas in the system and also the reasons for the reduction in profits. Gupta spent the next few weeks analyzing the various aspects in detail.

Question

Analyse the case and discuss the case facts.

Source: <http://www.icmrindia.org>

5.7 Summary

- Environmental analysis is nothing but identifying opportunities and threats affecting their business.
- Social and cultural environment refers to the influenced exercised by certain factors which are beyond the company's gate.
- Competitive markets exist in every economy, so long as two or more individuals are willing to undertake exchange transactions.
- Economic environment refers to all those economic factors which have a bearing on the functioning of business.
- The Government of India is now implementing several law for the monitoring and regulating business and industries.
- The most appropriate definition of environmental pollution would be the introduction of different harmful pollutants into certain environment.
- Many developed countries have introduced certain laws to not only regulate various types of pollution but also the laws to mitigate the adverse effects of pollution.
- Industrial pollution is pollution which can be directly linked with industry, in contrast to other pollution sources.
- The aim of an EIA is to ensure that potential impacts are identified and addressed at an early stage in the projects planning and design.
- One of the biggest concerns with the environmental clearance process is related to the quality of EIA report that are being carried out.

5.8 Keywords

Competitive environment: Competitive markets exist in every economy, so long as two or more individuals are willing to undertake exchange transactions.

Economic environment: Economic environment refers to all those economic factors which have a bearing on the functioning of business, like: economic policies, economic systems and economic reforms

EIA: EIA is an exercise to be carried out before any project or major activity is undertaken to ensure that it will not in any way harm the environment on a short term or long term basis.

Mitigation: In this phase the study team formally analyses mitigation. A wide range of measures are proposed to prevent, reduce, remedy or compensate for each of the adverse impacts evaluated as significant.

Political environment: Ruling party makes the policies of the government. Agenda of political party is most influencing factor for the business development.

Social and cultural environment: Social and cultural environment refers to the influenced exercised by certain factors which are beyond the company's gate. Such factors include people's attitude to work and wealth, role of family, marriage, religion and education, ethical issues and social responsiveness of business.

Technological environment: Technological environment is prevailing even before evolution of computers.

5.9 Review Questions

Notes

1. Discuss the meaning of environment and pollution.
2. Describe the dimensions of general environment.
3. Explain the pollution created by different Industries.
4. What are the methods of preventing pollution?
5. Discuss the methods to prevent Air Pollution.
6. What are the environmental regulations in India?
7. Describe, in brief, the Environment Protection Act, 1986.
8. Explain environmental clearance.
9. Discuss, in brief, the Environmental Impact Assessment.
10. Explain, in details the EIA process in India.

Answers: Self Assessment

1. Environmental
2. Social
3. Competitive
4. Economic
5. Ruling
6. Pollution
7. Human
8. DDT
9. Authority
10. EIA
11. Planning
12. 1992
13. Environmental

5.10 Further Readings



Books

- Clements/Gido, *Effective Project Management*, Thomson
Clifford F. Gray and Erik W. Larson, *Project Management*, Tata McGraw Hill
Dennis Lock, *Project Management*, Ninth Edition, Gower
K. Nagarajan, *Project Management*, Third Edition, New Age International
P.C.K. Rao, *Project Management and Control*, Sultan Chand & Sons
Prasanna Chandra, *Projects Planning, Selection, Financing, Implementation, and Review*, Sixth Edition, Tata McGraw Hill
Vasant Desai, *Project Management*, Second Revised Edition, Himalaya Publishing House

Notes



Online links

www.col.org/SiteCollectionDocuments/SuccessProjMgt.pdf

www.freelancer.com/jobs/Project-Management/

www.mindtools.com/pages/main/newMN_PPM.htm

www.mpug.com/Pages/WhatisProjectManagement.aspx

www.nickjenkins.net/prose/projectPrimer

www.pma-india.org/ - *Trinidad and Tobago*

Unit 6: Social Cost Benefit Analysis

Notes

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Objectives

Introduction

- 6.1 Rationale for Social Cost Benefit Analysis
- 6.2 UNIDO Approach for Social Cost Benefit Analysis
- 6.3 Methods followed by Financial Institutions
- 6.4 Summary
- 6.5 Keywords
- 6.6 Review Questions
- 6.7 Further Readings

Objectives

After studying this unit, you will be able to:

- Know about rationale for social Cost benefit analysis;
- Understand UNIDO approach for social cost benefit analysis;
- Know about the methods followed by financial iInstitutions.

Introduction

It refers to the study of feasibility of a project in terms of its total economic cost and total economic benefits. It means to compare total cost with total benefit if we add external cost with private cost, it's called total social cost if we add external benefit with private benefit, called total social benefit.

6.1 Rationale for Social Cost Benefit Analysis?

Social Cost benefits Analysis means to analyze the social cost and total social benefits if we accept any project. We all know that for completing the big project, we need big investment. In Social Cost Benefit Analysis (SCBA), we see whether return or benefits on this investment are more than its cost from point of view of society in which we are living.

In public investment, we analyze and compare government expenditure with total benefits to society through SCBA. It is also good technique of financial evaluation of a project because we leave that project whose benefits to society are less than total cost which will to society because all resources are from society. Problems which can be solved by Social Cost Benefits Analysis.



Notes Social Cost Benefits Analysis means to analyze the social cost and total social benefits if we accept any project.

Notes

1st Problem: Rationale for SCBA

Market Imperfection

We will not analyze social cost benefit; we can not find market imperfections. After study of market rates following factors come in to our knowledge.

1. **Rationing factor** : It means some of raw material prices are controlled by Govt. So, it may increase our project cost but its social benefit will go to poor community.
2. **Regulation for providing minimum wage factor**: It also affects social cost and benefits of any project. Because company must have to pay this minimum wages.
3. **Foreign Exchange Regulations factor**: Sometime, we have to deal at currency rate which is less than actual market rate due to regulation on FOREX. So, we should analyze this point also.

Externalities

Externalities are non-cash or benefits which an organization suffer or get if it starts the project. For example, if govt. makes road near your project plant, you can get this facility without any payment. On the other side, if any other organization is polluting and spreading diseases, its cost may suffer due to absence of your employee for going to hospitals.

Tax and Subsidies

Tax is payment on the earning of the project and it will reduce our overall benefits. On the other hand, if govt. gives us subsidy for operating any project, it will count for our cost benefit analysis.

2nd Problem: What is Net Benefit to Society from a Project?

With UNIDO approach, we can evaluate net benefit from any project. Formula is given below

	Amount (IN \$)
Estimated profitability from a project	XXXXX
Add Net benefits of project in the term of economy	XXXXX
+/- Adjustment for the impact of project on saving and investment	XXXXX
+/- Adjustment for the impact of project on income distribution	XXXXX
Total Net Benefits to Society with the Project	XXXXX

3rd Problem: To Know the Effect of using one more Unit of Resources

With shadow price, we know the effect of using one more unit of resources on the social cost and benefits. Shadow pricing is relating to decision of project manager. Before accepting the project, we have to find the price if we have to use extra unit of resources. Suppose, we have to use one more hour of labor, what will we pay and what will its effect on social benefits.

Economic Analysis**Notes**

A methodology developed for evaluating investment projects from the point of view of the society (or economy) as a whole.

Used Primarily for Public Investment

SCBA aids in evaluating individual projects

1. Spells out broad national economic objectives
2. Allocation of resources to various sectors

SCBA is concerned with tactical decision making within the framework of broad strategic choices defined by planning at the macro level.

Features of Rationale for SCBA

1. Focuses on the social cost and benefits of the project
2. Principle sources of discrepancy:
 - (a) Market Imperfection
 - (b) Externalities
 - (c) Taxes and Subsidies
 - (d) Concern for Savings
 - (e) Concern for redistribution
 - (f) Merit Wants

Market Imperfection

Market prices reflect social values only under condition of perfect competition (which are rarely realized by developing countries). Common sources of market imperfection in developing countries:

1. Rationing
2. Prescription of minimum wage rate
3. Foreign exchange regulation

Externalities

External benefit or cost created by the project.

Not usually included in the financial cost benefit analysis of the project.

In SCBA all external costs and benefits, irrespective to whom they accrue and whether they are paid for or not, are relevant.

Taxes and Subsidies

From private point of view:

1. Taxes are monetary costs
2. Subsidies are definite monetary gains

Notes

From social point of view taxes and subsidies are generally regarded as transfer payments and hence considered irrelevant.

Concern for Savings

Parts of benefit saved is deemed more valuable than the part of benefits consumed.

In SCBA higher valuation is placed on savings and a lower valuation is put on consumption.

Concern for Redistribution

A rupee of benefit going to an economically poor section is considered more valuable than a rupee of benefit going to an affluent section.

 <i>Task</i> Describe about market imperfection

Self Assessment

Fill in the blanks:

1. analysis means to analyze the social cost and total social benefits if we accept any project.
2. In public investment, we analyze and compare government expenditure with total benefits to society through
3. Externalities are non-cash or benefits which an organization suffer or get if it starts the
4. is payment on the earning of the project and it will reduce our overall benefits.
5. SCBA is concerned with tactical decision-making within the framework of broad strategic choices defined by planning at the level.

6.2 UNIDO Approach for Social Cost Benefit Analysis

Two principle approach for SCBA:

1. UNIDO Approach
2. Little-Mirrlees Approach

UNIDO method involves five stages:

1. Calculation of financial profitability measured at market prices
2. Obtaining the net benefit of the project measured in terms of economic (efficiency) prices
3. Adjustment for the impact of the project on savings and investment
4. Adjustment for the impact of the project on income distribution
5. Adjustment for the impact of the project on merit goods and demerit goods

Net benefit in terms of Economic (Efficiency) prices:

1. Also referred to as shadow prices
2. Market prices represent shadow prices only under conditions of perfect markets

3. So, shadow prices need to be developed and economic benefit need to be measured in terms of these prices

Notes

Shadow Pricing

Choice of Numéraire

The unit of account in which the value of inputs or outputs is expressed

1. What unit of currency (domestic or foreign)?
2. Current values or constant values?
3. With reference to which point – present or future?
4. In terms of consumption or investment?
5. With reference to which group?

UNIDO Numéraire: “net present consumption in the hands of people at the base level of consumption in the private sector in terms of constant price in domestic accounting unit.”

Concept of Tradability

For tradable goods, the international price is a measure of its opportunity cost to the country

1. Substitute import for domestic production and vice versa
2. Substitute export for domestic consumption and vice versa

Hence, the international price, also referred to as the border price, represent the ‘real’ value of the good in terms of economic efficiency.



Caution So, shadow prices need to be developed and economic benefit need to be measured in terms of these prices

Sources of Shadow Prices

UNIDO approach suggests three sources of shadow pricing:

1. Increase or decrease the total consumption in the economy
2. Decrease or increase production in the economy
3. Increase or decrease export or import

UNIDO approach is one of the methods of calculating Social Cost Benefit analysis (SCBA). In fact very popular. Normally we calculate financial benefits from a project while evaluating it, but this method calculates economic benefits from the project. Although earlier it was commonly used by government organizations but now it is being used by private players also. In this analysis the monetary priced are replaced by shadow prices. Shadow prices are prices at perfect market conditions, also called as economic prices. Thus the market prices are replaced by the Economic prices and then the benefit or returns are calculated in addition to this, adjustment is made for Externalities (+ve like road facility, hospital facility etc. or -ve externalities like pollution), savings (a rupee saved is valued more than a rupee consumed), redistribution of income (a rupee distributed to poor is valued more than a rupee distributed to rich), taxes are

Notes not considered and merits. Then finally the economic rate of return is calculated by the same method as IRR is calculated.

Self Assessment

State whether the following statements are True or False:

6. Calculation of financial loss measured at market prices.
7. Obtaining the net benefit of the project measured in terms of economic (efficiency) prices.
8. Market prices represent shadow prices only under conditions of perfect markets.
9. UNIDO approach is one of the methods of calculating Social cost benefit analysis.

6.3 Methods followed by Financial Institutions

In the retail-banking sector, there is a constant threat from new financial institutions entering into the local market. The financial institutions already represented in India also constantly strive to attain competitive advantage over one another. As a result, financial institutions need to be able to implement innovative solutions with the minimum of delay to counteract these pressures. In consultation with the Project Managers at South Africa's leading financial institutions, these being ABSA Bank, First National Bank Metropolitan Delivery, Standard Bank and First National Bank Rural. It was found that the investment monetarily, was substantial, the total expenditure of these financial institutions being in excess of ₹ 500 million annually. It is therefore important that an effective strategy as regards building project management is in place. The strategy employed must be effective in terms of functionality and cost. This research will study how the financial institutions are conducting their building project management function, it will evaluate the relative effectiveness of that strategy. Through studying how the different financial institutions are undertaking their building project management function, this study will try to make meaningful recommendations to assist the financial institutions in the implementation of their building project management function.

Financial institutions face challenges relative to preserving the safety and soundness of the institution and its ability to manage earnings and capital. New technologies require increased diligence by financial intuitions. The FBI, in its 2001 report "Financial Institution Fraud and Failure Report," says Financial Institution Fraud (FIF) is a Tier 1 priority in its strategic plan and identifies bank failures, identify theft, check fraud, counterfeit negotiable instruments, check kiting, mortgage and loan fraud as its major areas of investigation and an increasing importance in its investigations related to emerging technologies and computer related banking. The FBI reports that throughout the 1980's and early 1990's most of the fraud was a result of abuse by insiders. Today, the dominant schemes result from outsiders. "The pervasiveness of check fraud and counterfeit negotiable instrument schemes, technological advances, as well as the availability of personal information through information networks, has fueled the growth in external fraud."

In addition to direct acts of fraud and abuse, financial institutions often become the instruments of money launders and illegal charitable contributions to terrorist.

The International Monetary Fund estimates that money laundering could be anywhere from 2-5% of the world's gross domestic product and has been called "the world's second largest underground economy." Both US and international organizations have placed a burden on financial institutions to detect and deter money laundering and the financing of terrorists. In the U.S., this is accomplished by using software to implement requirements of Section 314 of the Patriot Act and the Office of Foreign Assets Control (OFAC), Compliance Programs Division.

When banks fail to provide adequate control over information technology, they can expect to suffer operational damages from mass attacks launched against the Internet and the nation's critical infrastructure. In January 26, 2003, a "virus-like," worm attack against MS-SQL Server 2000 slowed Internet traffic worldwide and caused technical problems that brought down 13,000 ATM machines of the Bank of American and at Canadian Imperial Bank of Commerce. While these types of vulnerabilities often capture the negative attention of the public, they represent only a small portion of the business risks financial institutions must control.

The Office of the Comptroller of the Currency (OCC) has identified four of the nine categories in its risk framework to which technology-related products, services, delivery channels, and processes are most frequently exposed:

1. **Transaction risks:** The risks to earnings or capital arising from problems with service or product delivery, for example poorly configured or incompatible internal and external systems and processes.
2. **Strategic risks:** The risks to earnings or capital arising from adverse business decisions or improper implementation of those decisions.
3. **Reputation:** The risk to earnings or capital arising from negative public opinion.
4. **Compliance:** The risk to earnings or capital arising from violations or, noncompliance with prescribed practices or ethical standards.
5. **Failure to meet regulatory guidelines:** It can result in severe penalties for financial institutions. More recently the Office of Thrift Supervision (OTS), has grouped the technology risks faced by financial institutions in three categories:
 - (a) **Information Integrity risks:** Information must be available, accurate, complete, valid and secure.
 - (b) **Business continuity risks:** The institution's ability to adequately prepare and execute its responsibilities during a disaster.
 - (c) **Vendor management risks:** The risk that the service provider will not perform the contract terms and conditions as specified causing undesirable consequences for the institution's operations.

This reflects the going requirement for financial institutions to provide Internet-based services, utilize and oversee service providers, and prove, particularly the Board of Directors and Officers, due diligence in protecting customer information and meeting other regulatory requirements.

"Management can reduce a bank's risk exposure by adopting and regularly reviewing its risk assessment plan, risk mitigation controls, intrusion response policies and procedures, and testing processes."

Financial institutions are heavily reliant on external service providers for Web sites and other core information systems. In addition financial institutions have a strong business requirement to analyze daily financial transactions in order to spot portfolio, lending, and financial market trends, customer requirements, and improve services. This requires moving data from multiple transaction-based systems to analytical database applications or data warehouses. MS-SQL server is often used by Service Providers because it is comparatively low in cost; more easily scaled with the introduction of Windows 2000 Data Center, and can be deployed rapidly. Market share for ISP and ASP of this product is on the rise. Additionally, financial institutions may find it more efficient to use the MS-SQL Server internally to retain possession of certain business data and make it easier to analyze legacy, historical or trend data, while contracting with an ASP to run larger mainframe and multi-tier, integrated applications or Internet sites. The Data Transformation Services (DTS) and other Back Office Products included with MSSQL Server make it very efficient for use in this manner.

Notes



Did u know? Both US and international organizations have placed a burden on financial institutions to detect and deter money laundering and the financing of terrorists.

Self Assessment

Fill in the blanks:

- 10. The institutions already represented in India also constantly strive to attain competitive advantage over one another.
- 11. Financial institutions are heavily reliant on service providers for Web sites and other core information systems.
- 12. The Transformation Services (DTS) and other Back Office Products included with MSSQL Server make it very efficient for use in this manner.
- 13. to meet regulatory guidelines can result in severe penalties for financial institutions.
- 14. In addition financial institutions have a strong business requirement to analysis daily financial transactions in order to spot portfolio, lending, and market trends, customer requirements, and improve services.



Case Study

GMR's Terminal 3 for Delhi Airport: A Successful Project Execution Model for Public-Private Partnership Initiatives?

This case study discusses the infrastructure deficit in India and how the country was trying to overcome this problem with the help of the Public Private Partnership (PPP) model. The case details the 'Terminal 3 for Delhi Airport' project to explain the role and importance of PPP in overcoming infrastructure deficit. It also explains the different features of Terminal 3 (T3) which go to make it a world class airport terminal. In the end, the case study covers the limitations of the PPP model. The case study helps to understand the role of PPP and provides scope for discussions on how to overcome the limitations of PPP. It also provides ample scope for discussing how T3 was completed in just 37 months and what the upcoming infrastructure projects can learn from this project. This case is meant for MBA/MS students as a part of their Project Management curriculum.

Issues

- 1. Understand the importance of Public-Private Partnership initiatives, especially in emerging markets, to bridge the 'infrastructure deficit.
- 2. Understand the salient features of Delhi Airport's Terminal 3 (T3) project and analyze all the features that have contributed to the completion of T3 project in a record 37 months.
- 3. Discuss and debate what T3's record completion in 37 months means for PPP initiatives and what best practices this project execution offers for future PPP initiatives in the infrastructure sector.

Contd...

On July 14, 2010, the first flight touched down at India's newly built Terminal 3 (T3) of Delhi airport, the swankiest and largest in the country, opening a new chapter in the history of the airport and the Indian Aviation Industry. It was around 4:40 pm (IST) when the first commercial flight, the Air India flight from John F Kennedy International Airport, New York, touched down on the runway to be greeted by water cannon salutes from both sides. The 220 passengers and 18 crew members of AI-102 flight were warmly welcomed by the airport senior officers and staff and treated as special guests. They posed for media cameras and received gifts and certificates for being the first group of passengers to arrive at T3. Sunil Gupta (Gupta), Director of an IT firm in New York, who was among the first passengers, said, "The old terminal was shabby and barely had basic facilities. This one looks good and is up to international standards".

Not too long ago, Delhi airport had been known for its poor management and poor passenger services. Under-investment in airport infrastructure since independence was a major cause for concern. Lack of funds and the expertise to develop and maintain the growing airport infrastructure needs of the country forced the government to invite private players to participate in infrastructure development under Public Private Partnership (PPP). It was in January 2006, that a consortium led by the GMR Group won the bid to develop the airport. Very soon, the PPP initiative yielded results, with two terminals being renovated and one new runway and terminal 1D being opened up for commercial operation. However, revolutionary change, as the experts called it, came about when the T3 was inaugurated on July 3, 2010. At the inauguration of T3, Manmohan Singh (Singh), Prime Minister of India, said, "The Delhi airport has improved its rank sharply in terms of Air Service Quality (ASQ) performance, from 101 in 2007 to 21 in 2010. After the opening of this new terminal we are hopeful that the airport will shortly rank within the first 10 airports of the world."

About GMR Group

GMR Group (GMR), a Bengaluru, India-based leading Infrastructure group, had a stake in almost all types of infrastructure development activities including power, road, airport, and Urban Infrastructure. GMR was one of the first companies in India to take the initiative in infrastructure projects when they were thrown open to the private sector in the 1990.

PPPs in India's Infrastructure Development

Public Private Partnership (PPP) was a positive and sustainable solution to overcome infrastructure deficit, analysts said. The PPP model aimed at shifting the responsibility for financing, development.

GMR's T3 & Dial

Analysts cited GMR's T3 terminal as one of the successful PPP initiatives which had been completed significantly before the scheduled time. On the occasion of its grand opening.

The Limiting Factors

Experts stated that T3 would serve as an example for upcoming infrastructure projects. However, a few critics stated that the PPP model only provided profits to the private players through deals.

Question

Analyse the case and discuss the case facts.

Source: <http://www.icmrindia.org>

6.4 Summary

- Social Cost benefits Analysis means to analyze the social cost and total social benefits if we accept any project.
- In public investment, we analyze and compare government expenditure with total benefits to society through SCBA.
- We will not analyze social cost benefit; we can not find market imperfections. After study of market rates following factors come in to our knowledge. Externalities are non-cash or benefits which an organization suffer or get if it starts the project.
- With shadow price, we know the effect of using one more unit of resources on the social cost and benefits.
- UNIDO approach is one of the methods of calculating social cost Benefit analysis.
- The financial institutions already represented in India also constantly strive to attain competitive advantage over one another.
- Financial institutions face challenges relative to preserving the safety and soundness of the institution and its ability to manage earnings and capital.
- In addition to direct acts of fraud and abuse, financial institutions often become the instruments of money launders and illegal charitable contributions to terrorist.

6.5 Keywords

Business continuity risks: The institution's ability to adequately prepare and execute its responsibilities during a disaster.

Compliance: The risk to earnings or capital arising from violations or, noncompliance with prescribed practices or ethical standards.

Foreign Exchange Regulations factor: Sometime, we have to deal at currency rate which is less than actual market rate due to regulation on FOREX. So, we should analyze this point also.

Information Integrity risks: Information must be available, accurate, complete, valid and secure.

Rationing factor: It means some of raw material prices are controlled by Govt. So, it may increase our project cost but its social benefit will go to poor community.

Regulation for providing minimum wage factor: It also affects social cost and benefits of any project. Because company must have to pay this minimum wages.

Reputation: The risk to earnings or capital arising from negative public opinion.

Strategic risks: The risks to earnings or capital arising from adverse business decisions or improper implementation of those decisions.

Transaction risks: The risks to earnings or capital arising from problems with service or product delivery,

UNIDO approach: It is one of the methods of calculating Social Cost Benefit Analysis (SCBA).

Vendor management risks: The risk that the service provider will not perform the contract terms and conditions as specified causing undesirable consequences for the institution's operations.

6.6 Review Questions

Notes

1. Explain rationale for social Cost-benefit analysis.
2. Describe, in detail, the market imperfection.
3. Discuss UNIDO approach for social cost benefit analysis.
4. What do you know about shadow pricing and sources of shadow pricing?
5. Explain the concept of tradability
6. Discuss the methods followed by financial institutions.

Answers: Self Assessment

- | | |
|---------------------------------|---------------|
| 1. Social Cost benefit Analysis | 2. SCBA |
| 3. Project | 4. Tax |
| 5. Macro | 6. False |
| 7. True | 8. True |
| 9. True | 10. Financial |
| 11. External | 12. Data |
| 13. Failure | 14. Financial |

6.7 Further Readings



Books

Clements/Gido, *Effective Project Management*, Thomson
 Clifford F. Gray and Erik W. Larson, *Project Management*, Tata McGraw Hill
 Dennis Lock, *Project Management*, Ninth Edition, Gower
 K. Nagarajan, *Project Management*, Third Edition, New Age International
 P.C.K. Rao, *Project Management and Control*, Publication: Sultan Chand & Sons
 Prasanna Chandra, *Projects–Planning, Selection, Financing, Implementation, and Review*, Sixth Edition, Tata McGraw Hill
 Vasant Desai, *Project Management*, Second Revised Edition, Himalaya Publishing House



Online links

www.col.org/SiteCollectionDocuments/SuccessProjMgt.pdf
www.freelancer.com/jobs/Project-Management/
www.mindtools.com/pages/main/newMN_PPM.htm
www.mpug.com/Pages/WhatisProjectManagement.aspx
www.nickjenkins.net/prose/projectPrimer
www.pma-india.org/ - Trinidad and Tobago

Unit 7: Project Scheduling

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Objectives

After studying this unit, you will be able to:

- Know about project scheduling;
- Understand the language of PERT;
- Know about extensions to PERT/CPM.

Introduction

In the late 1950s, the Program Evaluation and Review Technique (PERT) and the Critical Path Method (CPM) were independently developed. PERT was developed by the U.S. Navy, Booz-Allen Hamilton (a business consulting firm), and Lockheed Aircraft (now Lockheed Martin Corp.); and CPM was developed by Dupont De Nemours Inc. When they were developed, there were significant differences in the methods.



Example: PERT used probabilistic (or uncertain) estimates of activity durations and CPM used deterministic (or certain) estimates but included both time and cost estimates to allow time/cost trade-offs to be used. Both methods employed networks to schedule and display task sequences. (Throughout this unit, we will use the words “activity” and “task” as synonyms to avoid constant repetition of one or the other.)

Both methods identified a critical path of tasks that could not be delayed without delaying the project. Both methods identified activities with slack (or float) that could be somewhat delayed without extending the time required to complete the project. While PERT and CPM used slightly different ways of drawing the network of activities, anything one could do with PERT, one could also do with CPM and vice versa. When writing about the history of project management, differentiating PERT and CPM is important and interesting. When managing projects, the

distinction is merely fussy. Traditional PERT is used less often than CPM; but CPM can be used with three-time estimates, and we can do things with PERT that were restricted to CPM in “olden times.” We use both names because users in the real world are apt to use either.

Notes

7.1 Brief History of CPM/PERT

CPM/PERT or Network Analysis as the technique is sometimes called, developed along two parallel streams, one industrial and the other military.

CPM was the discovery of M.R. Walker of E.I. Du Pont de Nemours & Co. and J.E. Kelly of Remington Rand, circa 1957. The computation was designed for the UNIVAC-I computer. The first test was made in 1958, when CPM was applied to the construction of a new chemical plant. In March 1959, the method was applied to a maintenance shutdown at the Du Pont works in Louisville, Kentucky. Unproductive time was reduced from 125 to 93 hours.

PERT was devised in 1958 for the POLARIS missile program by the Program Evaluation Branch of the Special Projects office of the U.S. Navy, helped by the Lockheed Missile Systems division and the Consultant firm of Booz-Allen & Hamilton. The calculations were so arranged so that they could be carried out on the IBM Naval Ordnance Research Computer (NORC) at Dahlgren, Virginia.

7.2 Language of PERT/CPM

Several terms used in discussing PERT/CPM analysis have been adopted from everyday language but have quite different meanings than in common usage. These terms are defined here as used in PERT/CPM.

Self Assessment

Fill in the blanks:

1. The was designed for the UNIVAC-I computer.
2. was devised in 1958 for the POLARIS missile program by the Program Evaluation Branch of the Special Projects office of the U.S. Navy.
3. The calculations were so arranged so that they could be carried out on the Ordnance Research Computer (NORC) at Dahlgren, Virginia.
4. Traditional PERT is used less often than

7.3 Project Uncertainty and Risk Management

Calculating Probabilistic Activity Times

First, it is necessary to define what is meant by the terms “pessimistic,” “optimistic,” and “most likely” (or “normal”). Assume that all possible durations (or all possible costs) for some task can be represented by a statistical distribution. The individual or group making the estimates is asked for a task duration, a , such that the actual duration of the task will be a or lower less than 1 percent of the time. Thus a is an optimistic estimate. The pessimistic estimate, b , is an estimated duration for the same task such that the actual finish time will be b or greater less than 1 percent of the time. (These estimates are often referred to as “at the .99 or the 99 percent level” or at the “almost never level.”)

Notes

Extensions to PERT/CPM

There have been several extensions to both network and chart forms of project scheduling. At times these extensions are quite sophisticated.



Example: The application of fuzzy set theory to aid in estimating activity durations in cases where activity durations are difficult to estimate because project activities cannot be well defined (McMahon, 1993). In this section we briefly discuss one significant extension of traditional scheduling methods, precedence diagramming. Elihu Goldratt's Critical Chain (1997) is also a significant addition to traditional scheduling methods. It uses networks that combine project scheduling with resource allocation.

We then comment on some of the managerial implications of the two fundamental approaches to risk management taken in this unit, statistical analysis and simulation.

Precedence Diagramming

One shortcoming of the PERT/CPM network method is that it does not allow for leads and lags between two activities without greatly increasing the number of sub-activities to account for this. That is, our regular network methods described earlier assume that an activity can start as soon as its predecessor activities are completed. Sometimes, however, the restrictions are more complex—



Example: When a follow-on activity cannot begin until a certain amount of time.



Notes There have been several extensions to both network and chart forms of project scheduling. At times these extensions are quite sophisticated; for example, the application of fuzzy set theory to aid in estimating activity durations in cases where activity durations are difficult to estimate because project activities cannot be well-defined.

7.4 Planning, Scheduling & Control

Planning, Scheduling (or organising) and Control are considered to be basic Managerial functions, and CPM/PERT has been rightfully accorded due importance in the literature on Operations Research and Quantitative Analysis. Far more than the technical benefits, it was found that PERT/CPM provided a focus around which managers could brainstorm and put their ideas together. It proved to be a great communication medium by which thinkers and planners at one level could communicate their ideas, their doubts and fears to another level. Most important, it became a useful tool for evaluating the performance of individuals and teams. There are many variations of CPM/PERT which have been useful in planning costs, scheduling manpower and machine time. CPM/PERT can answer the following important questions:

1. How long will the entire project take to be completed?
2. What are the risks involved?
3. Which are the critical activities or tasks in the project which could delay the entire project if they were not completed on time?
4. Is the project on schedule, behind schedule or ahead of schedule?
5. If the project has to be finished earlier than planned, what is the best way to do this at the least cost?

Framework for PERT and CPM

Notes

Essentially, there are six steps which are common to both the techniques. The procedure is listed below:

1. Define the Project and all of its significant activities or tasks. The Project (made up of several tasks) should have only a single start activity and a single finish activity.
2. Develop the relationships among the activities. Decide which activities must precede and which must follow others.
3. Draw the "Network" connecting all the activities. Each Activity should have unique event numbers. Dummy arrows are used where required to avoid giving the same numbering to two activities.
4. Assign time and/or cost estimates to each activity.
5. Compute the longest time path through the network. This is called the critical path.
6. Use the Network to help plan, schedule, monitor and control the project. The Key Concept used by CPM/PERT is that a small set of activities, which make up the longest path through the activity network control the entire project. If these "critical" activities could be identified and assigned to responsible persons, management resources could be optimally used by concentrating on the few activities which determine the fate of the entire project.

Non-critical activities can be replanned, rescheduled and resources for them can be reallocated flexibly, without affecting the whole project. Five useful questions to ask when preparing an activity network are:

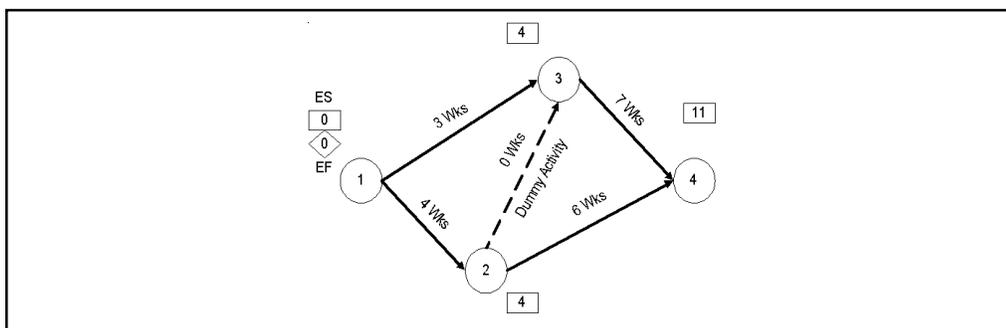
1. Is this a Start Activity?
2. Is this a Finish Activity?
3. What Activity Precedes this?
4. What Activity Follows this?
5. What Activity is Concurrent with this?

Some activities are serially linked. The second activity can begin only after the first activity is completed. In certain cases, the activities are concurrent, because they are independent of each other and can start simultaneously. This is especially the case in organisations which have supervisory resources so that work can be delegated to various departments which will be responsible for the activities and their completion as planned.

When work is delegated like this, the need for constant feedback and coordination becomes an important senior management preoccupation.

Drawing the CPM/PERT Network

Each activity (or sub-project) in a PERT/CPM Network is represented by an arrow symbol. Each activity is preceded and succeeded by an event, represented as a circle and numbered.



Notes

At Event 3, we have to evaluate two predecessor activities – Activity 1-3 and Activity 2-3, both of which are predecessor activities. Activity 1-3 gives us an Earliest Start of 3 weeks at Event 3. However, Activity 2-3 also has to be completed before Event 3 can begin. Along this route, the Earliest Start would be $4 + 0 = 4$. The rule is to take the longer (bigger) of the two Earliest Starts. So the Earliest Start at event 3 is 4.

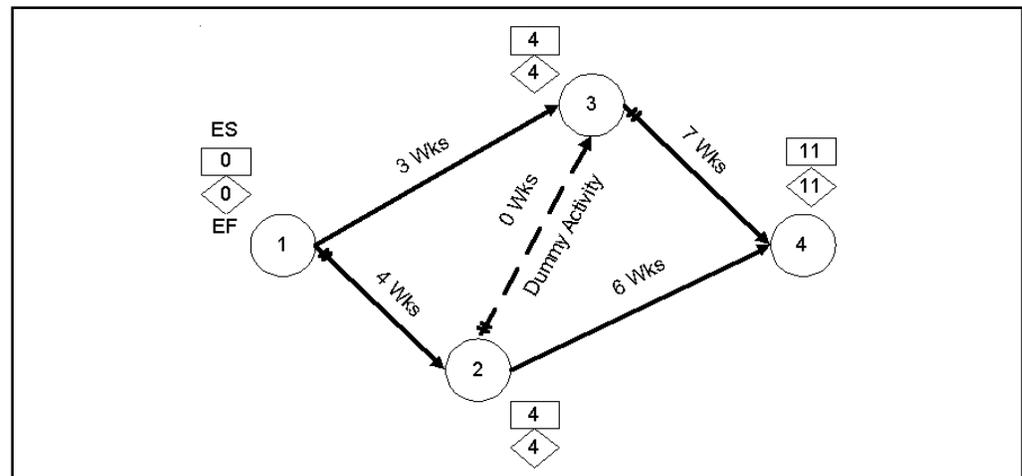
Similarly, at Event 4, we find we have to evaluate two predecessor activities – Activity 2-4 and Activity 3-4. Along Activity 2-4, the Earliest Start at Event 4 would be 10 wks, but along Activity 3-4, the Earliest Start at Event 4 would be 11 wks. Since 11 wks is larger than 10 wks, we select it as the Earliest Start at Event 4. We have now found the longest path through the network. It will take 11 weeks along activities 1-2, 2-3 and 3-4. This is the Critical Path.



Task Describe the steps for drawing the CPM/PERT Network.

The Backward Pass – Latest Finish Time Rule

To make the Backward Pass, we begin at the sink or the final event and work backwards to the first event.



At Event 3 there is only one activity, Activity 3-4 in the backward pass, and we find that the value is $11 - 7 = 4$ weeks. However at Event 2 we have to evaluate 2 activities, 2-3 and 2-4. We find that the backward pass through 2-4 gives us a value of $11 - 6 = 5$ while 2-3 gives us $4 - 0 = 4$. We take the smaller value of 4 on the backward pass.

Self Assessment

State whether the following statements are True or False:

5. Planning, Scheduling and Control are considered to be advanced Managerial functions.
6. There are many variations of CPM/PERT which have been useful in planning costs, scheduling manpower and machine time.
7. Non-critical activities can be replanned, rescheduled and resources for them can be reallocated flexibly.
8. Each activity in a PERT/CPM Network is represented by a circle symbol.

7.5 Tabulation & Analysis of Activities

Notes

We are now ready to tabulate the various events and calculate the Earliest and Latest Start and Finish times. We are also now ready to compute the Slack or Total Float, which is defined as the difference between the Latest Start and Earliest Start.

Event	Duration (Weeks)	Earliest Start	Earliest Finish	Latest Start	Latest Finish	Total Float
1-2	4	0	4	0	4	0
2-3	0	4	4	4	4	0
3-4	7	4	11	4	11	0
1-3	3	0	3	1	4	1
2-4	6	4	10	5	11	1

1. The Earliest Start is the value in the rectangle near the tail of each activity
2. The Earliest Finish is = Earliest Start + Duration
3. The Latest Finish is the value in the diamond at the head of each activity
4. The Latest Start is = Latest Finish – Duration

There are two important types of Float or Slack. These are Total Float and Free Float.

Total Float is the spare time available when all preceding activities occur at the earliest possible times and all succeeding activities occur at the latest possible times.

Total Float = Latest Start – Earliest Start

Activities with zero Total float are on the Critical Path

Free Float is the spare time available when all preceding activities occur at the earliest possible times and all succeeding activities occur at the earliest possible times.

When an activity has zero Total float, Free float will also be zero.

There are various other types of float (Independent, Early Free, Early Interfering, Late Free, Late Interfering), and float can also be negative. We shall not go into these situations at present for the sake of simplicity and be concerned only with Total Float for the time being.

Having computed the various parameters of each activity, we are now ready to go into the scheduling phase, using a type of bar chart known as the Gantt Chart.

There are various other types of float (Independent, Early Free, Early Interfering, Late Free, Late Interfering), and float can also be negative. We shall not go into these situations at present for the sake of simplicity and be concerned only with Total Float for the time being. Having computed the various parameters of each activity, we are now ready to go into the scheduling phase, using a type of bar chart known as the Gantt Chart.



Did u know? Total Float is the spare time available when all preceding activities occur at the earliest possible times and all succeeding activities occur at the latest possible times.

7.6 PERT (Probabilistic) Approach

So far we have talked about projects, where there is high certainty about the outcomes of activities. In other words, the cause-effect logic is well known. This is particularly the case in Engineering projects.

Notes

However, in Research & Development projects, or in Social Projects which are defined as “Process Projects”, where learning is an important outcome, the cause-effect relationship is not so well established. In such situations, the PERT approach is useful, because it can accommodate the variation in event completion times, based on an expert’s or an expert committee’s estimates.

For each activity, three time estimates are taken

1. The Most Optimistic
2. The Most Likely
3. The Most Pessimistic

The duration of an activity is calculated using the following formula:

$$t_e = \frac{t_o + 4t_m + t_p}{6}$$

Where t_e is the Expected time, t_o is the Optimistic time, t_m is the most probable activity time and t_p is the Pessimistic time. It is not necessary to go into the theory behind the formula.

It is enough to know that the weights are based on an approximation of the Beta distribution.

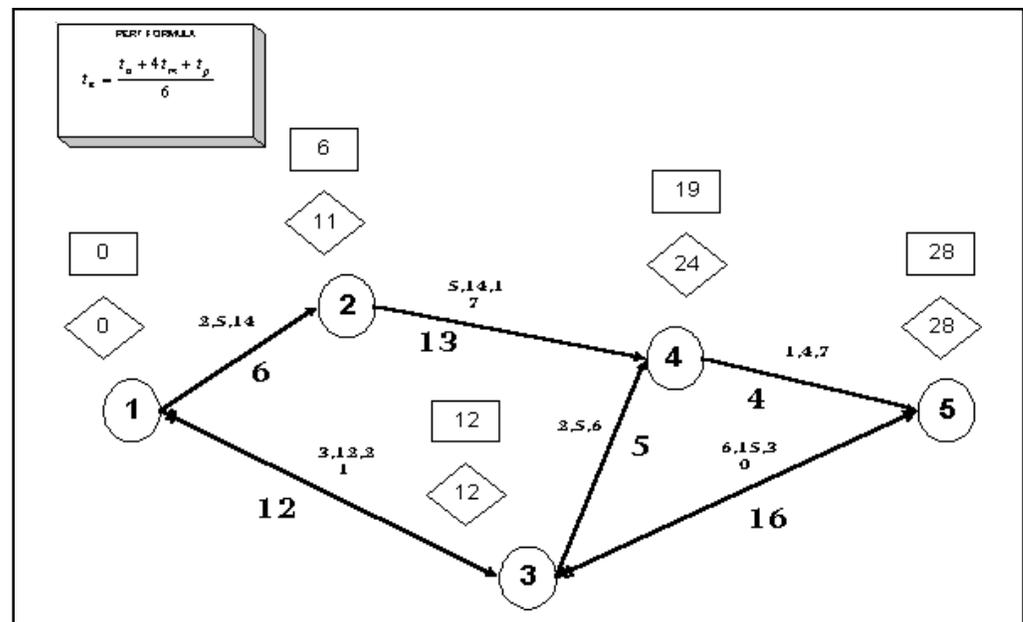
The Standard Deviation, which is a good measure of the variability of each activity is calculated by the rather simplified formula:

$$S_1 = \frac{t_p - t_o}{6}$$

The variance is the square of the standard deviation.

PERT Calculations for the Social Project

In our Social Project, the Project Manager is now not so certain that each activity will be completed on the basis of the single estimate he gave. There are many assumptions involved in each estimate, and these assumptions are illustrated in the three-time estimate he would prefer to give to each activity.



In Activity 1-3, the time estimates are 3,12 and 21. Using our PERT formula, we get:

Notes

$$t_e = \frac{3 + (4 \times 12) + 21}{6} = \frac{72}{6} = 12$$

$$S_1 = \frac{(21 - 3)}{6} = \frac{18}{6} = 3$$

The Standard Deviation (s.d.) for this activity is also calculated using the PERT formula.

We calculate the PERT event times and other details as below for each activity:

Event	t_o	t_m	t_p	t_e	ES	EF	LS	LF	TF	s.d.	Var.
1-3	3	12	21	12	0	12	0	12	0	3	9
3-5	6	15	30	16	12	28	12	28	0	4	16
1-2	2	5	14	6	0	6	5	11	5	2	4
2-4	5	14	17	13	6	19	11	24	5	2	4
3-4	2	5	8	5	12	17	19	24	7	1	1
4-5	1	4	7	4	19	23	24	28	5	1	1

Estimating Risk

Having calculated the S D. and the Variance, we are ready to do some risk analysis. Before that we should be aware of two of the most important assumptions made by PERT.

1. The Beta distribution is appropriate for calculation of activity durations.
2. Activities are independent, and the time required to complete one activity has no bearing on the completion times of its successor activities in the network. The validity of this assumption is questionable when we consider that in practice, many activities have dependencies.



Caution PERT assumes that the expected length of a project (or a sequence of independent activities) is simply the sum of their separate expected lengths.

Expected Length of a Project

PERT assumes that the expected length of a project (or a sequence of independent activities) is simply the sum of their separate expected lengths.

Thus the summation of all the t_e 's along the critical path gives us the length of the project.

Similarly the variance of a sum of independent activity times is equal to the sum of their individual variances.

In our example, the sum of the variance of the activity times along the critical path, VT is found to be equal to $(9+16) = 25$.

The square root VT gives us the standard deviation of the project length. Thus, $ST = \sqrt{25} = 5$. The higher the standard deviation, the greater the uncertainty that the project will be completed on the due date.

Notes

Although the t_e 's are randomly distributed, the average or expected project length T_e approximately follows a Normal Distribution.

Since we have a lot of information about a Normal Distribution, we can make several statistically significant conclusions from these calculations.

A random variable drawn from a Normal Distribution has 0.68 probability of falling within one standard deviation of the distribution average. Therefore, there is a 68% chance that the actual project duration will be within one standard deviation, ST of the estimated average length of the project, t_e .

In our case, the $t_e = (12 + 16) = 28$ weeks and the $ST = 5$ weeks. Assuming t_e to be normally distributed, we can state that there is a probability of 0.68 that the project will be completed within 28 ± 5 weeks, which is to say, between 23 and 33 weeks.

Since it is known that just over 95% (.954) of the area under a Normal Distribution falls within two standard deviations, we can state that the probability that the project will be completed within 28 ± 10 is very high at 0.95.

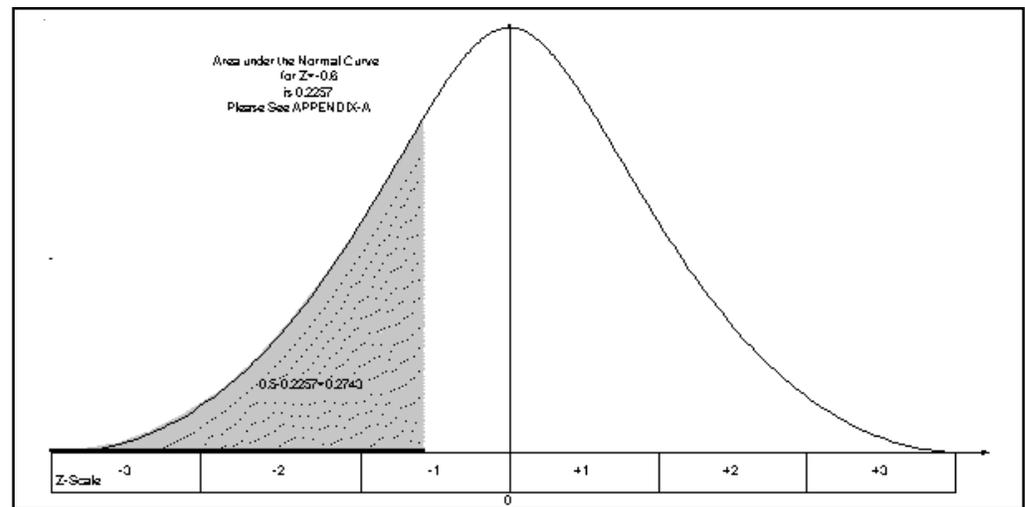
Probability of Project Completion by due Date

Now, although the project is estimated to be completed within 28 weeks ($t_e=28$) our Project Director would like to know what is the probability that the project might be completed within 25 weeks (i.e. Due Date or $D=25$).

For this calculation, we use the formula for calculating Z, the number of standard deviations that D is away from t_e .

By looking at the following extract from a standard normal table, we see that the probability associated with a Z of -0.6 is 0.274. This means that the chance of the project being completed within 25 weeks, instead of the expected 28 weeks is about 2 out of 7. Not very encouraging.

$$Z = \frac{D - t_e}{S_t} = \frac{25 - 28}{5} = \frac{-3}{5} = -0.6$$

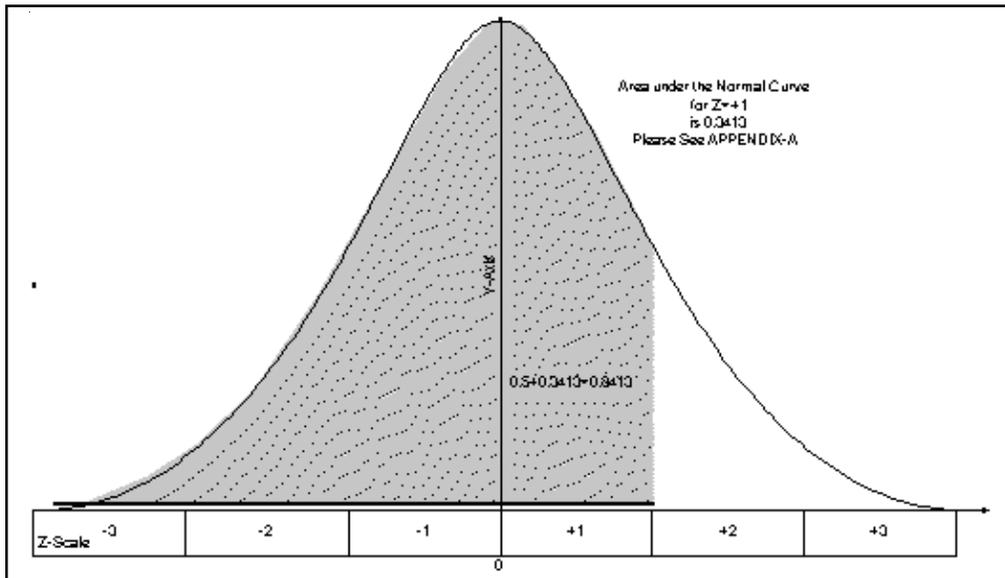


On the other hand, the probability that the project will be completed within 33 weeks is calculated as follows:

$$Z = \frac{D - t_e}{S_t} = \frac{33 - 28}{5} = \frac{5}{5} = 1$$

The probability associated with $Z = +1$ is 0.84134. This is a strong probability, and indicates that the odds are 16 to 3 that the project will be completed by the due date.

Notes



If the probability of an event is p , the odds for its occurrence are a to b , where:

$$\frac{a}{b} = \frac{p}{1-p} = \frac{0.84134}{0.15866} = \frac{16}{3}$$

Self Assessment

Fill in the blanks:

9. Activities with zero Total float are on the Path.
10. is the spare time available when all preceding activities occur at the earliest possible times.
11. The distribution is appropriate for calculation of activity durations.
12. assumes that the expected length of a project is simply the sum of their separate expected lengths.
13. The sum of the of the activity times along the critical path.
14. The square root gives us the standard deviation of the project length.
15. A random variable drawn from a Normal Distribution has probability of falling within one standard deviation of the distribution average.
16. The of the variance of the activity times along the critical path.



Case Study

Practicing Project Management: A Case Study, 2005 **BWF-HHMI Course in Scientific Management**

The ability to allocate resources to achieve a goal is the hallmark of project management. This case study is designed to help you practice the allocation of resources in project management and identify the effects of resource allocation on achieving specific goals. Read through and complete this case study, and examine the final outcome to understand the potential problems and pitfalls that can occur in projects. Through these types of exercises and personal experience you will build an experience base of skills that will help you better manage your own research laboratory.

Statement of Work

Background: You are an Assistant Professor at Enormous State University (ESU) and perform research on *Yersinia pestis* (plague) and pulmonary cell interactions. Recently you have found a very interesting proton pump in *Y. Pestis* that when blocked by a drug inhibitor in vitro, kills the bacteria but not human cells in culture (you have a paper submitted on this work). You have been wondering if this drug could be an antidote for a plague infection? The NIH has just released an RFA for "Saving our soldiers from dangerous pathogens" that is due in 13 weeks. This grant could fully fund your lab for five years. Your goal is to prepare yourself for a successful RFA proposal.

Case study: You need to define the scope of the work you would like to achieve to reach your goal. Yet you are constrained by the available research funds and can only choose two of the following for your scope of work.

Scope of Work

1. Propose a clinical trial for the existing drug inhibitor to demonstrate its efficacy in stopping *Y. Pestis*.
2. Create additional candidate drugs with similar structure to your inhibitor that have high potential to kill *Y. Pestis*.
3. Make an antibody to pump that will help in pump characterization.
4. Identify gene homolog and physiologic pathways of current pump identified.
5. Define role of immune system and its potential to improve cell killing with respect to pump inhibition.

Allocation of Resources: Assignment of Personnel

You have sufficient personnel in your laboratory to attempt the scope of work. Allocate your personnel according to the following rules:

1. Choose only two scope projects.
2. You must do the ongoing lab work.
3. Each person can only do one scope project/ongoing lab work.
4. You need at least one person per scope project.
5. You can have up to two people per project.
6. You must have people covering the ongoing lab work (one for each column).

Contd...

Notes

Different personnel have different research strengths and can or cannot function in different projects. Their abilities are listed in the following table. You can consider a degree of redundancy in the work assignments that you may want in case of personnel loss or turnover.

							<input type="checkbox"/>	<input type="checkbox"/>
Name	Person	Scope 1	Scope 2	Scope 3	Scope 4	Scope 5	Ongoing Lab Work 1	Ongoing Lab Work 2
Rudy	Physician-scientist	Best <input type="checkbox"/>	Poor <input type="checkbox"/>	Adequate <input type="checkbox"/>	Best <input type="checkbox"/>	Poor <input type="checkbox"/>	Poor <input type="checkbox"/>	Poor <input type="checkbox"/>
Chia-Ling	Graduate student	Poor <input type="checkbox"/>	Best <input type="checkbox"/>	Adequate <input type="checkbox"/>	Poor <input type="checkbox"/>	Poor <input type="checkbox"/>	Adequate <input type="checkbox"/>	Best <input type="checkbox"/>
Suzanne	Post-doc	Poor <input type="checkbox"/>	Poor <input type="checkbox"/>	Best <input type="checkbox"/>	Poor <input type="checkbox"/>	Adequate <input type="checkbox"/>	Adequate <input type="checkbox"/>	Best <input type="checkbox"/>
Hortence	Post-doc	Best <input type="checkbox"/>	Adequate <input type="checkbox"/>	Poor <input type="checkbox"/>	Best <input type="checkbox"/>	Adequate <input type="checkbox"/>	Best <input type="checkbox"/>	Adequate <input type="checkbox"/>
Pradip	Post-doc	Adequate <input type="checkbox"/>	Best <input type="checkbox"/>	Adequate <input type="checkbox"/>	Poor <input type="checkbox"/>	Best <input type="checkbox"/>	Best <input type="checkbox"/>	Adequate <input type="checkbox"/>

Things Happen!

In the course of all events it is certain that things will go wrong. While you are working on your projects the following things have happened in the laboratory. These will affect your work, and the ability to complete your goal.

1. Rudy quits the laboratory to join a private practice medicine group. If you want to continue Scope 1 you need to place another person on the project (if you do not already have another person covering the project).
2. Bob's Brain Foundation, the group funding your brain tumor research, decides to perform a review of your program. To keep funding you need to show significant progress. You need your "best" people doing the ongoing lab work.

Modify your available resources to best accomplish you goals. You may also change your scope projects, just realize it is a "bit late in the game" to be changing scope projects.

		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Name	Person	Scope 1	Scope 2	Scope 3	Scope 4	Scope 5	Ongoing Lab Work 1	Ongoing Lab Work 2
Chia-Ling	Graduate student	Poor <input type="checkbox"/>	Best <input type="checkbox"/>	Adequate <input type="checkbox"/>	Poor <input type="checkbox"/>	Poor <input type="checkbox"/>	Adequate <input type="checkbox"/>	Best <input type="checkbox"/>
Suzanne	Post-doc	Poor <input type="checkbox"/>	Poor <input type="checkbox"/>	Best <input type="checkbox"/>	Poor <input type="checkbox"/>	Adequate <input type="checkbox"/>	Adequate <input type="checkbox"/>	Best <input type="checkbox"/>
Hortence	Post-doc	Best <input type="checkbox"/>	Adequate <input type="checkbox"/>	Poor <input type="checkbox"/>	Best <input type="checkbox"/>	Adequate <input type="checkbox"/>	Best <input type="checkbox"/>	Adequate <input type="checkbox"/>
Pradip	Post-doc	Adequate <input type="checkbox"/>	Best <input type="checkbox"/>	Adequate <input type="checkbox"/>	Poor <input type="checkbox"/>	Best <input type="checkbox"/>	Best <input type="checkbox"/>	Adequate <input type="checkbox"/>

More Things Happen

Ongoing events affect your final productivity.

Hortence is sick and cannot complete her assigned tasks her productivity goes from "Best" to "Adequate", or from "Adequate" to "Poor" depending on the task she has been assigned.

Do not make any additional changes to the table. Copy your previous results onto the new table and calculate your point score.

Contd...

Notes

Final Productivity

		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Name	Person	Scope 1	Scope 2	Scope 3	Scope 4	Scope 5	Ongoing Lab Work 1	Ongoing Lab Work 2
Chia-Ling	Graduate student	Poor <input type="checkbox"/> 1 Point	Best <input type="checkbox"/> 3 Points	Adequate <input type="checkbox"/> 2 Points	Poor <input type="checkbox"/> 1 Point	Poor <input type="checkbox"/> 1 Point	Adequate <input type="checkbox"/> 2 Points	Best <input type="checkbox"/> 3 Points
Suzanne	Post-doc	Poor <input type="checkbox"/> 1 Point	Poor <input type="checkbox"/> 1 Point	Best <input type="checkbox"/> 3 Points	Poor <input type="checkbox"/> 1 Point	Adequate <input type="checkbox"/> 2 Points	Adequate <input type="checkbox"/> 2 Points	Best <input type="checkbox"/> 3 Points
Hortence (sick)	Post-doc	Adequate <input type="checkbox"/> 2 Points	Poor <input type="checkbox"/> 1 Point	Poor <input type="checkbox"/> 1 Point	Adequate <input type="checkbox"/> 2 Points	Poor <input type="checkbox"/> 1 Point	Adequate <input type="checkbox"/> 2 Points	Poor <input type="checkbox"/> 1 Point
Pradip	Post-doc	Adequate <input type="checkbox"/> 2 Points	Best <input type="checkbox"/> 3 Points	Adequate <input type="checkbox"/> 2 Points	Poor <input type="checkbox"/> 1 Point	Best <input type="checkbox"/> 3 Points	Best <input type="checkbox"/> 3 Points	Adequate <input type="checkbox"/> 2 Points

Examine the table above. Using the columns, copy the check boxes of the scope projects and personnel you used from the previous table. Record the points you received for each project at the bottom. If you chose a project and at least one of the personnel you placed on the project had a "Best" score it as 3 points. If the personnel had "Adequate" score it as 2 points. Add up your points and place the sum in the "TOTAL POINTS" Box. If the personnel had "Poor" score it as 1 point. If you switched any projects between table one and table (i.e. after the misfortune) subtract 2 points from your total.

TOTAL POINTS	
SUBTRACT 2 POINTS IF YOU CHANGES SCOPES	
FINAL POINTS	

Final Point Scoring

FINAL POINTS	OUTCOME
10-12	Excellent- Kept current lab funding and added new grant
8-9	Good-Kept current lab funding
0-7	Poor - Too high risk, lost all lab funding

The goal of this case study is not to win, but to see how ongoing events can affect your laboratory, and how project management can help you control your resources for your benefit. Key things to consider as you analyze your projects.

1. After the initial things went wrong, how did you reallocate your resources?
2. How much risk were you willing to take? If you lost a scope project, did you refocus on protecting the current lab funding? Were you willing to risk your current lab funding to get more funding?
3. What would you do differently next time?

This case study was developed by Milton Datta, M.D., Emory University, for the session on project planning at the 2005 BWF-HHMI Course in Scientific Management

Question

Analyse the case and discuss the case facts.

7.7 Summary

Notes

- CPM was the discovery of M.R. Walker of E.I. Du Pont de Nemours & Co. and J.E. Kelly of Remington Rand, circa 1957.
- PERT was devised in 1958 for the POLARIS missile program by the Program Evaluation Branch of the Special Projects office of the U.S. Navy.
- There have been several extensions to both network and chart forms of project scheduling.
- Planning, Scheduling (or organising) and Control are considered to be basic Managerial functions.
- In our Social Project, the Project Manager is now not so certain that each activity will be completed on the basis of the single estimate.
- The Beta distribution is appropriate for calculation of activity durations.
- One shortcoming of the PERT/CPM network method is that it does not allow for leads and lags between two activities without greatly increasing the number of subactivities to account for this
- Far more than the technical benefits, it was found that PERT/CPM provided a focus around which managers could brainstorm and put their ideas together.
- There are many variations of CPM/PERT which have been useful in planning costs, scheduling manpower and machine time.

7.8 Keywords

Free Float: It is the spare time available when all preceding activities occur at the earliest possible times and all succeeding activities occur at the earliest possible times.

PERT: PERT assumes that the expected length of a project (or a sequence of independent activities) is simply the sum of their separate expected lengths.

Total Float: It is the spare time available when all preceding activities occur at the earliest possible times and all succeeding activities occur at the latest possible times.

7.9 Review Questions

1. Describe the brief history of CRM.
2. Explain the language of PERT/CPM.
3. Discuss precedence diagramming.
4. Briefly explain the planning, scheduling and control.
5. Discuss the framework of PERT and CPM.
6. Describe total float and free float.
7. Explain the PERT approach.
8. Describe the PERT calculations for the social project.
9. Explain the expected length of a project.
10. Discuss the rule "The Backward pass".

Notes

Answers: Self Assessment

- | | |
|----------------|----------------|
| 1. Computation | 2. PERT |
| 3. IBM Noval | 4. CPM |
| 5. False | 6. True |
| 7. True | 8. False |
| 9. Critical | 10. Free Float |
| 11. Beta | 12. PERT |
| 13. Variance | 14. VT |
| 15. 0.68 | 16. Sum |

7.10 Further Readings



Books

Clements/Gido, *Effective Project Management*, Thomson

Clifford F. Gray and Erik W. Larson, *Project Management*, Tata McGraw Hill

Dennis Lock, *Project Management*, Ninth Edition, Gower

Freund, John E., *Modern Elementary Statistics*, Prentice-Hall of India Private Limited, New Delhi, 1979

K. Nagarajan, *Project Management*, Third Edition, New Age International

P.C.K. Rao, *Project Management and Control*, Sultan Chand & Sons

Prasanna Chandra, *Projects Planning, Selection, Financing, Implementation, and Review*, Sixth Edition, Tata McGraw Hill

Render, Barry and Stair Jr., Ralph M. *Quantitative Analysis for Management*, Massachusetts: Allyn & Bacon Inc., 1982, pp. 525-563

Vasant Desai, *Project Management*, Second Revised Edition, Himalaya Publishing House

Wiest, Jerome D., and Levy, Ferdinand K., *A Management Guide to PERT/CPM*, Prentice-Hall of India Private Limited, New Delhi, 1974



Online links

www.col.org/SiteCollectionDocuments/SuccessProjMgt.pdf

www.freelancer.com/jobs/Project-Management/

www.mindtools.com/pages/main/newMN_PPM.htm

www.mpug.com/Pages/WhatisProjectManagement.aspx

www.nickjenkins.net/prose/projectPrimer.p

www.pma-india.org/ - Trinidad and Tobago

Unit 8: Monitoring and Controlling

Notes

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Objectives

After studying this unit, you will be able to:

- Know about planning monitor cycle;
- Understand data collection and reporting;
- Know about project control.

Introduction

Project monitoring and control are, in some ways, simply the opposite sides of project selection and planning. The bases for selection as described dictate what to monitor and the details of planning identify the elements to be controlled. Monitoring is the collection, recording, and reporting of project information that is of importance to the project manager and other relevant stakeholders. Control uses the monitored data and information to bring actual performance into agreement with the plan. Clearly, the need to exert proper control mandates the need to

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monitor the proper activities and elements of the project. Frequently, the distinction between monitoring and control is blurred, and their interaction often makes us think we are working on a single task, but they are quite distinct. Although the data gathered from monitoring often serve many objectives — auditing, keeping management informed, learning from mistakes — these are all secondary compared to the purpose of control. Thus, the key issue in designing an effective monitoring and control system is to create an information system that gives the project manager and others the information they need to make informed, timely decisions that will keep project scope as close as possible to the plan.

8.1 Plan Monitor Control Cycle

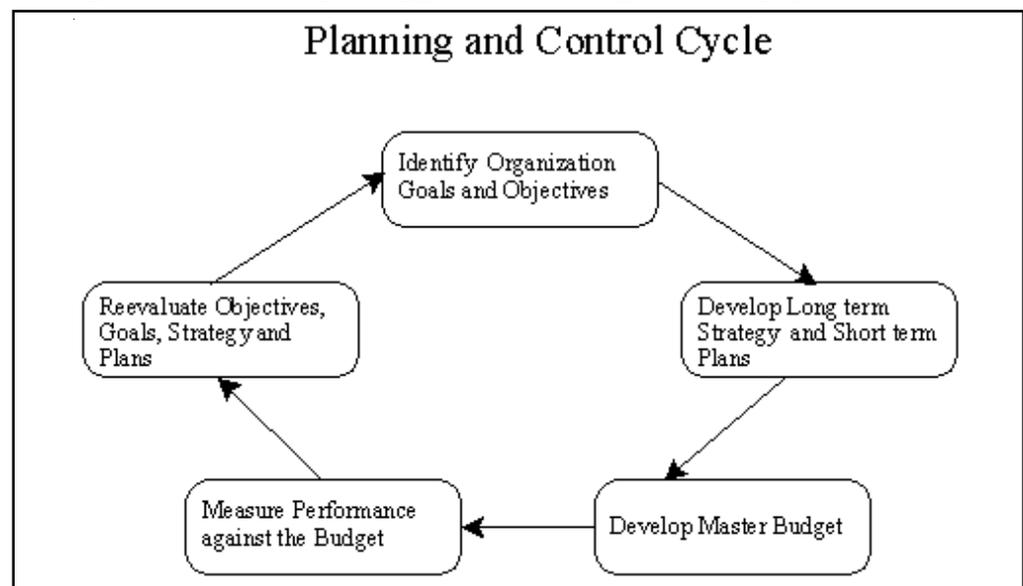
Managing a project involves continually planning what to do, checking on progress, comparing progress to plan, taking corrective action to bring progress into agreement with the plan if it is not, and replanning when needed. As noted previously, the fundamental items to be planned, monitored, and controlled are time, cost, and scope so that the project stays on schedule, does not exceed its budget, and meets its specifications.

This plan – monitor – control cycle constitutes a “ closed – loop “ process that continues until the project is completed.



Notes That the information flows up the organization and the authority flows down.

Unfortunately, it is often the case that when particularly complex, challenging, or uncertain projects are initiated, the planning – monitoring – controlling effort is minimized so that “the real work“ can be done. It is a great temptation to focus on doing something, anything, rather than to spend time on planning, monitoring, and controlling, especially if the stakes are high and the project is a difficult one. It is precisely such projects, however, that most desperately need a mature project manager, particularly one who realizes the importance of creating an effective planning – monitoring – controlling process. Only this will ensure that the project and its output are in full compliance with the law, as well as with the expectations of both senior management and the client. We are familiar with many firms that incurred tremendous expense and large losses because the planning process was inadequate for the project tasks undertaken.





Example: A retailer won a bid to supply a regional office of a national firm with a computer, terminals, and software. Due to insufficient planning, the installation was completed far beyond the due date with very inadequate performance. The project failure disqualified the retailer from bidding on an additional 20 installations planned by the national firm. Another firm in the construction industry ran 63 percent over budget and 48 percent over schedule on major project because the PM had managed similar projects several times before and “knew what to do without going into all that detail that no one looks at anyway. “

8.2 Designing the Monitoring System

The key to setting up a monitoring system is to identify the special characteristics of scope, cost, and time that need to be controlled in order to achieve the project goals as stated in the project plan. The exact boundaries within which these characteristics should be controlled must be determined, as well as the specified performance characteristics for each level of detail in the project activities. In order to manage for overall project success, control must be exercised at the detailed work level for each aspect of project performance or there is no guarantee that the desired changes will result. The project plan identifies what is being done, when, and the planned level of resource usage for each task and sub-task in the project, so real-time data must be identified to measure achievement against the plan. Mechanisms to gather and store such data must be designed. In addition to collection systems for hard data, the monitoring system should include telephone logs, change tracking/control systems, documentation processes for both formal (e.g., meetings) and informal communications, and other such softer data collection systems. Once again, monitoring is the direct connection between project planning and control.



Caution The key to setting up a monitoring system is to identify the special characteristics of scope, cost, and time that need to be controlled in order to achieve the project goals as stated in the project plan.

8.3 Data Collection and Reporting

Once we have decided on the type of data we want to monitor, the next question is how to collect these data and turn them into information useful for controlling the project. This is the activity of data collection and reporting. In this section we cover the physical collection of data and the analysis of that data, if necessary, to transform them into information. Once transformed, however, there are many ways to present the information and these are covered under the topic of reporting, including a discussion of the three main types of reports. A very special means of both collecting and disseminating data, and even sometimes information, is the proverbial “meeting, “ and we offer some advice for this often painful phenomenon — both in-person and virtual meetings are included. The use of electronic means for distributing information or reports is briefly examined. At some point we have to decide what data we need to collect and precisely how to go about collecting them. A number of questions are raised. Should we design and use special forms? Should data be collected just before or after an important milestone? Should time and cost data always be collected at the same time each month? There are many such issues that arise when considering the data collection process and most of them can only be answered in the context of a specific project.



Did u know? Once we have decided on the type of data we want to monitor, the next question is how to collect these data and turn them into information useful for controlling the project

8.4 Data Collection and Reporting Phases

This document takes a comprehensive view of the processes that occur during each phase of data collection and reporting, once a data need has been identified. It guides the reader step by step through these processes, from the initial articulation of a data need through the fulfillment of the data requirement. The following six phases form the conceptual framework in which the Standards have been developed and organized:

1. Management of Data Collection and Reporting,
2. Design,
3. Data Collection,
4. Data Preparation and Processing,
5. Data Analysis, and
6. Reporting and Dissemination of Data.



Task Discuss about data collection and reporting phases.

8.5 Project Control

Definition of Project Controls

The traditional view of Project Controls as defined by PMBOK has been cost & schedule during the project execution phase. Although this view is persuasive in industry, we believe an effective Project Controls process can be applied in a collaboration of its various sub-disciplines, such as:

1. Planning, Scheduling & Project Reporting
 - (a) Scope management;
 - (b) Project deliverables;
 - (c) Work breakdown/Cost breakdown structures;
 - (d) Schedule management;
 - (e) Schedule forecasting;
 - (f) Corrective action;
 - (g) Progress measurement/reporting;
 - (h) Productivity Analysis & Calculation;
2. Earned Value Analysis & Management
3. Cost Engineering & Estimating
 - (a) Estimating;
 - (b) Cost management;
 - (c) Cost control; and
 - (d) Cost forecasting.

4. Change Management & Controls

Notes

- (a) Change order control; and
- (b) Trend Analysis;

5. Risk and Delay Claims

- (a) Risk Assessment & management;
- (b) Delay Claims Quantification; and
- (c) Forensic Schedule Analysis.

Put simply, Project Controls encompass the people, processes and tools used to plan, manage and mitigate cost and schedule issues and any risk events that may impact a project.

Within these phases, an attempt has been made to arrange individual standards in the order in which they would be performed in an actual data collection and reporting activity. Sometimes, though, the processes addressed in different standards may occur simultaneously



Notes The traditional view of Project Controls as defined by PMBOK has been cost & schedule during the project execution phase.

Self Assessment

Fill in the blanks:

1. and control are, in some ways, simply the opposite sides of project selection and planning.
2. The traditional view of as defined by PMBOK has been cost & schedule during the project execution phase.
3. The key to setting up a system is to identify the special characteristics of scope, cost, and time that need to be controlled in order to achieve the project goals as stated in the project plan.
4. The project plan identifies what is being done, when, and the planned level of resource usage for each task and in the project
5. Project controls encompass the people, processes and tools used to manage and mitigate cost and schedule issues and any risk events that may impact a project.

8.6 Management of Data Collection and Reporting

Successful implementation of the standards and guidelines articulated in Phases 2-6 of the Standards (Design, Collection, Processing, Analysis, and Reporting) depends largely upon the creation of an organizational environment and organizational structures that encourage and fully support the production of high quality information.

Data are not free. Organizational resources must be devoted to the designing, collecting, processing, analyzing, and reporting phases of a data collection activity. Therefore, data-related activities must be managed and coordinated in order to focus available resources where they are most needed and in the most efficient and cost-effective manner.

The standards included in this phase are all based on a key assumption—that there is a clear and important information need that cannot otherwise be met. Therefore, at the most fundamental

Notes

level, processes must be put into place that provide the foundation for sound management and policy decisions about which data collection and reporting initiatives to pursue. Such decisions must be based on adequate information and must include the timely involvement and participation of all interested parties.

The first standard in this phase describes the creation of an organizational culture that is conducive to a quality management philosophy. Within this environment, management procedures must be put into place to ensure successful implementation of data collection activities. The remaining three standards deal with justifying, supporting, and managing an individual data collection.



Caution Data are not free. Organizational resources must be devoted to the designing, collecting, processing, analyzing, and reporting phases of a data collection activity.

8.6.1 Standard for creating an Infrastructure to Manage Data Collection Activities

GUIDELINES

- 1.1.1 Procedures should be implemented for routinely sensing the information needs of legislators, policymakers, practitioners, and the public.
- 1.1.2 Clearinghouses should be established and maintained for documenting reports, collection instruments, definitions, and records of available data.
- 1.1.3 Procedures should be developed for reviewing and approving data collection requests. Efforts should be made to coordinate federal, state, and local reviews, when feasible.
- 1.1.4 Advisory task forces or committees, comprised of data requestors, providers, producers, and users, should be established at every level (e.g., federal, state, local) to provide guidance on coordinating data collection activities.
- 1.1.5 Regular evaluations of ongoing data collections should be scheduled to:
 - (i) Assess continuing need
 - (ii) Analyze accuracy
 - (iii) Examine utility
 - (iv) Review collector and provider burden and costs
 - (v) Evaluate confidentiality procedures
 - (vi) Review propriety/appropriateness
- 1.1.6 Data producers and providers should adhere to standard definitions of data elements. Definitions of data elements should be periodically reviewed, published, and made available to data providers, data producers, and data users.

8.6.2 Standard for justifying Data Collection Activities

GUIDELINES

- 1.2.1 Data requestors should demonstrate that the data to be produced will be of sufficient value, applicability, and usefulness to justify the cost and burden. The specific cost of

collection to both data producers and providers, as well as the burden imposed, should be identified.

Notes

- 1.2.2 A determination should be made about whether the data can be obtained more appropriately from other sources within or outside the collecting agency. Reasons should be specified why similar available data cannot be used for the stated purposes.
- 1.2.3 An opportunity should be provided for comments by data providers and users on the proposed collection of information. Concerns should be documented, along with the responses to those concerns.

RELATED STANDARDS

2.4. Standard for Assessing the Value of Obtainable Data

1. Document the circumstances that make the collection of information necessary, including any legal or administrative requirements.
2. Indicate as specifically as possible how, by whom, and for what purpose the data 'will be used.
3. Determine whether available data can be used to meet an emerging information need before initiating a new collection.
4. Identify required data collection activities, as well as the accuracy and specificity necessary to achieve collection objectives.
5. Analyze the costs and benefits of the proposed data collection to the producer and provider and, where appropriate, the costs of alternative strategies.
6. Review the terminology and data definitions to be used in the data collection to ensure that they conform to accepted usage. Any deviations from accepted usage should be explained. Definitions should conform whenever possible to nationally developed definitions to ensure that the data produced will be comparable to data produced by education agencies and organizations at the school, district, state, and federal levels.
7. Document data providers' concerns and data requestors' responses to those concerns.

8.7 Reporting and Dissemination of Data

Most data collection and analysis efforts culminate in one or more reports on the findings. The standards included in this phase are designed to ensure that reports are prepared, documented, and reviewed in a manner that enhances their accuracy, credibility, and usefulness. The standards also address the release and dissemination of data. When databases are accessible to the public, the relevant standards particularly those related to confidentiality—should be considered.

The standards for reporting and dissemination of data make a distinction between substantive reports that describe study findings and technical reports that document study procedures. Most substantive reports, however, contain some methodological information; thus, many of the standards for technical reports apply to substantive reports as well. For the purposes of these standards, a technical report includes comprehensive documentation and evaluation of data collection, processing, and analysis procedures.

When preparing a report for a professional journal, a private organization, or a government agency, those who use these standards should determine if there are additional guidelines that must be followed.

Notes

8.8 Project Control

Project controlling should be established as an independent function in project management. It implements verification and controlling function during the processing of a project in order to reinforce the defined performance and formal goals. The tasks of project controlling are also:

1. the creation of infrastructure for the supply of the right information and its update,
2. the establishment of a way to communicate disparities of project parameters,
3. the development of project information technology based on an intranet or the determination of a project Key Performance Index (KPI) System,
4. divergence analyses and generation of proposals for potential project regulation,
5. the establishment of methods to accomplish an appropriate the project structure, project workflow organization, project control and governance, and
6. creation of transparency among the project parameters.



Did u know? The successful performance of a project depends on appropriate planning. The PMBOK Guide defines the use of 21 processes that relate to planning out of the 39 processes for project management

Self Assessment

State whether the following statements are True or False:

6. Home resources must be devoted to the designing, collecting, processing, analyzing, and reporting phases of a data collection activity.
7. The standards included in this phase are all based on a key assumption—that there is a clear and important information need that can otherwise be met.
8. The third standard in this phase describes the creation of an organizational culture that is conducive to a quality management philosophy.
9. Most data collection and analysis efforts culminate in one or more reports on the findings.
10. Project controlling should be established as an independent function in project management.

8.8.1 Importance of Project Controls

The successful performance of a project depends on appropriate planning. The PMBOK Guide defines the use of 21 processes that relate to planning out of the 39 processes for project management, (Globerson & Zwikeyal 2002). The execution of a project is based on a robust project plan and can only be achieved through an effective schedule control methodology. The development of a suitable Project Control system is an important part of the project management effort (Shtub, Bard & Globerson 2005). Furthermore, it is widely recognized that planning and monitoring plays a major role as the cause of project failures. Despite the continuous evolution in the project management field, it appears evident that the traditional approach still shows a lack of utilisation of Project Controls and there have been a number of articles published to support the importance of control in the achievement of project objectives. It has been proved time and again that Project performance can be improved if dedicated Project Controls systems

are in place. An IBC 2000 Project Control Best Practice Study carried out by IPA identified that good Project Control practices reduce execution schedule slip by 15%. Project Controls cost range from 0.5% to 3% of total project, (including cost accounting), therefore, to break even, Project Control needs to improve cost effectiveness by around 2%. A sample study carried out by the IBC Cost Engineering Committee (CEC) in 1999, showed cost improvements for the projects in the study, was more than 10%. It is noted also that NPV (Net Project Value) also benefits from schedule improvements. Success factors are based on good Project Control practices, which result in good cost and schedule outcomes.

Another useful section of Gary Heerkens' brief case book "Project Management" covers Project Control and what it really means to the project manager. The discussion centers around the objectives of project control and what it is that the project manager is actually trying to control. I'm not wholeheartedly endorsing this information – I never am when I provide a magazine or book excerpt. However, I do find it interesting and worth further review and discussion.

8.8.2 What Project Control Really means?

The term control has several meanings. Those new to project management are initially dismayed by the use of the term "control," because they mistakenly equate it with the concept of authority. In the world of project management, control has very little to do with telling people what to do, dictating their actions or thoughts, or trying to force them to behave in a certain way— all of which are common interpretations of control. In project management, the term "control" is much more analogous to steering a ship. It's about continually making course adjustments with one main objective in mind—bringing the ship into safe harbor, as promised at the start of the voyage. And the successful project voyage includes identifying a specific destination, carefully charting a course to get there, evaluating your location throughout the voyage, and keeping a watchful eye on what lies ahead.

8.8.3 Objective of Project Control

Fledgling project managers (and some experienced ones!) often make the same mistake when trying to keep control of their projects. They get wrapped up in the here and now—the measurement and evaluation of their immediate situation—to the exclusion of everything else. They calculate their current position and how far off course they are. That's what they report to management and promise to fix. Their entire focus consists of staying on the line they've drawn from the beginning to end of the project. Unfortunately, controlling the destiny of your project is not that simple.

As we'll see, evaluating where you are in terms of where you're supposed to be is certainly part of the overall control and "getting back on track" is almost always a sound strategy. But your primary mission is to deliver what you've promised, so you should think of "maintaining control" in terms of minimizing the distance between where you end up and where you said you'd end up.

This means that overall project control requires an eye on the future, as this formula shows:

Calculated Present Variance + Estimated Future Variance = Final Project Variance

Maintaining proper control really requires that you consider three parameters: (a) where you are, compared with where you're supposed to be; (b) what lies ahead that can affect you; and (c) where you're going to end up, compared with where you said you would end up. Bear in mind that (a) and (b) are used primarily as internal control functions (although you may choose to report them outside the team). They're used for evaluating (c). At the risk of being repetitive, your primary focus should always be on evaluating where you think you're going to end up.

Notes

There are two reasons for this.

First, you must take intelligent and meaningful corrective action with the end point in mind. Guiding the ship must include more than just steering it back on course; it must also include recognizing that there's an object up ahead that you're going to have to steer around or winds around the upcoming point of land that have kicked up since you started your voyage. The future will always be different than expected at the outset of the project. Assumptions will be revised, operating conditions will change, and new things will be thrown in your path. Sometimes, actions you take now must compensate for future sources of variance as well as variances created though past performance.

The second reason you need to focus on the end point pertains to management reporting. In most cases, what will probably interest them most is a prediction of where you think you're going to end up: this is the type of information they need to run the business. Being able to report to your management that you're two weeks behind schedule or \$10,000 over budget right now may or may not be of value to them. Reporting that you expect the project to be completed three weeks late or \$15,000 over budget is much more likely to be of value.

What are you actually Controlling?

At this point, you're probably saying, "OK, so I should be focused on the end point of the project and I should be trying to 'get back on track' and minimize variances. But the end point of what? Get back on what track? And what kind of variance are we talking about?" All good questions.

The most fundamental measure of project success relates to meeting the agreed-upon targets in each of these dimensions. These are the targets that you promised to meet at the beginning of the project; these are the targets that you should focus on controlling.

Two of the targets pertain to the consumption of resources:

1. **Schedule:** Was the project completed on time? (How long did we take?)
2. **Cost:** Did the project come in at cost? (How much did we spend?)

The other two targets are tied to the deliverables of the project:

1. **Functionality:** Do project deliverables have the expected capability? (What can they do?)
2. **Quality:** Do the deliverables perform as well as promised? (How well can they do it?)

As far as many organizational managers are concerned, the ideal end point occurs when a project meets these four targets exactly as promised. Although "beating targets" is often characterized as desirable, hitting targets provides a level of predictability that most organizational managers value. The first two targets (schedule and cost) often get the most attention; hence the very common phrase "controlling cost and schedule."

Sometimes, however, controlling cost and schedule gets too much attention and deliverable performance is not as closely monitored as it should be. This is a major oversight, one that you should concentrate on avoiding.

8.9 Characteristics of Project Control System

Ultimately, the only way to control a project is for every member of the project team to be in control of his or her own work. A project manager can achieve control at the macro level only if it is achieved at the micro level. However, this does not mean that you should practice micro-managing! It actually means that you should set up conditions under which every team

member can achieve control of his or her own efforts. To do this requires five basic conditions. These are shown separately. To achieve self-control, team members need:

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1. A clear definition of what they are supposed to be doing, with the purpose stated.
2. A personal plan for how to do the required work.
3. Skills and resources adequate to the task.
4. Feedback on progress that comes directly from the work itself.
5. A clear definition of their authority to take corrective action when there is a deviation from plan (and it cannot be zero!).

The first requirement is that every team member be clear about what her objective is. Note the difference between tasks and objectives. State the objective and explain to the person (if necessary) what the purpose of the objective is. This allows the individual to pursue the objective in her own way. The second requirement is for every team member to have a personal plan on how to do the required work. Remember, if you have no plan, you have no control. This must apply at the individual as well as at the overall project level. The third requirement is that the person has the skills and resources needed for the job. The need for resources is obvious, but this condition suggests that the person may have to be given training if she is lacking necessary skills. Certainly, when no employee is available with the required skills, it may be necessary to have team members trained. The fourth requirement is that the person receives feedback on performance that goes directly to her. If such feedback goes through some roundabout way, she cannot exercise self-control. To make this clear, if a team member is building a wall, she can measure the height of the wall, compare it to the planned performance, and know whether she is on track. The fifth condition is that the individual must have a clear definition of her authority to take corrective action when there is a deviation from plan, and it must be greater than zero authority! If she has to ask the project manager what to do every time a deviation occurs, the project manager is still controlling. Furthermore, if many people have to seek approval for every minor action, this puts a real burden on the project manager.

The control system must focus on project objectives, with the aim of ensuring that the project mission is achieved. To do that, the control system should be designed with these questions in mind:

1. What is important to the organization?
2. What are we attempting to do?
3. Which aspects of the work are most important to track and control?
4. What are the critical points in the process at which controls should be placed?

Control should be exercised over what is important. On the other hand, what is controlled tends to become important. Thus, if budgets and schedules are emphasized to the exclusion of quality, only those will be controlled. The project may well come in on time and within budget, but at the expense of quality. Project managers must monitor performance carefully to ensure that quality does not suffer.

Taking Corrective Action

A control system should focus on response—if control data do not result in action, then the system is ineffective. That is, if a control system does not use deviation data to initiate corrective action, it is not really a control system but simply a monitoring system. If you are driving and realize that you have somehow gotten on the wrong road but do nothing to get back on the right

Notes

road, you are not exercising control. One caution here, though. I once knew a manager whose response to a deviation was to go into the panic mode and begin micro-managing. He then got in the way of people trying to solve the problem and actually slowed them down. Had he left them alone, they would have solved their problem much faster.

Timeliness of Response

The response to control data must be timely. If action occurs too late, it will be ineffective. This is frequently a serious problem. Data on project status are sometimes delayed by four to six weeks, making them useless as a basis for taking corrective action. Ideally, information on project status should be available on a real-time basis. In most cases, that is not possible. For many projects, status reports that are prepared weekly are adequate. Ultimately, you want to find out how many hours people actually work on your project and compare that figure to what was planned for them. This means that you want accurate data. In some cases, people fill out weekly time reports without having written down their working times daily. That results in a bunch of fiction, since most of us cannot remember with any accuracy what we did a week ago. As difficult as it may be to do, you need to get people to record their working times daily so that the data will mean something when you collect them. What's in it for them? Perhaps nothing. Perhaps future estimates will be better as a result of collecting accurate information on this project.

In any case, you need accurate data, or you may as well not waste your time collecting them. When information collection is delayed for too long, the manager may end up making things worse, instead of better. Lags in feedback systems are a favorite topic for systems theorists. The government's attempts to control recessions and inflation sometimes involve long delays, as a result of which the government winds up doing the exact opposite of what should have been done, thereby making the economic situation worse. There is one point about control that is important to note. If every member of the project team is practicing proper control methods, then reports that are prepared weekly are just checks and balances. This is the desired condition.

Designing the Right System

One system is not likely to be correct for all projects. It may need to be scaled down for small projects and beefed up for large ones. Generally, a control system adequate for a large project will overwhelm a small one with paperwork, while one that is good for small projects won't have enough "clout" for a big project.

Practicing the KISS Principle

KISS stands for "Keep it simple, stupid!" The smallest control effort that achieves the desired result should be used. Any control data that are not essential should be eliminated. However, as was just mentioned, one common mistake is to try to control complex projects with systems that are too simple!

To keep control simple, it is a good idea to check periodically that reports that are generated are actually being used for something by the people who receive them. We sometimes create reports because we believe the information in them should be useful to others, but if the recipients don't actually use it, we kid ourselves. To test this point, send a memo with each report telling people to let you know whether they want to receive future reports; if you do not hear from them, their names will be removed from the distribution. You may be surprised to find that no one uses some of your reports. Those reports should be dropped completely.



Notes KISS stands for “Keep it simple, stupid!” The smallest control effort that achieves the desired result should be used. Any control data that are not essential should be eliminated. However, as was just mentioned, one common mistake is to try to control complex projects with systems that are too simple!

Notes

8.10 Project Review Meetings

There are two aspects to project control. One can be called maintenance and the other aims at improvement of performance. The maintenance review just tries to keep the project on track. The improvement review tries to help project teams improve performance. Three kinds of reviews are routinely conducted to achieve these purposes. They are:

1. Status reviews
2. Process or lessons-learned reviews
3. Design reviews

Everyone should do status and process reviews. Design reviews, of course, are appropriate only if you are designing hardware, software, or some sort of campaign, such as a marketing campaign.

A status review is aimed at maintenance. It asks where the project stands on the PCTS measures that we have used throughout this book. Only if you know the value of all four of these can you be sure where you are. Process means the way something is done, and you can be sure that process always affects task performance. That is, how something is done affects the outcome. For that reason, process improvement is the work of every manager.

Self Assessment

Fill in the blanks:

11. There are aspects to project control.
12. The maintenance review just tries to keep the on track.
13. The response to control data must be
14. A control system should on response
15. The control system must focus on project, with the aim of ensuring that the project mission is achieved



Case Study

Project Management in Competitive Exports

An Indian firm involved in the export market, predominantly to the United States, was a manufacturer of telecom and switching equipment. An efficient and competitive firm, if not the largest, it used the best quality components and was the first company in its industry to regularly export such technical equipment to the West. However, times were changing: overall, component quality had improved greatly and the company now faced competition from recently acceded countries to the European

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Union and from the economic and technological superpower that is China. Margins at the company were relatively tight and costs were not always stable as a large part of the raw materials were volatile commodities, such as metals, bought on the international market. Many of the managers had been educated both at Western universities and at India's top universities, with a biased representation, naturally, from engineering and technical disciplines.

After some years of stiff competition, the company lost out on a contract to supply the key US export market to a South Korean company. After much reflection—their quality assurance process was first rate, their manufacturing process efficiency standards were leading edge, and their own supplier contracts were as tightly negotiated as possible—managers began to think about applying project management to the whole product life cycle. Detailed costs were identified and allocated. Responsibility for different stages of the process was more clearly demarcated and the concept of team ownership of specific projects was used for the first time. Reward and incentive schemes were initiated and internal team competitions established. Benchmarks for delivery were created that were more closely related to cost and schedule, as opposed to previously when the emphasis had been toward quality and reliability. Within a year the firm had won back that export contract and improved efficiency enough to bid for another, without increasing the headcount.

Capacity Management

For the SME, project management need not be too complicated. There do not need to be large numbers of variables in the spreadsheets and project management software. As often as not, managing the process of project management can itself become a challenging job. Therefore, as a director one needs to be aware of the capacity of the individual who is doing the project management. Too many projects and too much complexity can easily overwhelm the project management, leading to suboptimal performance and projects that come in under par. As a rule of thumb, two or three small projects are all that one person should manage. Don't overlook the ancillaries that go with projects—attending meetings, preventing bottlenecks, and defending one's turf from rival managers who are aware of the fixed resources available at company level. These can easily detract from the successful completion of a project.

Project Review and Change

It may be thought this section is self-evident. It isn't in fact project review and project change are vital components of both successful and unsuccessful projects. If a project is going wrong, there has to be a clearly defined set of criteria that set out exactly what must be done and whose responsibility it is to do it. Typically it will be a director who decides whether to abort a current project or significantly change the path the project is on. However, detailed reporting rules need to be agreed on by all team members to ensure that management is aware of the precise status of a project.

Conclusion

Management and Leadership

These two are inextricably linked: just as manufacturing control is only a small part of project management, project management is itself only a small part of running a company. Leadership is key here: not every manager is a leader, nor is every leader a successful manager quite often the two attributes are very separate. Leadership is for another chapter, but it is essential if a project manager is to "buy in" the team doing the work he or she requires of them to his or her vision of why they are doing it. The subtle difference

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between management and leadership alone can shift the bottom line either way by tens of thousands.

Making it Happen

1. Project management can be a huge specialism, so understand your project and your contribution to it.
2. Distinguish between the various theories of project management and discover which best fits your situation.
3. Do not lose sight of the importance of process control.
4. Review your project path and be prepared to change it if not doing so could jeopardize successful implementation.
5. Motivate and involve team members they are your facilitators

Question

Analyse the case and discuss the case facts.

Source: <http://www.qfinance.com>

8.11 Summary

- Project monitoring and control are, in some ways, simply the opposite sides of project selection and planning.
- Monitoring is the collection, recording, and reporting of project information that is of importance to the project manager and other relevant stakeholders.
- Managing a project involves continually planning what to do, checking on progress, comparing progress to plan.
- The traditional view of Project Controls as defined by PMBOK has been cost & schedule during the project execution phase.
- The first standard in this phase describes the creation of an organizational culture that is conducive to a quality management philosophy.
- Data requestors should demonstrate that the data to be produced will be of sufficient value, applicability, and usefulness to justify the cost and burden.
- Most data collection and analysis efforts culminate in one or more reports on the findings.
- Project controlling should be established as an independent function in project management.
- The successful performance of a project depends on appropriate planning.
- Fledgling project managers (and some experienced ones!) often make the same mistake when trying to keep control of their projects.
- The response to control data must be timely.
- KISS stands for "Keep it simple, stupid!"

8.12 Keywords

Data Collection: Data are not free. Organizational resources must be devoted to the designing, collecting, processing, analyzing, and reporting phases of a data collection activity.

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KISS: KISS stands for “Keep it simple, stupid!”

PMBOK: The PMBOK Guide defines the use of 21 processes that relate to planning out of the 39 processes for project management

Project Control: The term control has several meanings. Those new to project management are initially dismayed by the use of the term “control,” because they mistakenly equate it with the concept of authority.

Project controlling: It should be established as an independent function in project management. It implements verification and controlling function during the processing of a project in order to reinforce the defined performance and formal goals.

8.13 Review Questions

1. Discuss plan-monitor control cycle.
2. Explain about designing the monitoring system.
3. What do you mean by the collection and monitoring?
4. What do you know about project control?
5. Explain the management of data collection and reporting.
6. Describe the standard for creating an infrastructure to manage data collection activities.
7. Discuss the standard for justifying data collection activities.
8. What do you know about reporting and dissemination of data?
9. Discuss about the importance of project controls?
10. What is the objective of project control?
11. Explain the characteristics of a project control system.
12. Describe, in brief, the project review meetings.

Answers: Self Assessment

- | | |
|-----------------------|--------------------|
| 1. Project Monitoring | 2. Project Control |
| 3. Monitoring | 4. Sub-task |
| 5. Plan | 6. False |
| 7. False | 8. False |
| 9. True | 10. True |
| 11. Two | 12. Project |
| 13. Timely | 14. Four |
| 15. Objectives | |

8.14 Further Readings



Books

Clements/Gido, *Effective Project Management*, Thomson

Clifford F. Gray and Erik W. Larson, *Project Management*, Tata McGraw Hill

Dennis Lock, *Project Management*, Ninth Edition, Gower

Notes

K. Nagarajan, *Project Management*, Third Edition, New Age International

P.C.K. Rao, *Project Management and Control*, Sultan Chand & Sons

Prasanna Chandra, *Projects–Planning, Selection, Financing, Implementation, and Review*, Sixth Edition, Tata McGraw Hill

Vasant Desai, *Project Management*, Second Revised Edition, Himalaya Publishing House



Online links

www.col.org/SiteCollectionDocuments/SuccessProjMgt.pdf

www.freelancer.com/jobs/Project-Management/

www.mindtools.com/pages/main/newMN_PPM.htm

www.mpug.com/Pages/WhatisProjectManagement.aspx

www.nickjenkins.net/prose/projectPrimer.p

www.pma-india.org/ - Trinidad and Tobago

Unit 9: Evaluation and Termination

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9.1 Purposes of Project Evaluation

9.2 Conducting the Project Process Review

9.3 Project Auditing

9.4 Project Termination

9.5 Perform Project Closure

9.6 Review Project Completion

9.7 Summary

9.8 Keywords

9.9 Review Questions

9.10 Further Readings

Objectives

After studying this unit, you will be able to:

- Know about purpose of project evaluation;
- Understand about the project process review;
- Know about project auditing.

Introduction

As the dictionary definition says, to evaluate a project is to attempt to determine whether the overall status of the work is acceptable, in terms of intended value to the client once the job is finished. Project evaluation appraises the progress and performance of a job compared to what was originally planned. That evaluation provides the basis for management decisions on how to proceed with the project. The evaluation must be credible in the eyes of everyone affected, or decisions based on it will not be considered valid. The primary tool for project evaluation is the project process review, which is usually conducted at major milestones throughout the life of the project.

9.1 Purposes of Project Evaluation

Sports teams that practice without reviewing performance may get really good at playing very badly. That is why they review game films—to see where they need to improve. In other words, the purpose of a review is to learn lessons that can help the team to avoid doing things that cause undesired outcomes and to continue those that help. The review should be called a lessons learned or process review.

I have deliberately avoided the word audit, because nobody likes to be audited. Historically, an audit has been designed to catch people doing things they shouldn't have done so that they can

be penalized in some way. If you go around auditing people, you can be sure they will hide from you anything they don't want you to know, and it is those very things that could help the company learn and grow.

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As Dr. W. Edwards Deming has pointed out in his book, *Out of the Crisis*, there are two kinds of organizations in this world today—those that are getting better and those that are dying. An organization that stands still is dying. It just doesn't know it yet. The reason? The competition is not sitting by idly. It is doing new things, some of which may be better than yours. If you aren't improving, you will be passed by, and soon you won't have a market. The same is true of every part of an organization. You can't sub-optimize, improving just manufacturing. You have to improve every department, and that includes how you run projects. In fact, good project management can give you a real competitive advantage, especially in product development. If you are sloppy in managing your projects, you don't have good control of development costs. That means that you have to either sell a lot of product or charge large margins to cover your development costs so that the project is worth doing in the first place. If you can't sell a lot of widgets, then you have to charge the large margin.

If your competitor, on the other hand, has good cost control, it can charge smaller margins and still be sure that it recovers its investment and makes money. Thus, it has a competitive advantage over you because of its better control of project work. Additionally, in order to learn, people require feedback, like that gained by a team from reviewing game films. The last phase of a project should be a final process review, conducted so that the management of projects can be improved. However, such a process review should not be conducted only at the end of the project. Rather, process reviews should be done at major milestones in the project or every three months, whichever comes first, so that learning can take place as the job progresses. Furthermore, if a project is getting into serious trouble, the process review should reveal the difficulty so that a decision can be made to continue or terminate the work. Following are some of the general reasons for conducting periodic project process reviews. You should be able to:

1. Improve project performance together with the management of the project.
2. Ensure that quality of project work does not take a back seat to schedule and cost concerns.
3. Reveal developing problems early so that action can be taken to deal with them.
4. Identify areas where other projects (current or future) should be managed differently.
5. Keep client(s) informed of project status. This can also help ensure that the completed project will meet the needs of the client.
6. Reaffirm the organization's commitment to the project for the benefit of project team members.



Notes Ideally, a project process review should be conducted by an independent examiner, who can remain objective in the assessment of information.

9.2 Conducting the Project Process Review

Ideally, a project process review should be conducted by an independent examiner, who can remain objective in the assessment of information. However, the process review must be conducted in a spirit of learning, rather than in a climate of blame and punishment. If people are afraid that they will be “strung up” for problems, then they will hide those problems if at all possible. Even so, openness is hard to achieve. In many organizations, the climate has been punitive for so long that people are reluctant to reveal any less-than-perfect aspects of project performance. Dr. Chris

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Argyris, in his book, *Overcoming Organizational Defenses*, has described the processes by which organizations continue ineffective practices. All of them are intended to help individuals “save face” or avoid embarrassment. In the end, they also prevent organizational learning. Two questions should be asked in the review. The first is, “What have we done well so far?,” and the second is, “What do we want to improve (or do better) in the future?” Notice that I am not asking, “What have we done badly?” That question serves only to make everyone defensive, because they assume that you will punish them for things done wrong. Furthermore, there is always the possibility that nothing has been done wrong, but there is always room to improve. Finally, the results of the review should be published. Otherwise, the only people in the organization who can take advantage of it are the members of the team just reviewed. If other teams:

1. Keep client(s) informed of project status. This can also help ensure that the completed project will meet the needs of the client.
2. Reaffirm the organization’s commitment to the project for the benefit of project team members.

9.3 Project Auditing

Audit

Audit is a review process. It is basically an internal audit of the propriety type in which the appropriateness of any action and decision linked in the objective is checked. Usually this type of audit is by a team headed by a senior well informed person with an open mind and an analytical ability with a view to have an independent evaluation of the total project control and reports to the top directly. The audit shall be a preventive rather than an investigative type.

Objectives of Audit

The very objective of the project audit system is to act as independent control. The reason for the conduct of an audit control systems include:

1. All other control systems normally focus on their own achievements rather than point out their differences/weaknesses. They may point out distorted facts and hence could be misleading.
2. One may manipulate, make mistakes and may ignore vital points which could adversely affect the project. The responsibility of the independent audit team should be to examine all such major lapses (at least critical audits) critically one after the other which could be corrected and taken care in future phase to avoid such mistakes.
3. A regular check on the management practices, policies and procedures shall help in improving managerial efficiency. The team must encourage the majority of the people who are always honest and sincere and get morally boosted.
4. The audit replies provide a method of evaluating financial and non- financial impact of the project. The audit team’s functioning is to point out the various variances and the suggestions how to improve rather than highlighting them with a view to criticize so that appropriate actions should be taken to have the desired results including providing information for future capital expenditure decision.
5. The audit also has a psychological impact on the individuals proposal capital investments.

Benefits of Audit & Review

1. It provides a check on the quality of estimate if taken care.
2. It points out the bottlenecks which many lead the prefect to fail/over run.

3. It keeps a check on the personal biases and acts as a moral booking of the project team included.
4. It clearly points out the schedule attainment and project efficiency.
5. It provides information for future capital expenditure decision and to take connective actions whenever estimates have gone wrong.

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It means the team is happy that the management recognizes the importance of independent decision.

Self Assessment

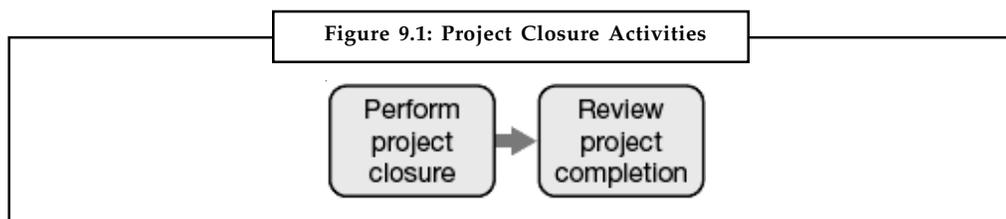
Fill in the blanks:

1. Sports teams that practice without reviewing may get really good at playing very badly.
2. If your on the other hand, has good cost control, it can charge smaller margins and still be sure that it recovers its investment and makes money.
3. is a review process.
4. The audit reports provide a method of evaluating and non- financial impact of the project.
5. The audit also has a impact on the individuals' proposed capital investments.
6. All other systems normally focus on their own achievements rather than point out their differences/weaknesses.

9.4 Project Termination

At the end of the execution phase, all required deliverables will have been constructed and accepted by the customer as complete. The project should have achieved the objectives and delivered the business benefits described in the business case. The project can be formally closed by undertaking the activities outlined in Figure 9.1. It is no real surprise that most projects simply close their doors at this point. They release their resources and move on to other projects or business initiatives. In doing this, there is no formal review to determine whether the project actually achieved the objectives and business benefits stated in the business case. There is no clear indication of whether the project was a complete success or a marked failure.

In the author's experience, more than 90 per cent of projects undertaken fail to independently review the level of success after completion. The reason is simply that it takes time and additional budget to formally close the project and review its level of success. Also, many project managers are averse to having their project reviewed by an external party to the project. This combined with the business expense incurred in seeking an independent review leads many businesses to overlook this phase and spend their budget on initiating other new project activities. If you can find the time and budget to complete this phase in its entirety, you will not only ensure that your project is closed quickly and efficiently, but you will also gain the learning needed to ensure that your next project is even more successful than the last.



Notes

The following sections describe the activities required to perform project closure.



Task Discuss about project termination

9.5 Perform Project Closure

To initiate the closure of the project, a project closure report should first be created. This report lists all of the closure activities and identifies the resource responsible for each activity listed. Following the approval of the report by the customer, the activities identified are actually undertaken to close the project.

Document a Project Closure Report

A project closure report is a document which formalizes the closure of a project. It provides confirmation that the criteria for customer acceptance have been met and requests sign-off from the project sponsor to close the project. A project closure report includes:

1. a detailed list of project completion criteria;
2. confirmation that all completion criteria have been met;
3. a list of outstanding business activities, risks and issues;
4. a set of actions to hand over project deliverables and documentation, terminate supplier agreements, release resources to the business and inform stakeholders of the closure;
5. a request for project closure approval.

A project closure report is prepared at the start of the project closure phase by the project manager and is submitted to the project sponsor for sign-off. Following sign-off, a suite of closure activities are undertaken to formally close out the project.

The following sections describe how to create a project closure report, providing tables and real life examples used for projects.

Validate the Project Completion

This section confirms that the criteria required to complete the project have been met and that any outstanding items have been identified.

Completion Criteria

The first step towards initiating project closure is to confirm that the project completion criteria have been achieved. List the project completion criteria in Table 9.1 and for each criterion listed, confirm whether or not it has been approved by the customer.

Table 9.1: Completion Criteria		
Completion category	Completion criterion	Accepted by customer
Objectives	The project vision has been achieved as defined in the terms of reference All project objectives have been achieved as defined in the terms of reference	Y/N

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Benefits	The full benefits have been realized, as defined in the business case	Y/N
Deliverables	All deliverables have been completed as defined in the terms of reference All deliverables have been accepted by the customer, as per the acceptance plan	Y/N
...

Outstanding items

Even though the project will have met the criteria for completion, there may be outstanding items which still need to be identified and undertaken. For each item, list the actions that should be taken and the owner responsible for each action, using Table 9.2.

Table 9.2: Completion Actions

Item	Action	Owner
Activities	List any outstanding activities or tasks	Name
Risks	List any business risks which have not yet been fully mitigated	Name
Issues	List any current issues which have not yet been resolved	Name
...

Identify the Closure Activities

Next, identify the activities required to close the project. This includes the handover of deliverables and documentation to the customer, termination of supplier contracts, release of project resource back to the business or market place, and the communication of closure to all project stakeholders.

Deliverables

Create a plan for the release of all project deliverables to the customer, using Table 9.3.

Table 9.3: Deliverables

Deliverable	Current		New		Hand-over plan		
	Owner	Location	Owner	Location	Activities	Date	Owner
Financial General Ledger, Accounts Payable and Accounts Receivable system modules	Name	Address	Name	Address	Hand over system maintenance activities. Hand over operational support activities. Hand over system documentation.	Date	Name
...

Documentation

Create a plan for the release of all project documentation to the customer, using Table 9.4.

Notes

Table 9.4: Documentation Release Plan

Documentation	Current		New		Hand-over plan		
	Owner	Location	Owner	Location	Activities	Date	Owner
<i>Project initiation:</i> Business case Feasibility study Terms of reference	<i>Name</i>	<i>Address</i>	<i>Name</i>	<i>Address</i>	<i>Activity</i>	<i>Date</i>	<i>Name</i>
<i>Project planning:</i> Project plan Resource plan Financial plan Quality plan Acceptance plan	<i>Name</i>	<i>Address</i>	<i>Name</i>	<i>Address</i>	<i>Activity</i>	<i>Date</i>	<i>Name</i>
<i>Project execution:</i> Change process Change form Change register Risk process Risk form Risk register	<i>Name</i>	<i>Address</i>	<i>Name</i>	<i>Address</i>	<i>Activity</i>	<i>Date</i>	<i>Name</i>
...

Suppliers

Create a plan for the termination of supplier contracts, using Table 9.5.

Table 9.5: Supplier Termination

Supplier name	Contract reference	Termination activity	Release date	Activity owner
<i>Supplier name</i>	<i>Contract ref. no.</i>	Notify supplier of termination Return supplier assets Pay supplier invoices	<i>Date activity to be completed by</i>	Name of person responsible for activity
...

Resources

Create a plan for the release of all project resources, using Table 9.6.

Table 9.6: Release of Project Resources

Resource name	Current designation	Release activity	Release date	Activity owner
<i>Staff name</i>	<i>Project role</i>	Notify staff member of release. Release staff member. Return staff assets. Pay final staff salary.	<i>Date staff member released</i>	<i>Name of person responsible for activity</i>
<i>Equipment name</i>	<i>Equipment purpose</i>	Identify new owner. Sell / release equipment. Update General Ledger.	<i>Date equipment released</i>	<i>Name of person responsible for activity</i>
...

Communication**Notes**

Identify a plan to communicate the project closure to all project stakeholders, using Table 9.7.

Table 9.7: Communicating the Project Closure

Target audience	Intended message	Method used	Dispatch date	Dispatch owner
<i>Recipient names or groups for receipt of messages</i>	Project has been successfully completed and is now closed. All intended business benefits have been realized due to success of the project.	E-mail each project stakeholder. Final project board presentation.	<i>Date when communication should be released</i>	<i>Name of the person responsible for communication</i>
...

You are now ready to collate all of the materials listed in this section and create your project closure report. The next step in the project life cycle is to complete the project closure actions identified in the project closure report.

Complete Project Closure Actions

Following approval, the activities stated in the project closure report are undertaken to close the project. These activities involve the handover of deliverables and documentation to the customer, the termination of supplier contracts, the release of project resource back to the business and the communication of project closure to all project stakeholders.



Caution A Post-implementation Review (PIR) is an assessment of the overall success of the project.

9.6 Review Project Completion

The final step in the project life cycle is to review the project completion. A post-implementation review is undertaken to formally review the project and identify any lessons learnt.

Undertake a Post-implementation Review

A Post-implementation Review (PIR) is an assessment of the overall success of the project. The PIR is conducted by closely reviewing the project's performance against the original plans, and conformance against the project management processes defined for the project. The purpose of the PIR is not only to assess the project's level of success but also to identify lessons learnt and make recommendations for future projects to enhance their likelihood of success. The PIR results are recorded in a document which is retained by the business as the last record of the project.

The PIR document includes:

1. an assessment of how the project performed against the objectives, scope, deliverables, schedule, expense and resource targets identified during the project initiation and project planning phases;

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2. a rating of the level of conformance against each of the project processes including time, cost, quality, change, risk, issue, procurement, communications and acceptance management;
3. a list of the project achievements and failures;
4. any lessons learnt and recommendations for future projects.

The PIR is undertaken at the end of the project closure phase, after the project closure report has been approved and all project closure activities completed. Some companies wait a number of weeks before undertaking the PIR, to enable the benefits provided by the project to be fully realized by the business. The PIR is typically completed by an independent person who offers an unbiased opinion of the project’s level of success.

The PIR is presented to the project sponsor/customer for approval and is retained on file for future projects.

Review Project Performance

To undertake a PIR, first identify how the project performed against each of the targets set during the initiation and planning phases of the project.

Benefits

Identify any deviations between the forecast business benefits specified in the business case and the actual benefits realized by the business, in Table 9.8.

Table 9.8: Benefit Realization				
Benefit category	Intended benefit	Forecast value	Actual value	Deviation
Financial	New revenue generated	\$x	\$x	\$x
	Reduction in costs	\$x	\$x	\$x
	Increased profit margin	\$x	\$x	\$x
Operational	Improved operational efficiency	x%	x%	x%
	Reduction in produce time to market	x hours	x hours	x hours
	Enhanced quality of product/ service	x%	x%	x%
Market	Increased market awareness	x%	x%	x%
	Greater market share	x%	x%	x%
	Additional competitive advantage	Describe	Describe	Describe
...

Objectives

Identify the extent to which the project achieved the objectives specified in the TOR, as well as any shortfall, in Table 9.9.

Table 9.9: Objectives Achieved			
Objective category	Original objective	Actual achievement	Shortfall
Business	<ul style="list-style-type: none"> ● To deliver new accounts payable and receivable and payroll processes, thereby reducing financial processing timescales by at least 30%. 	Describe	Describe

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Notes

	<ul style="list-style-type: none"> To build new work premises with 50% more space, 30 more car parks and 20% fewer operational costs than the existing premises. To provide a new customer complaints service to enable customers to issue complaints online and receive a direct response from the company within 24 hours. 		
Technology	<ul style="list-style-type: none"> To install a new accounts payable, receivable and payroll system, resulting in a 20% improvement in accounting efficiencies. To relocate existing technology infrastructure at the new building premises within a 2-month timeframe with no impact on customer service delivery. To build a new website allowing customers to track customer complaints. 	Describe	Describe
...

Deliverables

List the original deliverables, quality criteria and standards outlined in the quality plan and rate the overall level of achievement for each, using Table 9.10.

Table 9.10: Resultant Deliverables

Deliverable	Quality criteria	Quality standards	% achieved
Oracle Financials General Ledger (GL), Accounts Payable (AP) and Accounts Receivable (AR) system modules	<p><i>System functionality:</i></p> <ul style="list-style-type: none"> GL tested and installed. AP tested and installed. AR tested and installed. <p><i>System performance:</i></p> <ul style="list-style-type: none"> System up-time System response time. Data migrated. 	<p><i>System functionality:</i></p> <ul style="list-style-type: none"> GL operational (no errors). AP operational (no errors). AR operational (no errors). <p><i>System performance:</i></p> <ul style="list-style-type: none"> < 5 second response times. 100% data accuracy. 	0-100%
...

Expenses

Identify any deviations between the forecast project expenditure and the actual project expenditure, as documented in the financial plan.

Table 9.11: Final Expenditure

Expense type	Forecast expenditure	Actual expenditure	Deviation
Labour: Project manager <i>Labour type</i>	\$/€/other currency	\$/€/other currency	\$/€/other currency
Equipment: Computers <i>Equipment type</i>			
Materials: Stationery <i>Material type</i>			

Contd...

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Other:			
Grand total			

Resources

Compare the quantity of resource forecast with the quantity of resource actually utilized (from the resource plan), using Table 9.12.

Table 9.12: Final Resource Utilization

Resource type	Forecast resource level	Actual resource level	Deviation
Labour: Project manager <i>Labour type</i>	<i>\$/£/other currency</i>	<i>\$/£/other currency</i>	<i>\$/£/other currency</i>
Equipment: Computer <i>Equipment type</i>			
Materials: Printer cartridges <i>Materials type</i>			
Other:			
Grand total			

Review Project Conformance

Next, identify whether or not the project conformed to the processes outlined during the initiation and planning phases. A number of checklists have been provided to help you determine the actual level of conformance.



Did u know? The PIR document includes an assessment of how the project performed against the objectives, scope, deliverables, schedule, expense and resource targets identified during the project initiation and project planning phases.

Self Assessment

State whether the following statements are True or False

7. A project closure report is prepared at the start of the project closure phase by the project manager and is submitted to the project sponsor for sign-off.
8. The first step towards initiating project closure is to confirm that the project completion criteria have been achieved.
9. The initial step in the project life cycle is to review the project completion.
10. A Pre-implementation review is undertaken to formally review the project and identify any lessons learnt.
11. The PIR is undertaken at the end of the project closure phase, after the project closure report has been approved and all project closure activities completed.



Case Study

Axis Bank Centralizes Information, Achieves Significant Project Visibility

Following significant growth and a corresponding increase in the number of projects needing to be managed, Axis Bank wanted to improve its project and resource management methodologies. It also wanted a centralized repository for internal project information to help executives better manage resources and make more informed decisions. The bank implemented the Microsoft Enterprise Project Management (EPM) solution, which includes Microsoft Project Server 2010, Microsoft Project Professional 2010, and Microsoft SharePoint Server 2010. The EPM solution has streamlined total work management, provided better accountability, increased employee efficiency and involvement, and simplified reporting. It has also significantly improved project visibility and better resource management. In addition, standardized project management processes have enhanced collaboration across the IT delivery teams.

Situation

Axis Bank was the first of the new private banks to have begun operations in 1994, after the Government of India allowed new private banks to be established. The bank was promoted jointly by the Administrator of the specified undertaking of the Unit Trust of India (UTI - I), Life Insurance Corporation of India (LIC), General Insurance Corporation of India (GIC), and the other four PSU insurance companies, i.e., National Insurance Company Ltd, The New India Assurance Company Ltd, The Oriental Insurance Company Ltd, and United India Insurance Company Ltd.

Headquartered in Mumbai, India, the bank has a wide network of over 1,200 branches and 7,500 ATMs. It has strengths in both retail and corporate banking and is committed to adopting the best industry practices internationally in order to achieve excellence.

Axis Bank IT Projects Management Office (PMO) had a primary objective of recording, monitoring, and reporting on IT Projects delivery. The IT PMO was looking for adequate visibility into all aspects of IT projects such as schedules, resource allocations, and projects delivery status.

RVS Sridhar, President IT and Retail Banking Operations, Axis Bank, says, "We wanted an enterprise wide view of schedules, resources, and progress on IT projects throughout the organization, with emphasis on a robust and transparent project governance model. "

Solution

To overcome these challenges, Axis Bank wanted a unified project management system that offered greater business analysis and planning capabilities. The bank determined that an EPM solution would enable it not only to standardize and improve resource allocation and planning, but also to centralize all information relating to project management. It ultimately chose the Microsoft EPM solution because it best met the requirements.

The Microsoft EPM solution includes Microsoft Project Server 2010, Microsoft Project Professional 2010, and Microsoft SharePoint Server 2010. The solution intelligently manages the entire project lifecycle. Capabilities include work management, resource and investment management, portfolio optimization, quality management, and business/intelligence reporting. "The EPM solution gives us what we need," says Subhakanta

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Satpathy, Senior Vice President IT and CIO Axis Bank. "It also integrates with the user desktop logins."

Project Server 2010 provides innovative capabilities across the entire lifecycle to help effectively initiate, select, plan, schedule, and monitor the projects for timelines and budget. It unifies project and portfolio management to help prioritize investments, align resources, and execute projects efficiently and effectively. What's more, it brings together the business collaboration platform services of Microsoft SharePoint Server 2010 with structured execution capabilities to provide flexible work management solutions.

Axis Bank started the EPM deployment in October 2010. The implementation was completed smoothly in approximately one year. Currently, the solution is available to about 250 employees of the IT department.

Axis Bank uses Project Server 2010 to incorporate the database of potential projects and to prioritize them. The solution is used to manage the stages and functions of all its projects and other activities related to those projects. As Project Server 2010 is built on SharePoint Server 2010, the bank has the collaborative part of its solution.

A centralized and consolidated view of project schedules, scope, and resource information helps executives to better evaluate and prioritize activities.

Project Managers are using Project Professional 2010 to create projects and delegate work items to the execution team members. Employees access it on the web to modify and update the status of different activities resulting in an efficient and seamless collaborative environment.

The EPM solution provides a powerful reporting infrastructure coupled with flexible business intelligence tools to help ensure visibility across project portfolios. Project Server 2010 uses the Microsoft business intelligence platform, including Excel Services, PerformancePoint Services, SQL Reporting Services, and more, all of which provide a comprehensive solution that can grow with Axis Bank's reporting needs.

The solution provides non-technical resources with familiar tools to easily create reports and configure powerful audience-based dashboards. Technical resources or power users can create complex views using the solution's more sophisticated capabilities.

"Project Server 2010 enhances reporting and project execution," says Ajay Lande, Deputy Vice President – IT Project Management Organization (PMO), Axis Bank. "We now have a central repository of project data that helps us to monitor and review the progress of our projects as part of the PMO function."

The Excel reporting services enables easy and flexible data extraction from the tool says Sameer Khan, Assistant Vice President - IT PMO. "It makes tracking and reporting of the project portfolio easy and flexible.

Project Server 2010 workflow capabilities help Axis Bank define the right governance processes to effectively control the Project lifecycle. The solution also empowers the mobile workforce by bringing the power of Microsoft Project Professional 2010 to the browser with web based project scheduling.

Benefits

Since it began using the solution, Axis Bank has better visibility and control over all projects and resources. Project Server is helping the bank to centralize project information, and enhance capacity and resource management. Vidya Jayaram, Vice President IT and head PMO, Axis Bank explains, "The EPM solution provides us with powerful reporting

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and analysis features that can be accessed across the organization. As a result, we will be able to optimize the project management process by facilitating communication, effectively managing projects and resources, and generating complete and up-to-date reports.”

Better Organizational Visibility

Axis Bank is using Project Server as a centralized repository for internal project data. The bank now has much clearer visibility into its tasks, resources, issues, and deliverables. Currently, the CIO, project managers, and team leaders are using the solution to track projects and find out where things are and who’s working on what. “Our goal was to have all metadata associated with a project in one place. We have achieved our goal of complete visibility of the projects in a single solution. Going forward, we intend to use the platform to manage and measure the progress on all projects.” Subhakanta Satpathy, Senior Vice President IT and CIO of Axis Bank says, “I would say we have achieved significant insight into our IT projects.”

Improved Resource Management

At Axis Bank, the IT department was frequently approached with new project requests and swiftly acting upon them was always a priority. With Project Server 2010, the bank will have the ability to manage its resources optimally.

With the EPM solution, managers will be able to check for resources in a single place. Employees can quickly see who is busy and who is available for work. “The solution will facilitate our decision making on resource requirements and capacity planning for IT projects. This will help us better manage our projects portfolio,” says R Mani, Vice President IT, Axis Bank.

Enhanced Collaboration

With the integration of the Microsoft EPM with SharePoint Server, Axis Bank gains a powerful and centralized tool to help its team members collaborate. SharePoint Server allows employees easy access to important project plans, documents, and reports. It provides an enhanced platform for team collaboration. “With SharePoint Server, we can easily access and manage project information in one place,” adds Subhakanta Satpathy. “By streamlining the collaboration process, team members work together more closely and execute faster on project timelines.”

The senior management has a consolidated, as well as drilled down views of all the IT projects running at the bank. They can now also view the specific category of a project, like delayed projects, high-risk projects, etc.

Question

Analyse the case and discuss the case facts.

Source: <http://www.microsoft.com/india/casestudies>

9.7 Summary

- Ideally, a project process review should be conducted by an independent examiner, who can remain objective in the assessment of information.
- The process review must be conducted in a spirit of learning, rather than in a climate of blame and punishment.
- If people are afraid that they will be “strung up” for problems, then they will hide those problems if at all possible. Even so, openness is hard to achieve.

Notes

- The meaning of control that is important to project managers is the one implying the use of information; comparing progress to plan so that action can be taken to correct for deviations from plan.
- The only way a project is really in control is if all team members are in control of their own work.
- A Post-implementation Review (PIR) is an assessment of the overall success of the project.
- The PIR is conducted by closely reviewing the project's performance against the original plans, and conformance against the project management processes defined for the project.
- The purpose of the PIR is not only to assess the project's level of success but also to identify lessons learnt and make recommendations for future projects to enhance their likelihood of success.

9.8 Keywords

Analytic Approach: Breaking problems into their constituent parts to understand the parts better and thereby solve the problem.

Audit: Audit is a review process. It is basically an internal audit of the propriety type in which the appropriateness of any action and decision linked in the objective is checked

Benefit-Cost: A ratio to evaluate a proposed course of action.

PIR: A post-implementation review (PIR) is an assessment of the overall success of the project.

Project Closure: A project closure report is a document which formalizes the closure of a project. It provides confirmation that the criteria for customer acceptance have been met and requests sign-off from the project sponsor to close the project.

9.9 Review Questions

1. Explain the need of project evaluation.
2. What is post audit and what are its objectives?
3. Why controlling is important in project management?
4. Why should a project have a regular reporting period?
5. Describe, in your own words, what is meant by the project control process? Give an example of its use.
6. Describe, in brief, the project completion.
7. Explain, in brief, project termination.
8. What are the benefits of audit and review?

Answers: Self Assessment

- | | |
|------------------|---------------|
| 1. Performance | 2. Competitor |
| 3. Audit | 4. Financial |
| 5. Psychological | 6. Control |
| 7. True | 8. True |
| 9. False | 10. False |

9.10 Further Readings

Notes



Books

Clements/Gido, *Effective Project Management*, Thomson.

Clifford F. Gray and Erik W. Larson, *Project Management*, Tata McGraw Hill.

Dennis Lock, *Project Management*, Ninth Edition, Gower.

K. Nagarajan, *Project Management*, Third Edition, New Age International.

P.C.K. Rao, *Project Management and Control*, Sultan Chand & Sons.

Prasanna Chandra, *Projects—Planning, Selection, Financing, Implementation, and Review*, Sixth Edition, Tata McGraw Hill

Vasant Desai, *Project Management*, Second Revised Edition, Himalaya Publishing House.



Online links

www.col.org/SiteCollectionDocuments/SuccessProjMgt.pdf

www.freelancer.com/jobs/Project-Management/

www.mindtools.com/pages/main/newMN_PPM.htm

www.mpug.com/Pages/WhatisProjectManagement.aspx

www.nickjenkins.net/prose/projectPrimer.p

www.pma-india.org/ - Trinidad and Tobago

Unit 10: Managing E-business Projects

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Objectives

After studying this unit, you will be able to:

- Know about the managing E-business projects;
- Understand the generic E-business balance score card;
- Know about the measures for customer orientation.

Introduction

As we enter the new millennium, the internet-based way of doing business is certainly going to change whole industries and markets and will therefore have a great impact on consumers and businesses. Electronic business (E-business) can be described as the process of buying and selling or exchanging of products, services, and information; generating demand for them through marketing and advertising; servicing customers; collaborating with business partners; and conducting electronic transactions within an organization via computer networks including the internet (Turban, Lee and King). Electronic business will change all aspects of our lives – how we work, play, learn and shop. It will transform our economic infrastructure in the sense that new methods of supply, distribution, marketing, service and management will emerge. E-business will improve business performance through low cost and open connectivity by introduction of new technologies in the value chain and connecting value chains across businesses in order to improve service, reduce costs, open new channels and transform the competitive landscape.

10.1 E-business Projects

Companies are becoming increasingly aware of the many potential benefits provided by E-business. Some of the E-business potential benefits are:

1. Ultimate support of Business Process Reengineering efforts;

2. Expansion of the market reach that goes beyond any boarder;
3. Strengthening of relationships with customers and suppliers;
4. Cost reductions through the deployment of electronic internal and external business processes;
5. Lower telecommunications costs as a result of the inexpensive internet infrastructure.

Notes

Because of the intangible nature of some of these benefits, it is difficult to measure the contribution of E-business initiatives to business performance and to manage these projects to ensure that real profits are realized. In practice, E-business projects are often managed too technically and little attention is paid to the business case.



Example: The Belgian online grocery store Ready be that used its web storefront to take customers' orders. It relied heavily on manual processes to fulfill the orders. In less than two years Ready be set up a centralized warehouse and fifty points of distribution where customers could pick up their purchases they made through internet. Beside this, Ready be renewed its web site three times and even started a WAP (Wireless Application Protocol) project that would allow customers to mail their shopping list via their mobile phone.

In the year 2000 the losses of Ready be amounted to 12 million Euro and the online grocery had to stop its business. This mini case shows clearly that E-business projects are to be monitored and that each E-business initiative needs a well-defined business case (what are the benefits and what are the costs?). In the grocery case, the use of a monitoring instrument could easily have shown that too many costs were made that could be avoided by just using the existing warehouses and shops of their traditional grocery chain and by not starting yet the WAP project (this pervasive computing project was clearly technically driven). Therefore, a recent developed monitoring instrument, the balanced scorecard, will be presented and applied to E-business projects.

The need for measuring E-business performance is confirmed by a study conducted by the consulting firm Accenture (formerly Andersen Consulting) and the Cranfield School of Management (Adams et al.). Senior managers from more than 70 bricks-and-mortar, clicks-and-mortar and dot.com firms were surveyed regarding their performance management systems. One of the major findings is that dot.coms appear to measure more than the two other types of businesses but that this optimism may be misguided because numerous publications reveal that E-businesses are failing to deliver the expected service and go even bankrupt. We agree with one of the study's conclusions that "even if they do have the data, they would appear to be failing to act on it". Another observation is that too many dot.coms are "obsessed with measurement rather than management". The deployment of an E-business balanced scorecard may overcome these problems if it is implemented as a measurement and management system.



Notes Because of the intangible nature of some of these benefits, it is difficult to measure the contribution of E-business initiatives to business performance and to manage these projects to ensure that real profits are realized.

10.2 Balance Scorecard

In the 1990s, Kaplan and Norton developed the balanced scorecard. Their idea is that the evaluation of a company should not be restricted to the traditional financial performance measures but

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should be supplemented with measures concerning customer satisfaction, internal processes and the ability to innovate. Results achieved within the additional perspectives should assure future financial results (Kaplan and Norton). Kaplan and Norton propose a three layered structure for the four perspectives: mission (to become the customers' most preferred supplier), objectives (to provide the customers with new products) and measures (percentage of turnover generated by new products). To put the BSC to work, companies should translate each of the perspectives into corresponding metrics and measures that assess the current situation. These assessments have to be repeated periodically and have to be confronted with the goals that have to be set beforehand. At first, the BSC was used as a performance measurement system and a planning and control device. Later on, some companies moved beyond this early vision of the scorecard. They discovered that the measures on a balanced scorecard can be used as the cornerstone of a management system that communicates strategy, aligns individuals and teams to the strategy, establishes long-term strategic targets, aligns initiatives, allocates long and short term resources and finally, provides feedback and learning about the strategy (Kaplan and Norton). Different market situations, product strategies, business units and competitive environments require different scorecards to fit their mission, strategy, technology and culture. The general BSC-framework can be translated to the more specific needs of the monitoring and evaluation of the IT function and recently the IT BSC has emerged in practice (Graeser et al.; Van Grembergen and Saull). In Van Grembergen and Van Bruggen and Van Grembergen and Timmerman a generic IT scorecard is proposed consisting of four perspectives: business contribution, user orientation, operational excellence and future orientation. This IT scorecard differs from the company-wide BSC because it is a departmental scorecard for an internal service supplier (IT): the customers are the computer users, the business contribution is to be considered from management's point of view, the internal processes under consideration are the IT processes (systems development and operations) and the ability to innovate is measuring the use of new technologies and the human IT resources.

Self Assessment

Fill in the blanks:

1. projects are often managed too technically and little attention is paid to the business case.
2. In the 1990s, and Norton developed the balanced scorecard.
3. Kaplan and Norton propose a three layered structure for the perspectives: mission, objectives and measures.
4. This IT scorecard differs from the company-wide BSC because it is a departmental for an internal service supplier.

10.3 Generic E-business Balanced Scorecard

The costs that go with the development, implementation and the maintenance of an E-business project can be very high. Therefore, E-business projects, like any other projects, need to be evaluated and monitored to find out if the project delivers what it was supposed to deliver. This means that performance measurement is one of the most important activities that occur once an E-business project is started. However, many of the E-business benefits such as better customer service, increased responsiveness and faster deliveries are intangibles that are difficult to translate into monetary benefits. Raisinghani reports that three-fourths of information systems investments, ranging from data centers to web sites, offer no calculable business value. The traditional financial performance measures such as ROI, NPV, IRR and the payback method are therefore problematic in measuring E-business investments because they need monetary values for benefits and costs.

Multi-criteria methods may solve this problem because they account for tangibles as well as for intangible impacts (Berghout and Renkema). One of the best known multi-criteria methods is Information Economics (Parker). This method uses an extended form of the ROI, which includes an assessment of intangible elements. The greatest weakness of this technique is the fact that it is a scoring technique with the difficulty that one has to agree on scores (Robson). The solution for our measurement problem seems to be the in the 90's developed balanced scorecard which is a measurement system that also takes into account intangible elements. Moreover, it enables businesses to drive their E-business strategies based on measurement and follow up. Within an IT scorecard, we certainly will have some contribution measures regarding E-business projects, but within the E-business scorecard we will have more detailed and in-depth E-business projects measures that will allow us to monitor and manage these emerging projects. Similar to Rosemann who applies the BSC to ERP (Enterprise Resource Planning) projects, the scorecard concepts are applied to another type of projects, in casu E-business projects. In Table 10.1 a generic E-business balanced scorecard is proposed. The Customer Orientation perspective represents the evaluation of the consumer and business clients of the web site and in this way also the supporting back office systems. The Operational Excellence perspective represents the E-business processes employed to deliver the demanded services and the E-business applications. The Future Orientation perspective represents the human and technology resources needed by the E-business project to deliver its services over time.

The Business Contribution perspective captures the business value created from the E-business investments. In building this generic E-business scorecard, performance measures defined in Van Grembergen and Saull, Rosemann and Chaffey et al. are integrated into this scorecard.

Table 10.1: Generic E-business Balanced Scorecard

<p>CUSTOMER ORIENTATION</p> <p>What is the company's success in acquiring and retaining customers through the web site?</p> <p><i>Mission</i> To be the preferred supplier through the internet</p> <p><i>Objectives</i></p> <ul style="list-style-type: none"> ● customer satisfaction ● customer retention ● acquiring new customers ● effective internet marketing 	<p>BUSINESS CONTRIBUTION</p> <p>How should the E-business project appear to the Board in order to be considered as significant contribution to company success?</p> <p><i>Mission</i> To enable and contribute to the achievement of business strategies through effective application of E-business</p> <p><i>Objectives</i></p> <ul style="list-style-type: none"> ● E-business strategic plan achievements ● business value of E-business project ● compliance with budget
<p>OPERATIONAL EXCELLENCE</p> <p>At which services and processes must the E-business application excel to satisfy the stakeholders and customers?</p> <p><i>Mission</i> To deliver timely and effective E-business services at targeted service levels</p> <p><i>Objectives</i></p> <ul style="list-style-type: none"> ● fulfillment process ● availability of the E-business system ● improvement of system development ● security and safety 	<p>FUTURE ORIENTATION</p> <p>How will IT develop the ability to change and improve in order to better achieve the company's strategy through E-business application?</p> <p><i>Mission</i> To enable and contribute to the achievement of business strategies through effective application of E-business</p> <p><i>Objectives</i></p> <ul style="list-style-type: none"> ● E-business expertise of developers ● E-business staff management effectiveness ● independence of consultants ● reliability of software vendors

10.4 Measures for Business Contribution

E-business strategic plan achievements:

- Completion of steps of the E-business project plan
- Business value of E-business projects
- Profitability of the web site
- Return on Investment (ROI) or Information Economics
- Direct online contribution to revenue
- Operational cost reductions
- Cost reductions of acquiring a new customer
- Cost reductions of customer relationship management
- Cost reductions of promotional material



Caution The Business Contribution perspective captures the business value created from the E-business investments.

10.5 Compliance with Budget

The ultimate goal of E-business projects, as any other IT project, is to satisfy the Board of Directors and consequently the shareholders. Surprisingly, the Adams' survey revealed that only 56 percent of the dot.com companies tracked shareholder satisfaction which is low if one takes into consideration their reliance on the stock exchange and investors (for the bricks-and-mortar and the clicks-and-mortar firms percentages were even lower with respectively 36 % and 44 %). We suppose that this is caused by the fact that many E-business projects are technically driven and that not always the business evaluation is taken too seriously. Therefore, in a *balanced* scorecard, the business contribution perspective is as important – not to say the most important – as the other three perspectives. Motivated, trained and experienced IT employees (future orientation) should improve the delivery of excellent E-business processes and applications (operational excellence), that in turn should enhance customer satisfaction (customer orientation), and finally should by all means result in financial profits (business contribution).

E-business projects often are deployed on the basis of a step-by-step approach. A well-known Gartner-model describes four levels of E-business: (1) the publishing level focusing on showing information of the company on a web site, (2) the prospecting level with customer oriented information, (3) the business integration level which is transaction centric and can be defined as E-commerce, and (4) the business transformation level which is the mature level of E-business that includes supplier and customer integration. *Completion of steps of the E-business project plan* will represents this evaluation item.

The business value of E-business projects shows how the E-business projects are affecting the performance of the whole business. It gives an idea of the contribution of the project measured through the standard financial measures that are used to determine the health of the business. Typical measures are the *profitability of the web site* that can be defined as the direct revenue of the web site minus the operational costs of the site and a combination of *Return on Investment* and *Information Economics* to capture the tangible and intangible benefits. The *direct online contribution*

measures the extent to which the internet contributes to sales and refers to the sales that are actually placed on the web site. It does not include the amount of revenue indirectly achieved due to the internet influencing buying decisions, although the internet has also in this case made a real contribution to sales (Lee).

Operational cost reductions, cost reductions of acquiring a new customer, cost reductions of customer relationship management and cost reductions of promotional material are measures that explain how the web site is helping to reduce costs. Cost reductions of promotional material e.g. are lower printing and distribution costs. In direct mail, money has to be spent for every additional person that a company wants to reach whereas with a web site there is no extra cost. E-business is supporting the customer on an ongoing basis through interactive online user groups, online technical support, frequently asked questions and answers, newsletters and online renewal and subscriptions. Therefore, the cost of supporting customers can be reduced because some of these functions can be partly or totally automated through specific E-business software such as customer relationship management products (e.g. Siebel), customer-facing e-mail products to manage large volumes of incoming e-mails, collaborative filtering packages to derive what products or services individuals will be likely to purchase based on their similarity to other individuals or groups, etc.

An E-business project represents a capital investment that entails expenses as well as revenues. The start of an E-business project is also the initiation of a permanent commitment to resource demands because of ongoing expenses that are often difficult to predict. Therefore, a financial evaluation is needed that compares the actual costs with the *budgeted expenses*. Important cost categories include the costs associated with the development and – not to forget – the maintenance of a web site and its back office systems.



Did u know? An E-business project represents a capital investment that entails expenses as well as revenues. The start of an E-business project is also the initiation of a permanent commitment to resource demands because of ongoing expenses that are often difficult to predict.

Self Assessment

State whether the following statements are true or false:

5. The costs that go with the development, implementation and the maintenance of an E-business project can be very high.
6. The Business Contribution perspective captures the business value created from the E-business investments.
7. Value-business projects often are deployed on the basis of a step-by-step approach.
8. The business value of E-business projects shows how the E-business projects are affecting the performance of the whole business.

10.6 Measures for Customer Orientation

The measures for customer orientation describe the company's success in acquiring and retaining customers and sales. This orientation also represents customer satisfaction and effective internet marketing that both are performance drivers for outcome measures regarding acquiring and retaining clients.

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Table 10.2: Measures for Customer Orientation

<p>Customer satisfaction</p> <ul style="list-style-type: none"> • score on online customer satisfaction surveys • # of customer complaints/resolution. <p>Customer retention</p> <ul style="list-style-type: none"> • retention rates of clients who use the internet compared with those who do not • % customers placing repeat orders <p>Acquiring new customers</p> <ul style="list-style-type: none"> • customer acquisition or new leads generated by the website • sales generated directly and indirectly by the website <p>Effective internet marketing</p> <ul style="list-style-type: none"> • # of hits • # of page impressions • # of site visits • # of visitors
--

Customer satisfaction is the feeling that a product or service meets the customer expectations and determines whether a customer will repeat his or her web purchases or not. Since service quality is an antecedent of user satisfaction in web environments, customer satisfaction will be enhanced by increasing customer service (Zeithaml, Berry and Parasuraman). Typical measures for customer satisfaction are *web site satisfaction scores* calculated on the basis of offline or online surveys, and the *number of customers complaints* eventually compared to *the resolutions within a reasonable time*. Customer satisfaction is perceived by senior managers involved in E-business projects as an important measure. All respondents of the Adams et al. survey said that they measured customer satisfaction or that they should measure it. Besides measuring the customer satisfaction, it is also crucial to know how to increase the *customer retention* rate – the degree to which a customer will stay with a specific vendor or brand. After all, there is no point having fairly satisfied customers who do not come back to buy again or who are not prepared to recommend the product or service to others. Customers will be likely to return to the merchant’s web site if they have had good repeat business happen when customers feel a connection to a site and believe that the site is their best option for doing business. Connection to a site is a function of web design, as customers see and interact with a company via the web interface. Belief in a site or in a company’s ability to fulfill its commitments is a function of service design. Both are required for relationships and repeat business. Furthermore, by retaining customers, a company can increase its profits because customers will buy more and sales will grow. In the end, a company’s market position is strengthened because customers are kept away from the competitors. Beside this, it is important they have developed trust. Trust can be developed through reputation, relationship and knowledge of the other party’s business (Stewart, Measurements are *retention rates of on line clients* and loyalty measures such as *percent of on line customers placing repeating orders*. *Acquiring new customers* is measured through the *number of new customers* and/or *new leads* generated via the web site. A more general measure is the *number of sales generated by the web site* eventually compared to the usual business. *Internet marketing measures* indicate the effectiveness of internet marketing activities in meeting customer, business and marketing objectives and can be collected online or offline. Although traditional offline metrics are still important, online web metrics are more often used for the assessment of internet marketing effectiveness.



Task Describe the measures for business contribution.

Self Assessment

Notes

Fill in the blanks:

9. The measures for orientation describe the company's success in acquiring and retaining customers and sales.
10. measures indicate the effectiveness of internet marketing activities in meeting customer, business and marketing objectives and can be collected online or offline.
11. Acquiring new customers is measured through the number of new customers and/or new leads generated via the
12. can be developed through reputation, relationship and knowledge of the other party's business.



Case Study

Using ROI to Evaluate Project Management Training

Return on Investment (ROI) is a monetary measurement that is used to evaluate the efficiency and effectiveness of an investment made by an organisation. Investments take many forms, financial, human capital, equipment, and training programmes, to name just a few. This article will focus on the use of ROI and the Phillips ROI Methodology™ to measure the effectiveness of a project management training programme completed within XYZ Law Firm. The 5 levels of evaluation which will be reviewed within the case study are:

1. **Level 1: Reactions (the "smiley" sheet):** Did participants like the training they received?
2. **Level 2: Learning:** Are participants confident that they have learned something from the training programme?
3. **Level 3: Behaviour/Application:** Are participants able to apply what they learned in the training programme back on the job?
4. **Level 4: Results/Business Impact:** Did the training show improvement in efficiencies, productivity, profits, costs, reduced turnover?
5. **Level 5: ROI:** Did the training programme show a positive ROI?

Why the Interest in ROI for Project Management Training Programmes?

The challenges surrounding training and its effectiveness within the organisation have become more complex over the years. Today, the challenge is even more significant for learning and development professionals. Return on Investment (ROI) as a tool for evaluating project management training is becoming an expectation of senior executives within organisations. In today's tight economy with reduced resources and tighter budgets, learning and development professionals are finding it increasingly necessary to show the monetary value of the project management programmes they are bringing to the organisation.

Today, the success of project management training programmes is measured by the financial contribution of the programme to the organisation. It is not surprising then that ROI measurements for project management training programmes are often requested. With such a large focus on project management in all kinds of organisations, there is an increasing desire to show the monetary benefit of investing in project management training

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Notes

programmes which often reach a wide variety of employees and represent a significant investment for organisations.

The case study example below will follow the Phillips ROI Methodology™ and encompass the four major phases of the methodology:

1. Evaluation Planning.
2. Data Collection.
3. Data Analysis.
4. Reporting.

Case Study Background: XYZ Law Firm

XYZ Law Firm was interested in developing a project management mindset within the firm. There was support from the managing partners and funding was expected to be approved. The goal of the training was to ensure that completing projects at the law firm was not a severe drain on resources. There was much anxiety behind any project which needed to be completed and the champions of the training programme, which included a few of the partners, attorneys and the paralegals, were confident that with some basic project management training, this anxiety could be controlled and projects done within the firm would be more easily managed. The whole concept of “project management” scared individuals.

The managing partners of the law firm specifically wanted to be updated on project status and they often felt they were unsure what projects were being worked on and how they were progressing. A significant goal was to ensure implementation of best practices and standard processes and increase knowledge sharing.

Overall the goals of the training programme included:

1. Increased likelihood of successful projects.
2. Ability to implement strategic plans into action.
3. Improved monitoring and controlling of projects.
4. Proactive risk management.
5. Improved time management and teamwork.
6. Efficient utilisation and tracking of resources.
7. Standards around status reporting.
8. Implementation of best practices and standard processes.

Some of the projects that the law firm worked on included:

1. IT/infrastructure projects.
2. A variety of projects for their corporate clients, such as mergers and acquisitions and major contract negotiations.
3. Annual recruiting projects, which included recruiting from law schools worldwide.
4. Long range capital strategic projects.

Many such projects took longer than originally planned for, went out of scope and went over budget and resource commitment. This was certainly a problem for the client projects the law firm worked on as such projects were under fixed price agreements with the client. If the project went off track, it would impact the profitability for the law firm for that particular engagement.

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Phase 1: Evaluation Planning

Based on the goals of the law firm, a three day customised basics of project management training programme was developed. Prior to the start of the programme, data was collected on past project initiatives, specifically around:

1. Budget
2. Time
3. Scope
4. Resource utilisation
5. Quality

Much of this data was tracked, although it was not in one central location and required conversations with many members of the law firm, from managing partners through to paralegals and administrative assistants.

In the first phase of the project, we developed a plan around the data we would be collecting. The plan included the following components for Level 1–4:

1. *Level 1:* Satisfaction survey to participants.
2. *Level 2:* A test administered to participants to measure the learning from the 3-day programme.
3. *Level 3:* Action plan follow-up and questionnaires including information on how the participants were applying the skills they learned. Level 3 questionnaires also went to managing partners and senior attorneys to get their feedback and perception of the skills being applied.
4. *Level 4:* Collection of all data for business impact.

We also developed an ROI Analysis Plan to include the items we intended to measure against to show improvement based on the 3-day training programme. The data items to be collected at level 4, which are the impact measures targeted for improvement included:

1. Improved performance on projects, including improved quality of end result.
2. Efficient utilisation and tracking of resources.
3. Increased percentage of successful projects (on time, within budget and within scope).
4. Implementation of best practices and standard processes.

We set the ROI (hurdle) rate at 20%.

Phase 2: Data Collection

A pilot group of 20 junior attorneys, paralegals and administrative assistants were selected to go through the programme first and measure the benefits of the training. In this way, an isolation factor, an important component of doing an ROI study, was available to compare against a similar group of attorneys, paralegals and administrative assistants who would work on projects also, but would not initially attend the 3 day programme.

The following data was collected from the programme:

1. *Level 1:* 95% of the participants were satisfied overall with the 3 day customised programme.
2. *Level 2:* 100% pass rate on the exam (85% or higher was considered passing). It should be noted that the exam was not an overly difficult exam and as long as the

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Notes

attendees participated and paid attention in the 3 day class they would be able to pass the exam. Frankly, the real measurement was in the Action Plans that were produced.

3. **Level 3:** 100% of the participants submitted Action Plans and completed follow up questionnaires. Action plans were completed after the class and followed up on within 6 months. The action plan included information on:

- (i) Participant's goals (individual improvement efforts).
- (ii) How participants intended to meet those goals:
 - (a) Action steps to be taken.
 - (b) Support and/or resources needed.
 - (c) Timeline for completion.
- (iii) How participants will know if they are successful in meeting those goals.
- (iv) How participants will evaluate that success:

After the 6 month time period, participants were asked to complete a Continuous Improvement Plan for moving forward. This follow up to the Action Plan included:

- (a) Results/accomplishments to date.
- (b) Next steps to accomplish.
- (c) Timeline for doing so and support needed.

4. **Level 4:** Data collected from participants, managing partners and senior attorneys on the impact to the business. The data collected from level 4 showed a 40% increase in the number of successful projects. Successful projects went up from 70 successful out of every 100 (smaller projects included in the 100 along with more strategic projects) to 98 successful out of 100.

- (i) 40% increase in the number of successful projects:
 - (a) On time, within budget and scope.
 - (b) Projects met set quality standards.
 - (c) Resources tracked and effectively allocated.
 - (d) Standard processes implemented for all projects.
 - (e) Lessons learned captured and best practices shared.

Phase 3: Data Analysis

In converting the data collected to a monetary value, we found that cost savings (programme benefits) were as follows:

- 1. More efficient use of resources: \$285,000.
- 2. Projects on time, within budget and scope: \$250,000.
- 3. Increase in better tracking of client projects: \$450,000.

Programme benefits are measured in level 4: Business Impact. To convert to a monetary value, a dollar amount was put to every resource based on salary/time/fringe, etc. If projects did not go out of scope, no additional resources were needed, which was a cost savings. More efficient use of resources also meant that projects had fewer people assigned to them. The \$450,000 in increase from better tracking of client projects was the amount

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that would have been lost from the bottom line had those projects that were measured not been completed successfully.

The total cost of the programme was \$320,000. This included planning for the ROI study, food and beverage for participants in the programme, facilitator costs, development of the customised programme, time out of the office for training, salary/fringe of participants, etc. Any cost associated with the programme or planning for the programme was included in the total costs. The biggest component of the cost was salary/fringe of participants, especially since the attorneys and paralegals are billable resources.

Intangible benefits, those benefits that did not have a dollar value associated with them, were also considered. They included:

1. Reduced anxiety over involvement in and managing projects.
2. Improved teamwork and reduced conflicts.
3. Satisfaction of managing partners and senior attorneys over status reporting on projects.

These intangible benefits were able to be tied back to the programme and certainly contributed to the success of the projects.

During phase 3, we calculate the ROI of the project management training programme, using the ROI formula:

ROI = Net Programme Benefits/Programme Costs × 100

1. ROI = \$665,000/\$320,000 × 100
2. ROI = 2.08 × 100
3. ROI = 208%

For every \$1.00 invested, \$2.08 is returned after the costs are recovered. This was significantly over the 20% ROI set at the beginning of the project during the planning of the study.

Phase 4: Reporting

A report of the results of the study was presented to the managing partners of the law firm. Components of the study were presented to the participants and others in the law firm. The project was considered a success and it was decided that the 3 day customised project management training programme would be rolled out firm-wide. Additionally, a half day programme was created for the managing partners of the firm to provide them training around how to support project initiatives. A future focus was to develop a portal to house all project information. That was a "to do" for the IT/Application Development department and would be a key strategic project for them.

Question

Analyse the case and Discuss the case fact.

Source: <http://www.projectsmart.co.uk/using-roi-to-evaluate-project-management-training.html>

10.7 Summary

- As we enter the new millennium, the internet-based way of doing business is certainly going to change whole industries and markets and will therefore have a great impact on consumers and businesses.

Notes

- The need for measuring E-business performance is confirmed by a study conducted by the consulting firm Accenture.
- In the 1990s, Kaplan and Norton developed the balanced scorecard.
- Their idea is that the evaluation of a company should not be restricted to the traditional financial performance measures but should be supplemented with measures concerning customer satisfaction, internal processes and the ability to innovate.
- The costs that go with the development, implementation and the maintenance of an E-business project can be very high.
- The Business Contribution perspective captures the business value created from the E-business investments.
- The ultimate goal of E-business projects, as any other IT project, is to satisfy the Board of Directors and consequently the shareholders.
- The business value of E-business projects shows how the E-business projects are affecting the performance of the whole business
- Customer satisfaction is the feeling that a product or service meets the customer expectations and determines whether a customer will repeat his or her web purchases or not.

10.8 Keywords

Balance Scorecard: In the 1990s, Kaplan and Norton developed the balanced scorecard. Their idea is that the evaluation of a company should not be restricted to the traditional financial performance measures but should be supplemented with measures concerning customer satisfaction, internal processes and the ability to innovate.

Customer Satisfaction: Customer satisfaction is the feeling that a product or service meets the customer expectations and determines whether a customer will repeat his or her web purchases or not.

E-business Project: An E-business project represents a capital investment that entails expenses as well as revenues.

10.9 Review Questions

1. Describe the E-business projects.
2. Explain the balance scorecard.
3. Describe the E-business balance scorecard.
4. What do you mean by measures for business contribution?
5. Explain the compliance with the budget.
6. Discuss the measures for customer orientation.

Answers: Self Assessment

- | | |
|---------------|--------------|
| 1. E-business | 2. Kaplan |
| 3. Four | 4. Scorecard |
| 5. True | 6. True |

- | | | |
|-------------|------------------------|-------|
| 7. False | 8. True | Notes |
| 9. Customer | 10. Internet Marketing | |
| 11. Website | 12. Trust | |

10.10 Further Readings



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Online links

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www.nickjenkins.net/prose/projectPrimer

www.pma-india.org/ - Trinidad and Tobago

Unit 11: Future of Project Management-I

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11.3 The Implications of Improving Performance

11.4 Craft-work, Brain-work and Leadership

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11.6 Summary

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Objectives

After studying this unit, you will be able to:

- Know about the future of project management;
- Understand the technical versus people management;
- Know about the scope creep and exercise control.

Introduction

The innovations we are likely to see in the theory and practice of project management in the next ten years? How will efficiency be improved, and what will be the key elements of project management circa 2000? Will it even exist, or will it be supplanted by some new management fad?

If we are to gain any insight into the future of project management, it behooves us to examine its evolution in the past. For while project management as a “profession” with its current “technology” may be the vogue of the late twentieth century, the problems of managing projects have been around since ancient history.

11.1 Starting with the Pyramids

We are told that “Although no trustworthy details of the lives of Zoser and Imhotep have come down, we can be sure that they were able men who worked long and effectively together. Probably Imhotep was a universal genius like Archimedes and Leonardo da Vinci. Such was his repute as a physician, architect, writer, statesman, and all-round sage that in later times collections of wise sayings circulated under his name.”



Example: Some of these problems were encountered in the construction of the earliest pyramid at Saqqara in Egypt, which was the first stone building of any size to be found in the

world. It was commissioned by King Zoser of the third dynasty and while the king was the “sponsor” of this project, the “project manager” was one of his ministers, Imhotep.

Thus was born the reputation of the project manager. This particular project was not without its own problems, however. The account goes on “[previously] . . . Egyptian kings and nobles were buried in a tomb called a mastaba . . . [but] . . . Zoser and Imhotep . . . built a stone mastaba of unusual size and shape. It was square instead of oblong like its predecessors, and was over 200 feet on a side and 26 feet high.

“Not yet satisfied, Zoser and Imhotep enlarged this mastaba twice by adding stone to the sides. Before the second of these enlargements was completed, the king changed his mind again. He decided not only to enlarge the structure still further, but also to make it into a stepped pyramid, resembling four square mastabas of decreasing size piled one atop the other. Then Zoser changed his mind once more. The tomb ended as a stepped pyramid of six stages, 200 feet high on a base 358 by 411 feet. . .”



Did u know? Over the centuries, the classic master-servant relationship continued to serve projects well, for major works continued to be built, including the seven wonders of the world.

Scope Creep and Exercising Control

Since a creeping scope was clearly evident during this project’s implementation, one must conclude that Imhotep was well acquainted with the principles of scope change management. On the other hand, it is doubtful if Imhotep was plagued with the current-day problems of “gaining and retaining team commitment”, for he had available to him a powerful enticement. Those who failed to perform could be summarily executed.

Today, this form of incentive has been mostly discredited, though not entirely. Its modern-day equivalent, summary dismissal, is to be found in the corporate world, but has the attendant difficulties of endless litigation if not conducted in a very careful manner.

Over the centuries, the classic master-servant relationship continued to serve projects well, for major works continued to be built, including the seven wonders of the world. It was not until the early twentieth century, however, that serious attention was given to the idea of “management”, and then only in the context of maintaining efficiency and continuity of an ongoing operation, rather than for the development of a “project”. Many and varied have been the techniques promoted from time to time, some with catchy buzz names. While some have stood the test of time, others have passed by only as temporary “management fads”.

One suspects that many were created simply to catch the imagination for purposes of selling consulting services to senior management — a sort of elixir of (management) life! Nevertheless, project oriented techniques began to emerge such as work study, graphical portrayal of activities (Gantt charts), management-by-objectives, and more recently, total quality management.



Notes Today, this form of incentive has been mostly discredited, though not entirely. Its modern-day equivalent, summary dismissal, is to be found in the corporate world, but has the attendant difficulties of endless litigation if not conducted in a very careful manner.

Notes

Self Assessment

Fill in the blanks:

1. Over the centuries, the classic master-servant relationship continued to serve projects well, for major works continued to be built, including the Wonders of the World.
2. One suspects that many were created simply to catch the imagination for purposes of consulting services to senior management.
3. A scope was clearly evident during this project’s implementation.

11.2 Technical versus People Management

A particular and major breakthrough was the development of “network analysis” and the concept of “critical path”. This grew out of the US Navy’s complex Polaris program and NASA’s Apollo program in the fifties and sixties. For many years and even to the present day, the critical path method, or CPM, and its associated “probability” techniques have been viewed as the essence of project management in terms of planning and controlling project performance.

More recently, however, we have seen a definite shift to the “human” side of project management and the incorporation of techniques essential for dealing with people equitably and effectively. At the same time, there has been a growing recognition that the creation of large physical projects, such as facilities and infrastructure, are not the only types of project to which these techniques can be applied. Indeed, projects can be many and varied, including “intellectual” type projects such as the introduction of new administrative systems, attitude changes and even cultural changes have been attempted in some organizations.

Today, we have a much better understanding of the holistic aspects of project management.



Example: We know that project management and corporate management have fundamentally different orientations as indicated in Table 1.

Specific differences between “project” and “enterprise” management are shown in Table 2. We also know that a “project” is essentially a “process” which leads to the delivery of a “product” within the confines of certain “constraints”. Occasionally, the term “project” is used loosely in substitution for the term “product”, but this inevitably leads to confusion.

Table 1: A Hierarchy of Management Orientation

Enterprise		Project	
<i>Direction</i>			
Goals:	Continuity defined by sets of Objectives	Purpose:	Change defined by sets of programs
Objectives:	defined through Strategies	Programs:	Defined through sets of projects
<i>Process</i>			
Strategies:	achieved through Tactics	Projects:	Achieved through sets of Tasks
Tactics:	achieved through consistent Activities	Tasks:	Achieved through variable Effort
Activities:	result in continuous product	Effort:	Results in unique product

Table 2

Enterprise (Period based)	Project (Plan-Accomplish based)
Output is defined within department's responsibility	Objective is an exception to the usual routine
Desired results are generalized, influenced externally	The required result becomes specifically identified
Goals and deadlines are general	Goals and deadlines are specific
Routines are related	Activities are related
Management based on market forecasting	Management based on project forecasting
Reporting based on long-term financial accounting	Reporting based on short-term project accounting
Products are identical and in large quantities	Specific product is unique (or very limited)

We know too that this project process is susceptible to the application of a systematic and logical sequence. In its most basic form, this may be described as "Plan first, then produce". The benefit of applying such systematic logic is that the process itself may be improved in its performance.



Task Discuss the future of project management in India.

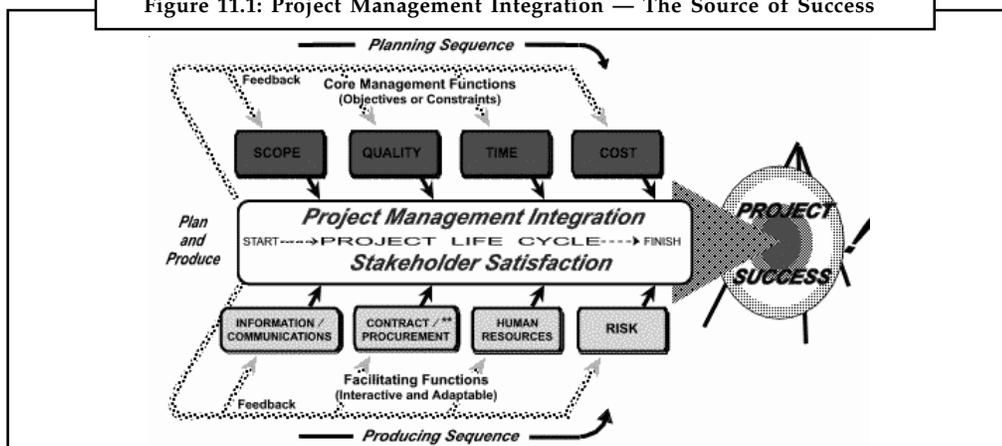
11.3 The Implications of Improving Performance

Why should we want to improve performance? Because the overall goal of project management is not only to achieve successful results but to be seen to have done so. This translates into stakeholder or "customer satisfaction".

Over the last two decades, there has been much study and discussion on the contents of the project management process. Currently, the Project Management Institute has identified ten major elements forming the Project Management Body of Knowledge (PMBoK). These consist of four core objectives (or constraints): the management functions of scope, quality, time, and cost; and four interactive and adaptable management functions of risk, human resources, contract/procurement and information/communications. In addition there are the elements of integration and success, all of which can be managed.

This complex relationship can be conveniently illustrated as shown in Figure 11.1.

Figure 11.1: Project Management Integration — The Source of Success



**Includes both internal (informal) commitments and external (formal) contracts

RMW, CQ, EJ & Others 1990

Notes



Did u know? Over the last two decades, there has been much study and discussion on the contents of the project management process. Currently, the Project Management Institute has identified ten major elements forming the Project Management Body of Knowledge.

Self Assessment

State whether the following statements are true or false:

4. A particular and major breakthrough was the development of “network analysis” and the concept of “critical path”.
5. Over the last one decades, there has been much study and discussion on the contents of the project management process.
6. Currently, the Project Management Institute has identified ten major elements forming the Project Management Body of Knowledge.

11.4 Craft-work, Brain-work and Leadership

While both craft-work and brain-work projects encapsulate all the attributes of project management, brain-work projects such as software and management systems nevertheless require a different focus.

The creation of physical products generally exact some degree of logical sequence in their construction, which favors hierarchical, linear type thinking. Products of the mind are not so constrained, although they will benefit from a logical and systematic approach. On the contrary, such projects benefit more from developing team commitment through lateral, cooperative and concurrent thinking.

Consequently, the type of leadership required is also different. The former type of project responds better to “command and control’ leadership, whereas the latter responds better to the delegation of responsibility and authority within the context of defined goals and objectives. “Empowered work teams” is the current buzz word, a device to bring management focus on activating and motivating project team members by playing on an individual’s natural need to feel valued. Nevertheless, without true integrative leadership, the results can be fragmented, controversial and lack substance.

So what do we see in the next ten or more years? Perhaps the first point is that another ten plus years is minimal in the overall scheme of things.

Certainly, judging by the many projects that fail to reach their optimum potential or just downright miscarry, there will be plenty of opportunity for education and training in the art and science of project management. There will be broader understanding that success criteria are not best defined by time and cost objectives, but by scope and quality objectives, especially quality. There will be promulgated a better understanding that management of a project encompasses proactive tradeoffs between the four parameters of scope, quality, time and cost as suggested by Figure 11.2 , and not just time and cost alone.

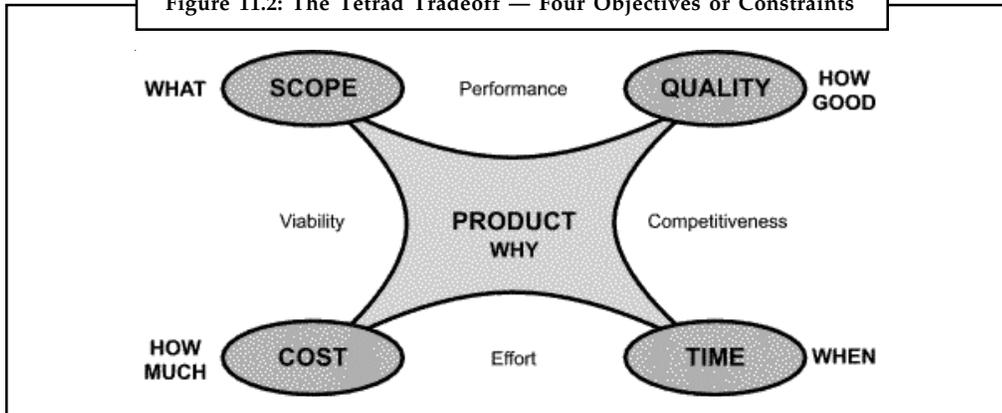
Moreover, the basis of successful decision will vary more with the type of project and the phase and stage in its life cycle than in management style.

But the shift in application of project management from physical to intellectual projects has highlighted an interesting dichotomy in the nature of human beings. On the one hand there are the “technologists” who, striving to make a new world, are filled with the lusty enjoyment of

material creativity. On the other there are the “existentialists” who, rejecting dogma, prefer to rely on the passions, impulses, urges and intuitions that are the basic ground of our personal existence.

Notes

Figure 11.2: The Tetrad Tradeoff — Four Objectives or Constraints



11.5 Thinkers and Feelers

In short, there is a split between *thinkers* and *feelers* and the impact on project work should not be underestimated.

When confronted by project goals and objectives, there are those who obtain satisfaction through the successful achievement of these goals and objectives. Their concerns stem from ensuring that the necessary time and resources are available and within their power to control. These are the thinkers who are usually involved by choice and often represent management.

The feelers, however, tend not to be stimulated by setting goals and objectives and indeed see it as being of little or no consequence. In their view, the only important thing about goal-setting is that the goals should be broadly based, loosely defined and flexible. Typically, they are the stakeholders and constituents and their satisfaction comes, if at all, not from a sense of achievement but from participating in the process.

We can see this dichotomy as far back as our story of Imhotep and King Zoser. Imhotep was clearly a thinker and achieved what he achieved through a satisfaction of “getting things done”. King Zoser, on the other hand, was a feeler and was obviously greatly concerned about how he would feel incarcerated in his magnificent mastaba.

Companies such as IBM, Microsoft & Deloitte have come to realization that they must excel at project management.

Today, the pendulum of management thought has swung towards “participative management” which is the buzz word for corporate management’s attempt to bridge this gap. We can already see this trend emerging in project work, and we can expect to see this trend continue. Indeed, the greater the number of stakeholders and constituents that are involved in the end results of a project, whether it be internal administrative or external infrastructure, the more important it is.

Unfortunately, these project constituents are rarely accountable for the project’s time and cost, at least in the short term. Consequently, “participation” in the project process may become stalled and even reversed, exacting a terrible toll in terms of the project’s core constraints.

As populations grow and the share of the world’s resources diminish, we can confidently expect the rate of change to accelerate. Project management will continue to be the most powerful

Notes

vehicle for handling these changes in an orderly manner. However, to do so there must be a progressive reconciliation or accommodation between the two view points of thinkers and feelers. This will be the challenge of the next decade and beyond.

In the longer term we can expect to see the pendulum swing back once more towards firmer leadership, an attribute desperately needed in today's world of population, environmental and political crises. To do so, project management leadership concepts will change progressively in response to the external demands of a better informed and discerning public and an increasingly better educated work force. Internally, the change will encompass the electronic revolution; socio-technical systems (wherein the team itself shares responsibility with accountability for self-management in defining all steps, execution, and project deliverables); and shared power (distributed leadership or partnering). The skill sets needed for these different and changing environments will be identified and the means developed for transferring them to project-managers-in-the-making through education. The rewards will be the survival of civilization — no less.

Self Assessment

Fill in the blanks:

7. The of physical products generally exact some degree of logical sequence in their construction, which favors hierarchical, linear type thinking.
8. The former type of responds better to "command and control" leadership, whereas the latter responds better to the delegation of responsibility and authority within the context of defined goals and objectives.
9. The shift in application of project management from physical to intellectual projects has highlighted an interesting in the nature of human beings.
10. The however, tend not to be stimulated by setting goals and objectives and indeed see it as being of little or no consequence.
11. As grow and the share of the world's resources diminish, we can confidently expect the rate of change to accelerate.
12. will continue to be the most powerful vehicle for handling these changes in an orderly manner.



Case Study

Rescuing a Small Project

Recently Robert was asked to jump in and rescue a small infrastructure project that was headed for disaster.

What did Robert do?

1. Assessed the project objectives & current status
2. Identified the current project team members
3. Discovered the project's major issues – and any major critical deliverables that were behind schedule
4. Determined who needed to be added (or removed) from project team

Contd...

5. Got the team talking, regularly and frequently!
6. Attacked the most important issues and most critically behind challenges first
7. Quickly and honestly reset any customer expectations, if necessary
8. Communicated regularly and directly with the team and with project stakeholders

Of this process, there were really two critical success factors:

First, he needed to push the long lead time items that had been missed, getting them in motion with expedited speed and escalated priority. In this case, that was circuit orders and equipment budget approval and orders.

Second, we needed to start communicating. The team wasn't talking amongst itself, no one was talking to the customer and vendors, and it was killing the initiative. Establishing a project team e-mail chain, twice-weekly brief status & problem solving meetings and customer-focused status summaries made a huge amount of difference! The team grew to understand the big picture and was more productive with group accountability for their deliverables.

There's a fine line that a project manager must walk with customer communication. On one hand, I believe in honesty and transparency related to project status. On the other hand, he feel that alerting your customer every time there is an issue can be counterproductive, it creates a Chicken Little "the sky is falling" mentality. My choice is to maintain issues documentation that customers can review if they choose to – but I only alert them of the issues that have a high probability of impacting the end result – time, scope, quality or budget.

Was the rescue effort successful? The project is still unfolding, it's due to wrap up at the end of the month. At this point, it seems to be back on track, with all planned components scheduled to complete on time. The customer is happy with progress and the project team members are pleased to be part of the effort.

Question

Analyse the case and discuss the case facts.

Source: <http://www.projectsart.co.uk/rescuing-a-small-project.html>

11.6 Summary

- A particular and major breakthrough was the development of "network analysis" and the concept of "critical path".
- Today, we have a much better understanding of the holistic aspects of project management.
- Over the last two decades, there has been much study and discussion on the contents of the project management process.
- While both craft-work and brain-work projects encapsulate all the attributes of project management, brain-work projects such as software and management systems nevertheless require a different focus.
- In short, there is a split between *thinkers* and *feelers* and the impact on project work should not be underestimated.
- Today, the pendulum of management thought has swung towards "participative management" which is the buzz word for corporate management's attempt to bridge this gap.

Notes

- Project management will continue to be the most powerful vehicle for handling these changes in an orderly manner.
- In the longer term we can expect to see the pendulum swing back once more towards firmer leadership, an attribute desperately needed in today's world of population.

11.7 Keywords

Feelers: The feelers, however, tend not to be stimulated by setting goals and objectives and indeed see it as being of little or no consequence.

PMBOK: These consist of four core objectives (or constraints): the management functions of scope, quality, time, and cost; and four interactive and adaptable management functions of risk, human resources, contract/procurement and information/communications.

Scope Creep: Since a creeping scope was clearly evident during this project's implementation, one must conclude that Imhotep was well acquainted with the principles of scope change management.

Thinkers: Their concerns stem from ensuring that the necessary time and resources are available and within their power to control. These are the thinkers who are usually involved by choice and often represent management.

11.8 Review Questions

1. Explain starting with the pyramids.
2. Discuss the Scope creep and exercising control.
3. Explain the Technical versus people management.
4. Explain the implications of improving performance.
5. Define the term "Craft Work".
6. Define the term "Brain Work".
7. Explain the thinkers and feelers.
8. Describe the direction and process.
9. Describe the future of project management.
10. What is the goal of project management?

Answers: Self Assessment

- | | |
|----------------|------------------------|
| 1. Seven | 2. Selling |
| 3. Creeping | 4. True |
| 5. False | 6. True |
| 7. Creation | 8. Project |
| 9. Dichotomy | 10. Feelers |
| 11. Population | 12. Project Management |

11.9 Further Readings

Notes



Books

Clements/Gido, *Effective Project Management*, Thomson

Clifford F. Gray and Erik W. Larson, *Project Management*, Tata McGraw Hill.

Dennis Lock, *Project Management*, Ninth Edition, Gower.

K. Nagarajan, *Project Management*, Third Edition, New Age International.

P.C.K. Rao, *Project Management and Control*, Publication: Sultan Chand & Sons

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Unit 12: Future of Project Management-II

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12.2 Contemporary Growth

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12.4 Future Growth

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Objectives

After studying this unit, you will be able to:

- Know about the future of project management;
- Understand the contemporary growth;
- Know about the current situation.

Introduction

One can trace artifacts back nearly 5000 years that represent the results of projects and a high degree of technical competence at managing the work. Perhaps the oldest artifact is The Great Pyramid of Giza – located near the city of Cairo, Egypt and the only survivor of the Seven Ancient Wonders of the World. There are other ancient artifacts, but without a specific date of construction identified. Circa 2560 BC, The Great Pyramid of Giza was constructed over a period of perhaps 20 years as the necropolis for the Egyptian pharaoh Khufu. Built to a height of 481 feet by using approximately 2 million stone blocks, each weighing more than two tons, it ranked as the tallest structure on earth for more than 43 centuries. Each side is oriented to the cardinal points of the compass – i.e., north, south, east, and west.

12.1 Historical Perspective of Project Management

In a November 1998 issue of National Geographic Magazine, it was suggested that the building of The Great Pyramid required a sophisticated community of such skills as planning, cooking, baking, healthcare, and stone cutting to accomplish this project. Pictures often depicting slaves being whipped to perform the tasks of stone cutting and stone placement, but this could not have been the typical “management method” for the project. There had to be some team organization and project management to accomplish the feat of building the pharaoh’s tomb whose actual planning and construction remains a secret from modern society today. Project management has continued to grow over the more than 5000 years through the demands of

society for a change to resources to create a more valuable product or service for human consumption. Techniques improved and tools were invented to make the tasks easier. Whereas construction may have been the seed for developing project management, many organizations across all industries use project management to some extent. Perhaps like the ancient Egyptians, a business's project management may include only fundamental concepts and practices with the expectation of continued growth as the need is recognized.

Notes



Notes Project Management is no longer regarded as a part time occupation or even a career path position.

12.2 Contemporary Growth

Planning tools have emerged over the past 50 plus years to address dynamic planning requirements. Computers have aided and revolutionized information management. Risk tools give probabilities for success or failure of projects.

An abundance of literature is available through books, articles, and electronic sources to describe project management theory, concepts, practices, procedures, and policy. This literature includes the US Air Force's 375 series on program management requirements from the 1960s and 1970s that influences many of the practices and procedures used today.

Formal project management education programs have been started in institutions of higher education as well as a wealth of independent training programs that address various aspects of project management.

There have been efforts to expand the transfer of knowledge from the single project model to a multiple project model. Studies have been accomplished to determine if project management is a profession or something less that does not meet a contemporary definition of profession.

No known study concludes that project management is a profession that meets current definitions. Project management, as a collection of theory, concepts, practices, and procedures, is, however, the management method of choice for many organizations and perhaps the most recognized term in management today. There are more than 500 books of all size and focus written each year on project management practices and procedures.



Did u know? For more than 50 years, project management has been in use but perhaps not on a world wide basis.

Self Assessment

Fill in the blanks:

1. tools have emerged over the past 50 plus years to address dynamic planning requirements.
2. An of literature is available through books, articles, and electronic sources to describe project management theory, concepts, practices, procedures, and policy.
3. project management education programs have been started in institutions of higher education as well as a wealth of independent training programs.
4. No known study concludes that management is a profession that meets current definitions.

12.3 Current Situation

In spite of advances made in project management over nearly 5000 years, there are still an inordinate number of project failures, i.e., failing to meet the original project objectives. While some progress has been made in increasing success rates of projects, a significant number still fall short of meeting the objectives. Why is there such a waste of resources through failed projects?

The one component that seems to be weak is the human side of managing people in project teams. Individuals are rewarded for individual achievement throughout their lives, but are expected to perform in a project team with the team's best interest in mind. Voting is often used to determine a course of action rather than using consensus. Team building is not high on the priority of the project manager as long as the project appears to be meeting the objectives. Team cohesiveness is often lacking and individuals often function like a single entity in a crowd. It was recognized in the early 20th century that managers were not tapping the collective physical and mental energies of the team members in a unified approach. In 1924, Mary Parker Follett (1868-1933) published *Creative Experience* that addresses "creative interaction of people through an ongoing process of circular response." Her ideas are recognized as "cutting edge" in organizational theory. These ideas include seeking win-win solutions, strength in human diversity, situational leadership, and a focus on process.

Today, little has been accomplished to fully harness the full potential of the project staff through team building and team motivation. Some examples of actions that destroy team unity and disrupt project efforts have been noted over the years of contact in projects. These examples raise awareness on what should not occur.

- Project Manager: "We have a team when everyone agrees with what I say."
- Project Manager: "I am empowering everyone to do whatever is necessary between milestones – Just don't miss a milestone."
- Project Manager: "Don't lie to the customer – that's my job."
- Project Manager: "Everyone get ready, we'll have some fun at the new guy's expense."
- Project Manager: "You're not a team player (to new team member)."
- Project Manager: "I need six resources on this job. (Refers to people in an impersonal way as though the people were objects.)"
- Team Member: "I need to check that with the project leadership, I mean leadership. (Freudian, perhaps)"
- Team Member: "Who is God's boss or who does God report to? I want to know how to properly address my boss (project manager)."

There are numerous examples that reflect the negative side of leadership and failure of leadership to effectively motivate the project team. Some evoke a smile or chuckle, but these failures cannot have a positive effect on team unity or team productivity.

Positive leadership and team building is needed in each example to obtain the best from the team individually and collectively.



Caution The one component that seems to be weak is the human side of managing people in project teams. Individuals are rewarded for individual achievement throughout their lives.

12.4 Future Growth

Notes

Future improvements in project management may be made through better tools and practices, but the one area ripe for change is the project team. Work is only accomplished through people and well-led people perform at their best following a high performance project leader.

In a 2000 interview with the former project manager of both the US Air Force's F-15 and SR-71 aircraft, the project manager attributed the success of these two aircraft to the composition of the team. Both project teams were selected based on their qualifications and each member was offered the opportunity to serve in an assignment other than the project. Only one person opted to take another assignment and the teams were comprised of people who wanted to be part of the projects. Not all projects have the luxury of having an all-volunteer team. The F-15 and SR-71 project manager gave full credit to his project teams and suggested that project success is largely dependent upon the project team and its ability to function as a true team. The products of these two teams, the F-15 fighter aircraft and the SR-71 strategic reconnaissance aircraft, have set world records for performance that has lasted for more than 30 years. More technically complex and with a greater need for superior leadership, these two air-craft demonstrate the outcome of high-performance teams.

A more recent example of projects that were replicated many times although each was unique and each involved major risk factors proved successful because of team training by simulation. Each project was simulated on a computer whereby each team member saw his or her role and was able to understand the parameters of their respective roles.

Team members were afforded the opportunity to ask other team members questions and respond to questions. Projects were limited in duration and scope to ensure rapid simulation of the tasks within the projects. This simulation of projects has given the organization a unique capability to integrate the efforts of all team members for the most effective results. While the simulation consumes project time, it has the advantage of reducing communication requirements during project implementation and has materially improved the probability of success for the project.

Self Assessment

Fill in the blanks:

5. improvements in project management may be made through better tools and practices.
6. were afforded the opportunity to ask other team members questions and respond to questions.
7. More complex and with a greater need for superior leadership, these two air- craft demonstrate the outcome of high-performance teams.
8. were selected based on their qualifications and each member was offered the opportunity to serve in an assignment other than the project.

12.5 Techniques and Tools

Techniques and tools will continue to play an important role in such areas as planning, information management, and risk assessment. There will be more reliance on automated techniques to support decision processes.



Task Compare the future of Project management in India as well as Globally.

Notes

Staff

Changes in people knowledge, skills, and competences will provide the greatest opportunity to improve project success through better organization and training of teams, to include training project managers in the art of leadership. Many future gains in project successes and reduced consumption of resources for each project will be dependent upon team performance. High-performance teams will become more prevalent in medium to large size projects. Project managers will become more widely versed and aware of the need for leadership skills to obtain the best results from individuals and teams. Project manager competence will include the ability to effectively lead teams and to motivate individuals in the performance of project work. This will lead to fewer project failures and waste of resources. Project Strategy Project strategies will be aligned with the enterprise's strategic goals and projects will be selected based on objective criteria that relates to the business's purpose. Portfolio management will become more common in all sizes of organizations.

The respective project roles for the project manager, project team member, and project sponsor need better definition and the right training to assure accomplishment of these duties. Project team members performing technical tasks will be trained in being team members as well as limited project management skills to understand the measurement of progress for the project.

Self Assessment

Fill in the blanks:

- 9. in people knowledge, skills, and competences will provide the greatest opportunity to improve project success through better organization and training of teams.
- 10. The respective for the project manager, project team member, and project sponsor need better definition and the right training to assure accomplishment of these duties.
- 11. members performing technical tasks will be trained in being team members as well as limited project management skills to understand the measurement of progress for the project.



Case Study

The Hidden Costs and Dangers of the Shortcut

We live in a world where we are often pressured to take shortcuts to save time and cut costs as much as possible. However, if you're not a skilled and experienced project manager, the wrong shortcut could end up costing you a lot more. Here's an anecdote to think about.

Let's say you are running a project, and the goal is to upgrade a road to a remote property. You solicit bids from several contractors and ask them to do it for the least cost possible, and you also stipulate you don't want to get any permits.

None of the contractors are willing to work under those conditions, so you get your own earth moving equipment and a friend with some experience to help you upgrade your road.

Contd...

In the process, you fill in a spillway to a dam for a reservoir. You think this is no big deal because the fine you pay for that is far less than what it would've cost to hire a contractor to do the job properly.

Three years later in a heavy rainstorm, the dam breaks because the spillway has been compromised. Seven homes are washed away in the ensuing flood and 10 people die. Now, what was intended as a shortcut to save money ends up taking lives.

Is it so far-fetched? How often is safety comprised every day because people are looking for the quick way out? Even more important as project managers, we have a responsibility to be the voice of reason that understands the hidden costs and dangers of the shortcut.

Let's look at how a PMP could have prevented this:

1. **Standards:** When someone gets a PMP, they are showing they are willing to learn the global standards that are universally accepted as a standard set of processes, tools and techniques for doing projects, ALL projects. This means they are willing to learn the rules of the game. Rules are generally created for very good reasons, and as project managers who know how to follow them, PMPs show their leadership because they have the ability to go the distance, learn the rules of the game and only adapt them when it is for the overall good of a project.
2. **Stakeholder Impact:** To become a PMP, a person has to learn about a variety of topics that influence the outcome of projects. Many factors that influence the outcome of a project have absolutely nothing to do with the goal of the project, as in the story above where the goal was to upgrade the road. In pursuit of their PMP project managers learn to weigh all the stakeholder impacts on their projects and to ask the tough questions.
3. **Communication:** PMPs learn how important it is to communicate with everyone involved in a project and look beyond the typical aspects of satisfying the project sponsor to include all the factors. In the anecdote, the property owner was, in fact, the project manager and is now being charged with manslaughter because of the unintended consequences of his project.

Could someone without a PMP have done just as good a job managing the road project? From my experience, having someone with a PMP leading your projects reduces the risks of managing the project because they have a demonstrated ability to play by the rules. In a world enamored with people "just doing it" and "thinking outside the box," we need folks who still know how to learn the rules, understand why they exist, and create a safe environment for all.

Question

Analyse the case and discuss the case facts.

Source: <http://www.projectsart.co.uk/the-hidden-costs-and-dangers-of-the-shortcut.html>

12.6 Summary

- Throughout history, from construction of ancient artifacts to modern projects, the major difference in project success has been influenced by the quality of the project team.
- Individuals may be threatened and coerced into performing certain functions, but the highly motivated individual will provide better results.
- Integrated teams of willing people provide the optimum solution for most projects whereby all individuals subordinate their goals to that of the team.

Notes

- Modern examples of teams give rise to the concept that well-motivated volunteers produce the best results.
- This motivation is derived from a competent project leader who understands the principles of leadership and exhibits traits that builds on team capability.
- Project success is dependent upon team performance.

12.7 Keywords

Contemporary Growth: Planning tools have emerged over the past 50 plus years to address dynamic planning requirements. Computers have aided and revolutionized information management. Risk tools give probabilities for success or failure of projects.

Data Application: The development of a data base of risk factors both for the current project and as a matter of historic record.

Debriefing: In the procurement process, informing bidders about the strengths and weaknesses of their proposal.

Future Improvements: Future improvements in project management may be made through better tools and practices, but the one area ripe for change is the project team.

Projects: Projects were limited in duration and scope to ensure rapid simulation of the tasks within the projects. This simulation of projects has given the organization a unique capability to integrate the efforts of all team members for the most effective results.

12.8 Review Questions

1. Describe the future of project management globally.
2. Explain the contemporary growth.
3. Explain the current the Situation of project management.
4. What do you know about the future growth of project management?
5. Discuss the historical perspective of project management.

Answers: Self Assessment

- | | |
|------------------|-------------------|
| 1. Planning | 2. Abundance |
| 3. Formal | 4. Project |
| 5. Future | 6. Team Members |
| 7. Technically | 8. Project Teams |
| 9. Changes | 10. Project Roles |
| 11. Project Team | |

12.9 Further Readings



Books

Clements/Gido, *Effective Project Management*, Thomson

Clifford F. Gray and Erik W. Larson, *Project Management*, Tata McGraw Hill.

Dennis Lock, *Project Management*, Ninth Edition, Gower.

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Unit 13: Regulatory Framework of Projects

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Objectives

After studying this unit, you will be able to:

- Know about the regulatory framework for M-governance in India;
- Understand the regulatory framework for cloud computing in india;
- Know about the E-waste law and regulatory framework in India.

Introduction

Companies incorporated in India and branches of foreign corporations are regulated by the Companies Act, 1956 (the Act). The Act, which has been enacted to oversee the functioning of companies in India, draws heavily from the United kingdom's Companies Act and although similar, is more comprehensive. The Registrar of Companies (ROC) and the Company Law Board (CLB) both working under the Department of Company Affairs ensure compliance with the Act.

13.1 Regulatory Framework for M-governance in India

Indian government is planning to adopt and use mobile governance (m-governance) for governmental purposes. This is a good decision but like other projects is unsupported by capacity building and necessary legal, regulatory and information technology infrastructure.



One of the main reasons for failure of e-governance in India is absence of accountability, lack of transparency and no time bound performance.



Example: Considering e-courts in India. Till the month of January 2011 we are still waiting for the establishment of *first e-court in India*. Even the National Litigation Policy of India (NLPI) failed to consider information technology for legal and judicial purposes in India.

Another key issue regarding e-governance and m-governance is absence of any legal framework for Mandatory Electronic Delivery of Services in India (*MEDSI*). The real problem with Indian E-Governance and M-Governance initiatives is that Legal Framework for Mandatory Electronic Delivery of Services in India is missing, says Praveen Dalal, Supreme Court lawyers and Managing Partner of India's exclusive techno legal law firm *Perry4Law*. There is no effective Legal Enablement of ICT Systems in India and even the Information Technology Act, 2000 is "Non-Mandatory" regarding E-governance and M-governance in India, informs Praveen Dalal.



Did u know? India has a poor track record of launching projects like Aadhar, Natgrid, CCTNS, etc.

Authorities like UIDAI are without any proper planning and strategy. Even legal frameworks for these projects/authorities are missing.

Let us hope that India would learn from the failures of these projects and would make proper planning, policies and legal framework for m-governance in India before launching the same in bewilderment.



Task Discuss the regulatory framework for M-governance in India.

13.2 Regulatory Framework for Cloud Computing in India

The proposal to use of cloud computing in India has raised many regulatory and security concerns. Without meeting these regulatory and security concerns, software as a service (SaaS) and cloud

Notes

computing should not be used in India. In fact, cloud computing in India must be techno legal in nature and till it meets the techno legal requirements, it should not be used in India.



Self Assessment

Fill in the blanks:

1. Companies incorporated in India and branches of foreign corporations are regulated by the Companies Act
2. The Act, which has been enacted to oversee the functioning of companies in India, draws heavily from the and although similar, is more comprehensive.
3. The Registrar of Companies (ROC) and the Company Law Board (CLB) both working under the ensure compliance with the Act.
4. Key issue regarding e-governance and m-governance is absence of any legal framework for
5. Indian government is planning to adopt and use for governmental purposes.

Before using cloud computing in India we must ask few questions to ourselves. These include what are the regulatory frameworks required for successful cloud computing, how the security concerns need to be addressed, what are the legal frameworks for multi jurisdictional cooperation, and what are the Quality of Service (QoS) parameters for effective cloud service.

Besides regulatory framework for cloud computing in India we must also ensure high availability levels, appropriate data erasing mechanisms, data privacy at the service provider’s level, export restrictions upon data, data handling monitoring mechanisms, jurisdictional issues, cloud computing security issues, licensing issues for cloud computing, etc.


Notes Till now we have no cloud computing policy of India. There is no cyber security in India and even cyber security policy of India is missing. There is no privacy law in India. There is no data protection law in India. And there is no data security law in and cyber security law in India. In short, there is no legal framework for cloud computing in India at all.

Fortunately, stakeholders have openly supported the need of regulatory framework for cloud computing in India. With an increasing pressure the Indian government may consider

formulating a legal framework for cloud computing in India. The sooner it is done the better it would for all the stakeholders concerned.

Notes



Case Study

Regulatory Framework for Investment Banking in India – October 14th, 2010

Investment Banking in India is regulating in its various facets under separate legislations or guidelines issued under statute. The Regulatory powers are also distributed between different regulators depending upon the constitution and status of Investment Bank. Pure investment banks which do not have presence in the lending or banking business are governed primarily by the capital market regulator (SEBI). However, Universal banks and NBFC investment banks are regulated primarily by the RBI in their core business of banking or lending and so far as the investment banking segment is concerned, they are also regulated by SEBI. An overview of the regulatory framework is furnished below:

1. At the constitutional level, all invest banking companies incorporated under the Companies Act, 1956 are governed by the provisions of that Act.
2. Investment Banks that are incorporated under a separate statute such as the SBI or IDBI are regulated by their respective statute. IDBI is in the process of being converted into a company under the Companies Act.
3. Universal Banks that are regulated by the Reserve Bank of India under the RBI Act, 1934 and the Banking Regulation Act which put restrictions on the investment banking exposures to be taken by banks.
4. Investment banking companies that are constituted as non-banking financial companies are regulated operationally by the RBI under sections 45H to 45QB of Reserve Bank of India Act, 1934. Under these sections RBI is empowered to issue directions in the areas of resources mobilization, accounts and administrative controls.
5. Functionally, different aspects of investment banking are regulated under the Securities and Exchange Board of India Act, 1992 and guidelines and regulations issued there under.
6. Investment Banks that are set up in India with foreign direct investment either as joint ventures with Indian partners or as fully owned subsidiaries of the foreign entities are governed in respect of the foreign investment by the Foreign Exchange Management Act, 1999 and the Foreign Exchange Management (Transfer or issue of Security by a person Resident outside India) Regulations, 2000 issued there under as amended from time to time through circulars issued by the RBI.
7. Apart from the above specific regulations relating to investment banking, investment banks are also governed by other laws applicable to all other businesses such as – tax law, contract law, property law, local state laws, arbitration law and the other general laws that are applicable in India.

Questions

1. Discuss the regulatory powers of SEBI.
2. Analyze the case and interpret it.

Notes

13.3 E-waste Law and Regulatory Framework in India

The menace of electronic waste (e-waste) in India has been increasing. India does not have a dedicated e-waste law and we are taking care of this crucial issue through guidelines and directions.



E-waste issues cannot be taken lightly and casually as has been done in India. Although the environment law jurisprudence is very strong and mature yet e-waste related legislations in India are still missing.

We need to have a dedicated e-waste law in India that can stringently deal with the menace of e-waste in India. India should not be a dumping ground for e-waste and commercial entities must be saddled with both civil and criminal liabilities for spreading illegal e-waste in India.



Notes E-waste is a popular, informal name for electronic products nearing the end of their “useful life.” Computers, televisions, VCRs, stereos, copiers, and fax machines are common electronic products. Many of these products can be reused, refurbished, or recycled. Unfortunately, electronic discards is one of the fastest growing segments of our nation’s waste stream. Rapid obsolescence of electronics goods, compounded by dumping from developed countries, has brought the e-waste problem in India to the brink of spilling over into an acute crisis. The communities that are affected by the toxics in e-waste need not necessarily be those that are creating the waste. The unethical export of e-waste by industrialised nations to developing countries is shifting the onus of development to communities ill-equipped to deal with such waste. A lot of these materials are being sent to developing nations under the guise of reuse-to bridge the digital divide.

The Basel Convention defines waste by its disposal destination or recovery processes. These various processes are listed in Annexure IV of the Convention.



Example: Virtually any material that will be recycled or processed in order to reclaim a metal, or to reclaim an organic or inorganic substance for further use, is deemed a waste. Electronic components that are used without further processing are not likely to be defined as a waste.

The Convention has provided for two lists. List A, found in Annexure VII, is presumed to be hazardous and thus covered by the Basel Convention; and List B, found in Annexure IX, is presumed to be non-hazardous and thus not subject to the Basel Convention. The waste listed in List A is waste that poses serious threats to environment and human health. As a result of their adverse effects these substances require special handling and disposal processes. The Annexure VIII hazardous waste list has the following entries applicable to e-waste:

A1180: Waste electrical and electronic assemblies or scrap containing components such as accumulators and other batteries included in List A, mercury-switches, glass from cathode-ray tubes and other activated glass, and PCB-capacitors, or contaminated with Annex I constituents (for example, cadmium, mercury, lead, polychlorinated biphenyl) to an extent that they possess any of the characteristics contained in Annexure III.

From the above we can gather that at the very least, circuit boards, CRTs, and other electronic boards or components and assemblies containing lead based solders and copper beryllium alloys (which include most computer circuit boards and much other electronic equipment), are indeed hazardous wastes according to the Basel Convention. Likewise, whole, used, discarded computers, printers, and monitors that contain such circuit boards or CRTs that are not to be re-used directly are to be considered as hazardous waste and subject to the Basel Convention. To date, the United States is the only developed country in the world that has not ratified the Basel Convention. In fact, US officials have actively worked to defeat and weaken the Basel waste export ban. The US government policies appear to be designed to promote sweeping the e-waste problem out the Asian back door. Not only has the US refused to ratify the Basel Convention and Ban, but in fact, the United States government has intentionally exempted e-waste materials, within the Resource Conservation and Recovery Act, from the minimal laws that do exist (requiring prior notification of hazardous waste shipments) to protect importing countries.



Did u know? The 160-State Basel Convention is the world's most comprehensive environmental agreement on hazardous and other wastes.

Governments are expected to minimize the generation of hazardous wastes, treat and dispose of wastes as close as possible to their place of generation and reduce the quantities transported. The proper implementation of the Basel Convention ensures that hazardous e-waste be managed in an environmentally sound manner as it provides the tools for the transparency and traceability of e-wastes destined for recycling or recovery. The development of international resource recycling systems would have to be combined with a mechanism capable of monitoring such systems to ensure their accountability. That could not be achieved, however, without intensified international efforts to help developing countries strengthen their capacity to implement the Convention.

A programme of action in the Asia-Pacific region to dispose of electrical and electronic waste in an environmentally sound way and stop its illegal trafficking was also launched with the support of the United Nations Environmental Programme's (UNEP) Basel Convention Regional Centres in China, Indonesia and Samoa. Due to rapid industrialisation, several developing countries in the Asia-Pacific region need to access large quantities of secondary raw materials. As a result, large amounts of used and end-of-life electronic wastes are being sent to them for recycling, recovery and refurbishment of non-ferrous and precious metals at facilities which do not always meet high environmental standards.

To combat the ever growing e-waste problem, India needs to have strong rules and regulations in place. Over the years, the government has instituted a number of regulations for better management of hazardous waste in the country. Some of these regulations are given below:

- (a) ***Hazardous Wastes (Management and Handling) Rules, 1989/2000/2003:*** These define hazardous waste as "any waste which by reason of any of its physical, chemical, reactive, toxic, flammable, explosive or corrosive characteristics causes danger or is likely to cause danger to health or environment, whether alone or when on contact with other wastes or substances."

In Schedule 1, waste generated from the electronic industry is considered as hazardous waste. Schedule 3 lists waste of various kinds including electrical and electronic assemblies

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or scrap containing compounds such as accumulators and other batteries, mercury switches, glass from cathode ray tubes and other activated glass and PCB capacitors, or contaminated with constituents such as cadmium, mercury, lead, polychlorinated biphenyl or from which these have been removed, to an extent that they do not possess any of the constituents mentioned in Schedule 2.

- (b) *DGFT (Exim policy 2002-07)*: Second hand personal computers (PCs)/laptops are not permitted for import under EPCG scheme under the provisions of para 5.1 of the Exim Policy, even for service providers. Secondhand photocopier machines, air conditioners, diesel generating sets, etc, can also not be imported under EPCG Scheme under the provisions of Para 5.1 of EXIM Policy even if these are less than ten years old.
- (c) MoEF Guidelines for Management and Handling of Hazardous Wastes, 1991.
- (d) Guidelines for Safe Road Transport of Hazardous Chemicals, 1995.
- (e) The Public Liability Act, 1991.
- (f) Batteries (Management and Handling) Rules, 2001.
- (g) The National Environmental Tribunal Act, 1995.
- (h) Bio-Medical Wastes (Management and Handling) Rules, 1998.
- (i) Municipal Solid Wastes (Management and Handling) Rules, 2000 and 2002.

Unfortunately, none of these regulations deal directly and specifically with e-waste. This situation requires the enactment of a special law dealing with the nuisance of e-waste. Even as the United States pushes India to relax its restrictions on importing used computers and parts, shiploads of illegally imported equipment from the US and other developed countries are swamping India, contributing to a growing “e-waste” problem. India and the United States are engaged in tough negotiations over import of secondhand computers and parts, with the US insisting that India allow more liberal importation of “pre-used” hardware, according to reports. India prefers to stick to its norm of importing hardware that has at least 80% residual life left. Unlike the developed countries, there are no set norms for handling of electronic waste, and secondly cheap labor not only makes disposal cost-effective and profitable for local traders but also encourages the developed countries to push electronic wastes to the countries like India. The two largest nations exporting their e-wastes are the United States and Britain. According to a recent British Environmental Protection Agency report, Britain shipped out 25,000 tons of e-waste to South Asia last year. The United States bought a staggering \$125 billion worth of electronic goods in 2005, and reportedly for every PC the country bought, one was discarded. Industry sources say in 2005 the US recycled about \$2 billion worth of electronic equipment, which may be just 20% of the e-waste it generated, much of which found its way to India, China, Southeast Asia and Africa. Electronic hardware discarded globally has skyrocketed, with 20 million to 50 million tons generated every year.

In partnership with various non-governmental organizations, independent bodies and governmental bodies — including the Indian Ministry of Environment and Forests as well as the Central Pollution Control Board, The Energy and Resources Institute (TERI) is responsible for kick-starting a program that lays out organizational procedures for e-waste recycling. The goal, according to experts at TERI, is to make recycling of computers more efficient — ensuring that while no part of the computer is wasted, standards will become more environmentally friendly.



Task Gather more information for TERI.

An additional factor is geared toward protecting those workers exposed to the various radioactive fumes emitting from the e-waste they are handling. Beginning the project in December 2005, TERI has since brought in experts from Europe to begin training Indian institutions in efficient recycling practices. The project has also partnered with advisers from the University of Dresden in Germany and the University of Crete in Greece.

The adoption of an ambitious e-governance plan by India is a good sign and we can hope that the e-waste management will also find favour with the Government soon. The concept of “absolute liability” is deterrent enough for the Government and private entrepreneurs to take environmental issues seriously. This is more so since the defense of “sovereign immunity” is also not available to the Government for tortuous liability. In short, e-governance presupposes the handling of various hazards originating out of and associated with the use of ICT and there is no reason to exclude the same from national policies pertaining to ICT and e-governance.

13.4 Developing Commercially Viable Infrastructure Projects

There is a wide spectrum of approaches to developing commercially viable infrastructure projects, from a narrow one that focuses on engineering design to a wide one that addresses ambitious goals, like city-wide coverage of all urban residents, including the poor. Some of the most ambitious projects may seek higher environmental performance and “green,” energy-efficient technologies. Commercially viable projects are capable of attracting private and institutional investment to pay for the capital costs. Repayment of this initial investment occurs over many years, and therefore, an owner needs to pay special attention to the long-term sustainability of the O&M of the infrastructure. For this reason, project risks need to be identified and addressed up front. Market demand is equally important to sustainability from the point of fully utilizing the services and paying user charges. Even if private investment is not required, a rigorous project development process will help produce better infrastructure in Indian cities. This chapter presents the key issues that need to be considered when developing commercially viable projects. The chapter does not discuss technical specifications of projects because that is primarily an engineering exercise that emerges from the parameters outlined.

If you are responsible for implementing projects remember the following:

- What is the environmental and social impact of Under-investment in basic services? What are the main objectives for improved infrastructure services (coverage, quality, efficiency)?
- What are the financial and tariff implications of new infrastructure investment? How will O&M be paid for over time?
- Are commitments in place for ensuring cost recovery? Are project revenues supplemented with other commitments from the general revenues and/or governmental transfers?
- Does the proposed institutional arrangement allocate risk to the parties best suited to manage them? Does the structure encourage private sector expertise and commercial investment?

Although large infrastructure projects are often risky by nature, certain structures can help mitigate risk better than others, thereby increasing the chances of success. Unfortunately, India’s traditional method of developing projects does not adequately address project risk. Under its centralized development model, from independence to the mid-1990s, the central government earmarked money for specific sectors. State governments also provided budget allocations for urban infrastructure, and both politicians and civil servants decided how the funding would be spent. Budget allocations accounted for more than two-thirds of the money spent on urban services. The other third came from government-backed financial institutions that made loans based on a national credit scheme, directed to priority sectors. Centrally directed credit, along

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with state guarantees, acted as a disincentive for employing rigorous financial analysis on project proposals. In addition, service providers adjusted annual revenue shortfalls against next year's budget transfer, further undermining good financial management and tariff structures.

Engineers in state-level agencies or local governments developed technical proposals and submitted them to state government for funding. With erratic budget transfers, funding requests often fell short of the estimated cost, and projects would have to be curtailed or spread out over many years. As a result, work tended to be implemented piecemeal, through many small contracts. Over time, numerous, overlapping contracts led to coordination problems, delays, and cost overruns. It also made performance monitoring very difficult, as was the case in Navi Mumbai's water and sewerage operations before the FIRE (D) Program helped them develop a performance-based contracting system in 2003.

Consequently, the system was inefficient and risk-prone. This became particularly apparent when, on the one hand, there were not enough funds for projects, while, on the other hand, agencies could not absorb the funding already available. Fund utilization was approximately 80% in 1997.

Projects were limited in scope and focused primarily on crucial needs or high-profile areas of the city. The system unraveled as urban populations grew disproportionately to dedicated budget allocations for infrastructure. For many years, central and state governments focused on rural development and missed the urbanizing trends unfolding across the country. Now, government resources, including staff capacity, have difficulty confronting the infrastructure needs.

The alternative that the FIRE (D) Program promotes is to develop projects that can attract commercial investment and private sector participation.

Self Assessment

Fill in the blanks:

6. Unfortunately, India's traditional method of developing projects does not adequately address
7. Under its development model, from independence to the mid-1990s, the central government earmarked money for specific sectors.
8. State governments also provided for urban infrastructure, and both politicians and civil servants decided how the funding would be spent.
9. Budget allocations accounted for more than of the money spent on urban services.
10. Centrally directed credit, along with state guarantees, acted as a for employing rigorous financial analysis on project proposals.

13.5 Determine True Costs of Services

If local infrastructure projects are to access commercial investment from financial institutions, capital markets, and private firms, it is important that services be delivered on a sustainable basis. Central to this is the need for determining the true cost of service provision after factoring in O&M costs, asset depreciation, environmental degradation, and social objectives. Ironically, tariff subsidies are justified in the name of poor, although the poor are not usually connected to the city networks as legal users (despite often having the ability and willingness to pay). Further, since revenue shortfalls from low tariff rates are met through general taxes and grants, resources get diverted away from necessary pro-poor programs, such as primary health and education.

13.6 Uncertainty Leads to High Project Risk

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Whether or not private sector financing and management of infrastructure is desired, holistic project development has become very important. This is underscored by the fact that new projects are slow to take off, have spotty implementation rates, and have difficulty achieving the desired performance. These common problems are traditionally handled in a very reactionary crisis mode, rather than anticipated from the onset. The Sangli case discussed earlier is just one of many challenging examples across the country. Pune's US\$185 million water supply and sewerage project that the FIRE (D) Program helped structure is another example. The project was cancelled after the commissioner, who was the local champion, got transferred. The local government council reviewed the project costs and expressed concern that they were too high. The council thought consumers would have to pay too much to ensure that a private operator received a sufficiently high rate of return. Furthermore, there was apprehension that an international firm would potentially win the contract. Ultimately, neither the political establishment nor the public understood the project structure, even though it was viewed as a model for the country. Technical Diagnostic on Project Development know the local market Conditions One of the main reasons that project risks threaten the development process is the lack of attention to local market conditions at the onset. By not incorporating market demand into project development, infrastructure becomes reduced to an engineering exercise that overlooks how the community will utilize the services, how good O&M will be ensured, and how the system will be financially sustainable. If local risks are identified early, they can be addressed more substantially. Since 1994, the FIRE (D) Program has focused heavily on these aspects and promoted key reforms. Over time, the project expanded its focus on commercially viable demonstration projects to encompass policy and governance issues, such as enhancing municipal financial and managerial capacity. The Jawaharlal Nehru National Urban Renewal Mission (JNNURM) has expanded much of the FIRE (D) Program's agenda into more than 60 cities. With time, a working definition (see the following section on "Defining Commercial Viability") of commercial viability for municipal infrastructure projects emerged based on practical experience and a growing understanding of municipal governance, infrastructure, and financing. The FIRE (D) Program advocates for projects to be framed within the context of a city's overall investment decisions for service improvements. For example, in the water sector, it is likely that immediate benefits would result from reducing the non-revenue water. Initiatives to improve system efficiencies must complement efforts to augment capacity. Considering both types of investments together will influence the sequencing of projects, the levels of investment required, and the need to revise user charges. The success of these decisions, however, requires clear linkages to improved efficiency in operations and institutional management. Project development with a commercial format require Pilot Projects: Design, Implementation, and Policy reform Although India had some experience in developing commercially viable projects in the power, transport, and telecommunication sectors by the middle 1990s, environmental urban infrastructure still utilized traditional public sector approaches. Now there are good demonstration cases in water, sanitation, and solid waste management, but substantial private sector participation and commercial investment is still not the norm. The FIRE (D) Program has tested several institutional arrangements and risk mitigation strategies to structure commercially viable projects over the last 17 years. Based on these lessons, the FIRE (D) Program established some useful tools for practitioners and policy makers.

13.6.1 Demonstration Projects Utilizing Commercially Viable Structures

1. Local government implementation through an engineering, procurement, and construction contract and commercial finance in Pune, Maharashtra's water and sewer project.

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2. Regional utility board accessing capital markets through a state infrastructure fund in Bangalore, Karnataka.
3. Concession contract for private sector delivery of bulk water supply in Tirupur, Tamil Nadu.
4. Performance-based management contracting with private firms for water and sewer services in Navi Mumbai, Maharashtra.
5. Corporatization of public sector agencies in the states of Maharashtra and Orissa.
6. Unbundling solid waste management services for assigning individual components to private companies and public agencies in Asansol and Durgapur, West Bengal.

The most important lessons of this pilot experience were highlighted in the “Key Things to Remember” section at the beginning of this chapter. No matter what institutional arrangement is chosen, local government needs to be more involved in infrastructure to make urban service delivery accountable to city residents and local politicians. Politics can play both negative and positive roles in the process, and systems need to be in place so that political pressure helps improve service delivery.

For this reason, (1) stakeholder participation, with a focus on social inclusion; (2) market-oriented design; and (3) local government accountability are all important governance features of developing commercially viable projects. But without technical capacity, local and state agencies cannot be expected to replicate the pilot activities on a larger scale. To facilitate this replication, as an essential first step, the FIRE (D) Program created several project development tools.

7. **Financial Prefeasibility Study:** To help identify a project concept, and to rapidly assess whether it can be developed in a commercially viable format, the FIRE (D) Program created a concise toolkit that provides a standardized approach to conducting prefeasibility studies, along with specific considerations for water and sanitation projects.
8. **Market Demand and Willingness to Pay Study:** To determine the preferences of residents, how they value improved services, and what they are willing to pay for them, a market demand study needs to be conducted. This study surveys various customer classes and helps establish detailed tariff categories and rates.
9. **Appraising Commercial Viability:** In partnership with financial institutions, the FIRE (D) Program established an appraisal format that incorporates the project concept and market demand study to assess risk. Here, the focus is an institutional credit assessment and a risk mitigation plan.
10. **Environmental Impact Assessment (EIA):** It is often assumed that environmental infrastructure projects have only positive impacts on the environment. However, large-scale projects can be very disruptive to the environment in both the short and long terms. An EIA develops strategies to mitigate negative externalities and encourage positive design elements.
11. **Procuring Urban Services:** It is important that local governments can access the technical support they need to augment their internal capacity. Procurements utilizing the best-value-for-money approach help ensure access to the best services at the right price.
12. **Contract Management:** Even if local governments decide to procure external support for developing infrastructure and managing services, in-house staffs still need to be heavily involved in the work to ensure that all parties are adequately fulfilling their obligations. Good contract management helps resolve problems as they arise and keeps the work progressing in the most efficient and effective manner

Self Assessment**Notes**

State whether the following statements are true or false:

11. Unbundling solid waste management services for assigning individual components to private companies and public agencies in Asansol and Durgapur, West Bengal
12. Politics can play both negative and positive roles in the process, and systems need to be in place so that political pressure helps improve service delivery.
13. If local infrastructure projects are to access commercial investment from financial institutions, capital markets, and private firms, it is important that services be delivered on a sustainable basis.
14. The need for determining the true cost of service provision after factoring in O&M costs, asset depreciation, environmental degradation, and social objectives.
15. Tariff subsidies are unjustified in the name of poor, although the poor are not usually connected to the city networks as legal users.

13.7 Policy and Regulatory Reform

Policy and regulatory structures vary across Indian states. Environmental infrastructure projects are affected by policies and regulations pertaining to the environment (e.g., water abstraction, pollution, and land planning and zoning), social issues (e.g., subsidies, slum rehabilitation, and land acquisition), and economics (e.g., grants, tariff-setting rules, and predictable revenue base).

Many of the state and central policy reforms that the FIRE (D) Program supported—including local government authority to enter into contracts, legal and practical recourse for contract changes, access to capital markets, municipal finance, reforms under the JNNURM program, and even slum upgrading—affect how infrastructure projects are structured. In many ways, project development is defined by the policy environment, and, therefore, the institution responsible for coordinating project development needs to be well versed in legal and regulatory issues. Since state governments, instead of central government, retain much of the regulatory and policy authority relating to local infrastructure development, the central government requested states to establish their own PPP-enabling legislation rather than create a national framework. Some states—Andhra Pradesh, Gujarat, and Punjab—introduced cross-sector PPP-enabling legislation. However, PPP provisions vary greatly across states and should still be considered fledgling. Under JNNURM, states have the option to pursue PPP reforms. If desired, one of the first steps, as articulated in the JNNURM PPP reform primer, is to establish enabling legislation in accordance with the Model Integrated Solution.

13.7.1 Commercially Viable Projects

The project development approach that the FIRE (D) Program recommends stems from pilot experiences over the past 17 years that have tested various institutional arrangements, all of which were embedded within the local Indian context. No matter whether the resulting project was fully public or privatized, the issues described in this chapter remain relevant. A project may not use outside investment, but following a commercially viable format for project development greatly increases the chances of successful implementation. No strict separation exists between the planning activities and the formal project development process discussed here. It is a continual and iterative process that depends on the level of detail required. The level of detail required at a city-wide planning stage is more conceptual because the purpose is to see how discrete projects fit together, how they contribute to the city's overall development, how local economic and land markets affect service demand, how to prioritize and phase long-term

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investments, and how to broadly finance the projects. The capital investment plan provides broad investment requirements based on conceptual scopes. During project development, the costs are detailed and reflect actual implementation requirements. For the most part, the FIRE (D) Program structured infrastructure projects within a municipal finance framework with recourse to the city's general revenue sources, in specified situations. In this framework, cost recovery for the infrastructure service is linked not only to a specific project's revenue streams (e.g., water user charges), but also to the overall municipal finances. Therefore, revision in property taxes, connection charges, and other non-related fees can still enhance project viability. The municipal finance framework is justifiable on the grounds of high economic rates of return of environmental infrastructure, due to considerable public health gains affecting the whole city. In contrast, financial rates of return based solely on project revenues tend to be unviable due to historically low tariff levels. A municipal finance approach needs to be combined with gradual tariff reforms to improve financial sustainability, with the recognition that user charges should at least pay for O&M costs.

13.8 Summary

- Companies incorporated in India and branches of foreign corporations are regulated by the Companies Act, 1956 (the Act).
- The Act, which has been enacted to oversee the functioning of companies in India, draws heavily from the United Kingdom's Companies Act and although similar, is more comprehensive.
- The Registrar of Companies (ROC) and the Company Law Board (CLB) both working under the Department of Company Affairs ensure compliance with the Act.
- Key issue regarding e-governance and m-governance is absence of any legal framework for mandatory electronic delivery of services in India (MEDSI).
- Indian government is planning to adopt and use mobile governance (m-governance) for governmental purposes.
- Unbundling solid waste management services for assigning individual components to private companies and public agencies in Asansol and Durgapur, West Bengal.
- Politics can play both negative and positive roles in the process, and systems need to be in place so that political pressure helps improve service delivery.
- If local infrastructure projects are to access commercial investment from financial institutions, capital markets, and private firms, it is important that services be delivered on a sustainable basis.
- The need for determining the true cost of service provision after factoring in O&M costs, asset depreciation, environmental degradation, and social objectives.
- Ironically, tariff subsidies are justified in the name of poor, although the poor are not usually connected to the city networks as legal users (despite often having the ability and willingness to pay).

13.9 Keywords

CLB: The Company Law Board

E-waste: E-waste is a popular, informal name for electronic products nearing the end of their "useful life."

EIA: Environmental Impact Assessment

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MEDSI: Mandatory Electronic Delivery of Services in India

ROC: The Registrar of Companies

TERI: The Energy and Resources Institute

13.10 Review Questions

1. What are e-wastes?
2. Discuss the principal forms of business organizations in India.
3. Environmental infrastructure projects are affected by policies and regulations pertaining to the environment. Discuss.
4. Discuss the M-governance in India.
5. Discuss the Regulatory Framework for Cloud Computing in India.
6. Explain the E-waste Law and Regulatory Framework in India.
7. What are demonstration projects?
8. "Politics can play both negative and positive roles in the process, and systems". Comment.
9. Discuss the e-waste management.
10. What are Commercially Viable Projects?

Answers: Self Assessment

- | | |
|-------------------------------------|---|
| 1. 1956 (the Act). | 2. United kingdom's Companies Act |
| 3. Department of Company Affairs | 4. mandatory electronic delivery of services in India (MEDSI) |
| 5. mobile governance (m-governance) | 6. project risk |
| 7. centralized | 8. budget allocations |
| 9. two-thirds | 10. disincentive |
| 11. True | 12. True |
| 13. True | 14. True |
| 15. False | |

13.11 Further Readings



Books

Clements/Gido, *Effective Project Management*, Thomson.

Clifford F. Gray and Erik W. Larson, *Project Management*, Tata McGraw Hill.

Dennis Lock, *Project Management*, Ninth Edition, Gower.

K. Nagarajan, *Project Management*, Third Edition, New Age International.

P.C.K. Rao, *Project Management and Control*, Sultan Chand & Sons.

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Prasanna Chandra, *Projects–Planning, Selection, Financing, Implementation, and Review*, Sixth Edition, Tata McGraw Hill.

Vasant Desai, *Project Management*, Second Revised Edition, Himalaya Publishing House.



Online links

www.col.org/SiteCollectionDocuments/SuccessProjMgt.pdf

www.freelancer.com/jobs/Project-Management/

www.mindtools.com/pages/main/newMN_PPM.htm

www.mpug.com/Pages/WhatisProjectManagement.aspx

www.nickjenkins.net/prose/projectPrimer

www.pma-india.org/ - *Trinidad and Tobago*

Unit 14: Project Management

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Objectives

After studying this unit, you will be able to:

- Know about the project management;
- Understand the deciding on a project;
- Know about the tools for developing schedules.

Introduction

To increase the output of your laboratory, you can either increase resources—by getting another grant and recruiting more people to work with you—or make better use of what you already have. One tool for achieving the latter is project management. Put simply, project management means allocating, using, and tracking resources to achieve a goal in a desired time frame. In a scientific setting, goals may include publishing a paper, obtaining a research grant, completing a set of experiments, or even achieving tenure. While keeping creativity intact, project management can help reduce wasted effort, track progress (or lack of it), and respond quickly to deviations from important aims. This unit highlights some of the techniques of project management and how you can use them.

14.1 What is Project Management

Project management is a series of flexible and iterative steps through which you identify where you want to go and a reasonable way to get there, with specifics of who will do what and when. The steps of project management are similar to the components of a grant proposal with a grant proposal, the probability of success is proportional to the thought that has gone into each part of the proposal. The reviewers as well as the funding agency staff want to see that you have

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thought things through. The same process also applies to other aspects of running your laboratory and planning your career.

14.2 Deciding on a Project

You may have an endless number of ideas for projects, but your resources (e.g., research funds, number of students and postdocs, time, and so on) are limited. The first thing you will have to do is decide which projects to pursue within the limits of your resources and considering your laboratory's mission.

For, example, you may want to obtain a second R01 grant because it will allow you to pursue another line of research and increase your chances of obtaining tenure.

The grant deadline is in nine months. You should ask yourself the following:

1. What experiments do I need to conduct to write a research paper and submit it for publication before the grant deadline?
2. Do you have enough time to obtain the necessary data?
3. Which students and postdocs could generate these data?

Once you have defined your overall objectives, how to get there, and from whom you need buy-in and participation, you can start the process of planning your project, working backwards from your stated objective:

Your project is to get an R01 funded within one and a half years.



Notes Project management is a series of flexible and iterative steps through which you identify where you want to go and a reasonable way to get there, with specifics of who will do what and when.

You will need to:

1. Obtain final data for the grant proposal (12 months)
2. Submit the grant with preliminary data (9 months)
3. Submit a paper for publication (6 months)
4. Integrate data and start writing a manuscript (5 months)
5. Complete the initial set of experiments (1 to 5 months)

Project management consists of planning each part of your project using the tools outlined in the sections below. One of the most important benefits of project management is that it helps you accurately anticipate how much time a project will take and what resources you will need. Even if some back-of-the-envelope thinking convinces you that a project is worth pursuing and that you can generate an initial set of publishable results for your grant in five months, you will need to plan each step more carefully to answer the following questions:

1. How long will the project really take?
2. Do we really have the people to do this?
3. Do we really have the funds to do it?
4. Can we get it done in time?

14.3 Getting Started

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The Statement of Work

The statement of work is a written document that clearly explains what the project is. It should include the following sections:

Purpose. This section should include the purpose and the objectives of the work.

Background: Why was the project initiated and by whom, what happens if it's not done, and what else relates to it?

Scope of work: What will you do?—A brief statement describing the major work to be performed.

Defining the Audience

Any of your audiences—the people and groups that have an interest in your project, are affected by it, or are needed to support it—can sink the entire enterprise if their needs are not considered. Early on, you should make a list of the project's audiences, both within your institution and outside it. Although you can do this in your head, a written list serves as a reminder throughout the project to touch base with these stakeholders as you proceed. A project can succeed only if everyone involved does his or her part.



Caution People who tell you what to do, defining to some degree what your project will produce and what constitutes success. As a principle investigator, you are the main driver for your research. Additional drivers might include competitors and collaborators in your field, the editors of scientific journals

Divide your audience list into three categories:

Drivers: People who tell you what to do, defining to some degree what your project will produce and what constitutes success. As a principle investigator, you are the main driver for your research. Additional drivers might include competitors and collaborators in your field, the editors of scientific journals (if they are advising you on what experiments should be done in order to get a manuscript published), and the study section reviewers of the research grants (if their feedback is shaping the course of your research project). If possible, keep these people abreast of how the project is going or consult with them before changing direction or branching out in a different area. For example, if an editor at Nature has requested specific experiments in a revised manuscript but you decide to do different ones that you think are more appropriate or easier to do given the expertise in your lab, you can contact the editor to make sure that the proposed experiments will satisfy his or her requirements.

Supporters: People who will perform the work or make the work possible (e.g., the students and postdocs in your lab as well as the program director for the organization that is funding the project). Make sure that these people are motivated to do the work and understand how what they are doing relates to achieving the overall scientific goal.

Observers: People who have an interest in your project but are neither drivers nor supporters. They are interested in what you're doing, but they're not telling you what to do or how to do it (e.g., other scientists working in your field, mentors, and potential supporters). It can be helpful to your career to let as many scientists as possible know what you have accomplished. This can be done by giving presentations at meetings and conferences, by asking colleagues to review a manuscript that you are preparing to submit for publication, or by sending scientists in your

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field copies of a paper you have published. Keep in mind that people who are familiar with your work, but who are not direct collaborators, will have to submit letters for your tenure.

These people might also invite you to give talks or suggest that you participate in study sections or become part of a meeting planning team.

As you work on the project, revise the list as necessary. Categorizing audiences is less difficult than it may look, and you don't have to start from scratch for every activity. Many of the same people are likely to be on your audience list over time for different activities.

Defining Who Does What and When

The Work Breakdown Structure (WBS) is an outline of all the work that will have to be performed for your project. To develop a WBS, start with broad work assignments, break them down into activities, and divide these into discrete steps. In the jargon of the project management field, an activity is a task that must be performed for your project and an event is a milestone marking the completion of one or more activities. You will want to list on your timeline resources and the people that will carry out the activities, so that you can successfully complete some milestone event—for example, getting a paper accepted, a grant funded, or a difficult technique reduced to practice.

The WBS is one of the most important elements of project management as it will help you schedule the project and its parts, estimate resources, assign tasks and responsibilities, and control the project. (For more information about developing this kind of outline, when you develop a WBS, think in one- to two-week increments. You probably wouldn't want to include detailed plans for activities that take less time (e.g., experiments to be done each day). However, the level of detail you include in your WBS depends, in part, on who is doing the work. Most undergraduates will need more detail than an experienced postdoc or technician. It may be useful to teach your trainees to think in this time- and resource-aware way, perhaps by, early in their stay in your lab, having them write out detailed weekly plans or design flow charts for how they intend to work through a difficult technical issue at the bench.

Question: Is project management a top-down or a mutual process?

Answer: It must be mutual. For the best possible outcome, you need both staff insights and "buy-in." Project management does not say, "Forget thinking and just do what I say." It's a process for identifying what to think about, not how to think about it.

Question: If I have experiments A, B, C, and D, is it reasonable to do detailed planning only for A first and deal with the others later?

Answer: That may be reasonable, but what if B isn't entirely dependent on A, and you could have done some work for B or any of the other experiments without waiting until A was done? Project management tools and software can help you see where timelines may differ.



Did u know? The WBS is one of the most important elements of project management as it will help you schedule the project and its parts, estimate resources, assign tasks and responsibilities, and control the project.

Self Assessment

Fill in the blanks:

1. The is an outline of all the work that will have to be performed for your project.

2. People who have an interest in your but are neither drivers nor supporters.
3. The WBS is one of the most important elements of project management as it will help you the project and its parts.

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14.4 Tracking the Work and the Resources

Complex projects require a series of activities, some of which will have to be performed in sequence and others in parallel. Project schedules outline the order in which activities are to be performed and estimates of how long each will take. In addition, for each step of the schedule, you will need to assign the necessary resources, including people, funds, equipment, supplies, facilities, and information.

To schedule your activities and resources, you will need to follow these steps:

1. Identify activities and events (from the WBS).
2. Identify constraints (from the statement of work).
3. Determine the durations of different activities and, if more than one person will be involved, who will be doing them.
4. Decide on the order of performance.
5. Develop an initial schedule.
6. Revise your schedule as necessary.

Tools for Developing Schedules

You have probably seen some of the tools for developing schedules, timelines, flow charts, and so on, before. Here are some popular ones:

Key events schedule: A table showing events and target dates for reaching them (remember that events are milestones signaling the completion of one or more activities).

Activities plan: A table showing activities and their planned start and end dates.

Gantt chart: A graph consisting of horizontal bars that depict the start date and duration for each activity.

PERT chart: A diagram in which activities are represented by lines and events on the nodes (typically depicted as circles or bubbles).

The key events schedule and the activities plan display dates better; the Gantt and PERT charts give a better overview of how long activities take and where they coincide. Regardless of which format you use, take the time to develop a schedule you have a reasonable chance of meeting. Think realistically and estimate how long each step will take, how many uninterrupted hours you have available during the day, and how other demands on your time will affect what you or your lab can get done.

To determine how long a very complex process may take, think about similar things you've done before. Flip through your notebook or calendar and try to remember—how many hours did it really take you to write, edit, get feedback on, make figures for, revise, revise again, and submit that last paper or grant? Try to be conservative in your estimates.



Task Discuss the project management software.

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Self Assessment

State whether the following statements are true or false:

4. A circle consisting of horizontal bars that depict the start date and duration for each activity.
5. PERT chart is a diagram in which activities are represented by lines and events on the nodes (typically depicted as circles or bubbles).
6. The key events schedule and the activities plan display dates better; the Gantt and PERT charts give a better overview of how long activities take and where they coincide.

14.5 Project Management Software

If you are keeping track of a simple project involving only one or two individuals, you can probably use a network diagram drawn on a board or in an electronic document. But as the number of projects and responsibilities you juggle grows, you may want to make use of one of the many software packages available. They can help you spot, for example, resource conflicts (such as one person assigned to three overlapping activities) and identify which activities can be delayed to accommodate that problem without jeopardizing the schedule. Good software helps you brainstorm the organization of activities on screen, create a WBS, link activities, develop a schedule, identify resources, maintain information on progress, and generate reports. When you make a change, the software reflects the impact of that change throughout the project.

Microsoft Project, a program that seamlessly integrates with Microsoft Office, is a popular choice. The software package lets you enter any number of tasks and schedule them. You can then view the data using multiple formats (e.g., Gantt charts or PERT diagrams). You can also enter cost for each resource and the software will automatically track the spending of the project. Other popular choices are the packages Act! (Symantec Corp.) and Now Up-to-Date (Qualcomm, Inc.).

After some short training on these software packages, it is straightforward to build new plans. Several fields, including construction and some areas of business management, make extensive use of this kind of software. You may be able to find undergraduates, especially in engineering or business schools, who would be eager to polish their skills (and get a line for their résumé) by doing the grunt work needed to move your established pencil-and-paper plans onto the computer.

Controlling the Project

Effective project management demands that the components of a project be constantly monitored and revised with new information. The principle investigator typically plays this role in addition to the following tasks:

1. Championing the project for the project audience (e.g., through seminars and informal updates to supporters).
2. Clearing away obstacles for the project team (such as minimizing other responsibilities for the team members and providing a supportive and comfortable work environment).
3. Providing resources, by way of funds, access to essential equipment, and technical skills.

4. Communicating the project vision to keep the team motivated and focused.
5. Communicating with the department chair, NIH, journal editors, and the external collaborators.

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Keeping Your Work on Track

It is hard to predict how the course of a project will run. Flexible planning is needed to help you deal with the unexpected and still keep your many projects moving.

14.6 Project Management

14.6.1 A Real-life Example

It can be understood in the following manner:

The Statement of Work

It consists of the following:

Section 1: Purpose

Background: Theresa, a postdoc in the laboratory, wants to examine the possible role for alterations in the gene Sumacan in prostate cancer. She noted that Sumacan, which encodes a growth factor receptor, maps to a genetic region involved in human prostate cancer. Current studies in the lab focus on the role of Sumacan in brain tumors. Bob, a postdoc, is screening drugs that block Sumacan function; Ming Li, a graduate student, is elucidating the functional pathways Sumacan is involved in; and Steve, a graduate student, is performing a mutational analysis of the Sumacan gene. These same studies can be applied to prostate cancer, thereby opening up potential avenues for funding through prostate cancer foundations.

Scope of work: Examine whether the functional pathway for Sumacan is present in human prostate cancer cells.

Compare the expression of Sumacan in normal human prostate tissues and prostate cancers, and correlate expression levels with clinical outcome in prostate cancer. Identify mutations in Sumacan in patients with prostate cancer.

Strategy: Each person in the lab is already working on different aspects of Sumacan biology in brain tumors. In each case, the work will be applied to prostate cancer cell lines that we will obtain from Mike, a colleague in our department. We have identified two additional potential collaborators—Rajiv, a pathologist who studies human prostate tissues and cancers, and Kathy, a geneticist who studies human prostate cancer families. We will use funds from our current R01 grant to obtain preliminary findings. We plan to use these findings to obtain a second R01 grant to the laboratory.

Section 2: Objective

Statement: Investigate the possible role of Sumacan in prostate cancer.

Measure 1: Our experiments will provide preliminary evidence to either support or deny a role for Sumacan in prostate cancer.

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Specifications: The experiments we carry out will answer the following questions:

1. Is Sumacan expressed in the prostate?
2. Is Sumacan expressed in prostate cancer?
3. Is there a difference between the expression of Sumacan in the prostate and in prostate cancer?

Measure 2: The results obtained by these experiments will generate publications and grants.

Specifications: At least two (one for each postdoc working on the project) research articles will be accepted for publication in a top-tier research journal in the field.

A request to NIH for funds to continue the research begun receives a percentile score on first-round submission of at least 25 percent and subsequent funding on the resubmission.

Measure 3: People in the field are aware of our research.

Specifications:

1. We will receive several requests for information about the research.
2. We will publish at least two research articles in the scientific literature.
3. We will present the research results at at least two conferences in one year.

Section 3: Constraints

Limitations

The NIH proposal is due June 1, 2007. This means that the first research manuscript must be submitted for publication by approximately January 1, 2007, and accepted by mid-April 2007. Our lab has limited funds to cover the generation of preliminary data, which means that productivity has to be reviewed monthly.

Needs

Our lab needs to be able to grow prostate cancer cells. Our lab needs to be able to handle human prostate cancer specimens.

Section 4: Assumptions

The current research team will be willing and able to perform prostate cancer studies in addition to their brain tumor studies. The collaborators we have identified will be willing and able to work with our group or will provide the name of another person who wants to collaborate.

Self Assessment

Fill in the blanks:

7. The research team will be willing and able to perform prostate cancer studies in addition to their brain tumor studies.
8. The proposal is due June 1, 2007.
9. A request to NIH for funds to continue the research begun receives a percentile score on first-round submission of at least
10. After some short training on these packages, it is straightforward to build new plans.



Case Study

Every Beginning is Difficult

Beginning of 2008, Hui Bing was selected to participate in the first wave of Lean Six Sigma training and project work. After being nominated she did some readings on the web to figure out what Lean Six Sigma is about. The result was sobering: Lean Six Sigma is a tedious, time-consuming exercise that is based on lots of data and has been applied in preferably manufacturing environments. Equipped with a “can do” mindset, she attended the training and started working on a project together with her team members to increase efficiency in the outbound operations.

“Nothing is too small to know, and nothing is too big to attempt. Sometimes we give up at the exact moment when changes are about to occur for the better. If you know you are doing the right thing, keep going and you will get the results you are looking for.” Xie Hui Bing, Operations Manager at Schenker Singapore (Pte) Ltd.

The process became thornier when she tried to involve her warehouse staff in the project work. On one hand, they were interested in improving their own work environment. On the other hand however, every warehouse staff were scared of losing their income due to the project’s benefits in overtime reduction. It took her a lot of courage and leadership skills to navigate through the early phase of the project work.

Over time, Hui Bing and her team members as well as her warehouse staff got captivated by a methodology that made sense, even in constantly varying logistics processes. Understanding the value stream and optimising the flow of the outbound operations – from receiving the order through picking and packing until ready-to-ship, revealed plenty of room for improvements. At the end, her team developed more than twenty improvement ideas of which seven were selected for implementation in phase one, leading to significant increase in efficiency, i.e. higher throughput in lesser resources.

Her project was successfully completed in 2008 and she was tasked to present it at an all-staff communication session together with the other pilot Green Belt, Rhoger Tan, Operations Manager at Schenker Singapore. Since then, Hui Bing has been mentoring another Green Belt on his project to successful completion.

In January 2009, Katherine and Serene were listening to Hui Bing’s and Rhoger’s presentations. The first impression was very encouraging; both pilot teams were able to pull it off, i.e. on top of their daily workload, they learnt and applied some powerful new tools to their respective work processes, developed solutions and delivered remarkable results in processes and cost savings.

Not much later, the two together with a group of other Green Belts were commissioned to take on a Lean Six Sigma project for their respective operations. Whilst both were still under the very positive impression of the pilot runs, Katherine had only one fear: “I cannot do it because I don’t know how to deliver savings in my process!” Serene had another concern: “I do not like statistics. I will not be able to use these tools!”

Master Black Belt, KH Tan, Lean Six Sigma Specialist at Schenker Singapore, responsible for Lean Six Sigma deployment could calm them down. He assured all second wave Green Belt candidates that the focus of Lean Six Sigma is not all about statistics. It is much more about analysing and improving business processes, with some proven tools to deliver results for businesses, stakeholders and customers. Whilst statistics can be helpful, it does not mean that Lean Six Sigma Green Belts become statisticians. Often enough, one of a

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team member will be able to help out. Using the power of the team of different people with complementary strengths helps through personal despairs.

“A major success factor in Lean Six Sigma is your ability to involve your staff. They know best how to improve their process. You just need to motivate them to tell you.” Katherine Yap, Operations Manager at Schenker Singapore (Pte) Ltd

KH also made clear that the amount of savings a project delivers depends on the scale of the operations. In some projects, the benefits are not solely in terms of cost savings, but also in achieving higher customer satisfaction and retention.

A general pitfall of Lean Six Sigma work lies usually in the scoping of project. Katherine started off with the target of improving both the inbound and outbound processes at the same time. After the first training session and discussions with her coach, she was convinced to begin smaller and to tackle the outbound processes first.

Although she had to do much of the project work after office hours, she could overcome fears and obstacles, was able to involve her initially reluctant warehouse staff and eventually delivered results. Now the warehouse is well organised with a reduced order picking time and even on financial savings. The best reward however, lies in the compliment she received from her customer, “Katherine, you seem to have a brand new warehouse!” Throughout the entire assignment, Katherine has involved her team member Teh Ngee Hooi, Customer Service Executive at Schenker Singapore (Pte) Ltd such that now Ngee Hooi is able to roll out her own project for improving of the inbound processes.

“Use the power of data to convince others of changes necessary to deliver better results in your operations.” Serene Kwan, Senior Operations Executive at Schenker Singapore (Pte) Ltd

Serene’s statement after she got “volunteered” to participate in the second wave of Lean Six Sigma was somehow like “no choice.” However, some interest was stirred up by the impressive job, Hui Bing and Rhoger could proudly present. Contrary to her apprehension at the beginning, she was able to master the tools. More importantly, she pulled her team together to deliver a successful project with dramatically reduced defects through standardisation of workflows. Her work was crowned by a striking presentation to the management.

Now that the foundation is laid, the initial concerns and fears gave way for organisational courage to embrace the new methodology in additional waves of improvement projects. Reduced turnaround time for inventory, eliminated defects and significant increase in service level are the most noticeable results for DB Schenker’s customers.

This success is made up of some simple rules for change management: start small. Trust people with the right mindset. Be persistent. Generate credible success stories. Publish accomplishments. Celebrate success!

Question

Analyse the case and discuss the case facts.

Source: <http://www.projectsmart.co.uk/every-beginning-is-difficult.html>

14.7 Summary

- To increase the output of your laboratory, you can either increase resources.
- Project management is a series of flexible and iterative steps through which you identify where you want to go and a reasonable way to get there.

- People who tell you what to do, defining to some degree what your project will produce and what constitutes success.
- As a principle investigator, you are the main driver for your research.
- People who have an interest in your project but are neither drivers nor supporters.
- The work breakdown structure (WBS) is an outline of all the work that will have to be performed for your project.
- The WBS is one of the most important elements of project management as it will help you schedule the project and its parts, estimate resources, assign tasks and responsibilities, and control the project.

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14.8 Keywords

Activities plan: A table showing activities and their planned start and end dates.

Gantt chart: A graph consisting of horizontal bars that depict the start date and duration for each activity.

Key events schedule: A table showing events and target dates for reaching them (remember that events are milestones signaling the completion of one or more activities).

PERT chart: A diagram in which activities are represented by lines and events on the nodes (typically depicted as circles or bubbles).

14.9 Review Questions

1. What is project management?
2. Explain how to decide on a project.
3. Describe the defining on the audience.
4. Divide your audience list into three categories and explain it.
5. Explain the tracking the work and the resources.
6. What are the tools for developing schedules?
7. What do you know about the project management software?
8. Give a real-life example on project management.

Answers: Self Assessment

- | | |
|---------------|--------------|
| 1. WBS | 2. Project |
| 3. Schedule | 4. False |
| 5. True | 6. True |
| 7. Current | 8. NIH |
| 9. 25 percent | 10. Software |

14.10 Further Readings



Books

Clements/Gido, *Effective Project Management*, Thomson.

Clifford F. Gray and Erik W. Larson, *Project Management*, Tata McGraw Hill.

Dennis Lock, *Project Management*, Ninth Edition, Gower.

K. Nagarajan, *Project Management*, Third Edition, New Age International.

P.C.K. Rao, *Project Management and Control*, Sultan Chand & Sons.

Prasanna Chandra, *Projects-Planning, Selection, Financing, Implementation, and Review*, Sixth Edition, Tata McGraw Hill.

Vasant Desai, *Project Management*, Second Revised Edition, Himalaya Publishing House.



Online links

www.col.org/SiteCollectionDocuments/SuccessProjMgt.pdf

www.nickjenkins.net/prose/projectPrimer.p

www.pma-india.org/ - Trinidad and Tobago

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