The Essentials of Project Management

Third Edition

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GOWER

1 *Introduction to Project Management*

All projects share one common characteristic – the projection of ideas and activities into new endeavours. The ever-present element of risk and uncertainty means that the events and tasks leading to completion can never be accurately foretold. Examples abound of projects that have exceeded their costs by enormous amounts, finishing late or even being abandoned before completion. Such failures are far too common and are seen in all kinds of projects in industry, commerce and the public sector.

The purpose of project management is to predict as many of the dangers and problems as possible and to plan, organize and control activities so that projects are completed successfully in spite of all the risks. This process should start before any resource is committed and must continue until all work is finished. The primary aim of the project manager is for the result to satisfy the project sponsor or purchaser and all the other principal stakeholders within the promised timescale and without using more money and other resources than those that were originally set aside or budgeted.

DIFFERENT TYPES OF PROJECTS

The principal characteristic of a project is its novelty. It is a step into the unknown, fraught with risk and uncertainty. No two projects are ever exactly alike: even a repeated project will differ from its predecessor in one or more commercial, administrative or physical aspects. However, I find it convenient to identify four different types of projects.

Type 1 projects: civil engineering, construction, petrochemical, mining and quarrying

Projects in this category spring to mind whenever industrial projects are mentioned. One common feature is that work must be conducted on a site that is exposed to the elements and usually remote from the contractor's head office. These projects are thus open to public gaze. They incur special risks and problems of organization. They may require massive capital investment and they deserve rigorous management of progress, finance and quality. Operations are often hazardous so that health

and safety aspects demand special attention, particularly in work such as heavy construction, tunnelling and mining.

For very large industrial projects the funding and resources needed can be too great for one contractor to risk or even find. The organization and communications are therefore likely to be complicated by the participation of many different specialists and contractors, possibly with the main players acting together through a consortium or joint venture company established specifically for the project.

Type 2 projects: manufacturing

Manufacturing projects result in a piece of mechanical or electronic equipment, a machine, ship, aircraft, land vehicle or some other product or item of specially designed hardware. The finished product might be purpose-built for a single customer but internal research and development projects for products to be sold in all market sectors also fall into this manufacturing category. Manufacturing projects are usually conducted in a laboratory, factory or other home-based environment where the company should be able to exercise on-the-spot management and provide an optimum environment in which to do and manage the work. Of course, these ideal conditions do not always apply. Some manufacturing projects involve work away from the home base, for example in installing and commissioning a machine or equipment on a customer's premises, customer training and post-project service and maintenance.

More difficult is the case of a complex product that is developed and manufactured by a consortium of companies, sometimes with members based in different countries. An example is aircraft production, where the engines might be developed and manufactured in one country, the wings in another and the final assembly taking place in a third country. Such international manufacturing projects are prone to higher risk and difficulties in control and coordination arising through organizational complexity, national rivalries, contracts, long-distance communications, multiple languages and conflicting technical standards.

Type 3 projects: IT projects and projects associated with management change

This class of project proves the point that every company, whatever its size, can expect to need project management expertise at least once in its lifetime. These are the projects that arise when companies relocate their headquarters, develop and introduce a new computer system, launch a marketing campaign, prepare for a trade exhibition, produce a feasibility or other study report, restructure the organization, mount a stage show, or generally engage in any operation that involves the management and coordination of activities to produce an end result that is not identifiable principally as an item of hardware or construction.

Most not-for-profit organizations, including national and local government departments, professional associations, charities and disaster relief agencies, conduct projects that fall into this category of management projects.

Although management projects do not usually result in a visible and tangible creation such as a piece of hardware, much often depends on their successful outcome and they can require enormous investment. There are several well-known cases where, for instance, failure to implement a new computer system correctly has caused serious operational breakdown exposing the managers responsible to public discredit. Effective project management is at least as important for these projects as it is for the largest construction or manufacturing project.

Type 3 projects may be associated with, or even depend upon, Type 1 or Type 2 projects. For example, if a company decides to relocate to a new purpose-built office, the overall relocation project is itself a Type 3 management project but its success will depend also on the Type 1 project needed to construct the new building. Thus projects of different types may be associated with each other in a company's project programme or project portfolio.

Type 4 projects: projects for pure scientific research

Pure scientific research projects (not to be confused with research and development projects) are a special case. They occasionally result in dramatically profitable discoveries. Conversely, they can consume vast amounts of money over many years yet yield no practical or economic result. Research projects carry the highest risk because they attempt to extend the boundaries of human knowledge. The project objectives are usually difficult or impossible to define and there may be no awareness of the possible outcome. Therefore, pure research projects are not usually amenable to the project management methods that can be applied to industrial, manufacturing or management projects.

Some form of control over pure research projects must, however, be attempted. Money and other resources cannot be spent without any form of monitoring or restraint. Budgets have to be set in line with available funding. A sensible method for controlling a pure scientific research project is to conduct regular management reviews and reassessments of the potential value of the project. At each review, a decision can be taken stop the project (known colloquially as 'pulling the plug') or release new funding to allow it to continue at least until the next review. Although this can be unsettling for the scientists involved, the project sponsor is not expected to pour money forever into a vast hole. This procedure, where continued project funding is dependent upon regular reviews, is known as stage-gate control.

Although the research activities might themselves lie outside the scope of familiar project management methods, the provision of accommodation, communications, equipment and research materials can constitute Type 1, 2 or 3 capital investment projects to which proper project management can and must be applied.

PROJECT LIFE CYCLES AND LIFE HISTORIES

Most authorities and writers, when they talk about the life cycle of a project, refer to the period that begins with the authorization of work on the project (or signing of

a customer-contractor contract) and ends with the handover of the desired product to the customer. Although that view can be too simplistic, it is the part of projects that is of most concern to project managers (and which is covered in this book). Figure 1.1 shows that the activities which take place during this period form a true cycle because they begin and end with the customer.

Travelling clockwise round the cycle reveals a number of steps or phases. In practice, these phases often overlap each other so that the boundaries between them are blurred. For example, some project purchasing and fulfilment work can usually start well before the design phase is complete.

The view of a project life cycle shown in Figure 1.1 is too simplistic for most projects because it ignores everything that happens before the start of actual work and takes no account of what happens to the project after its delivery to the customer. For a more complete picture we have to consider not only the project life cycle as seen by the project manager but also the entire life history of the project from its initial conception to final death and disposal. Figure 1.2 shows this more complete view of a project life history.

Many writers limit their account of the project life cycle or life history to phases six to 13 because these are the phases that usually come under the control of the project manager. They constitute the most active period of the project life history (sometimes called the fulfilment period). This period corresponds in most respects to the life cycle in Figure 1.1. The chapters in this book are arranged as far as possible in this life cycle sequence.

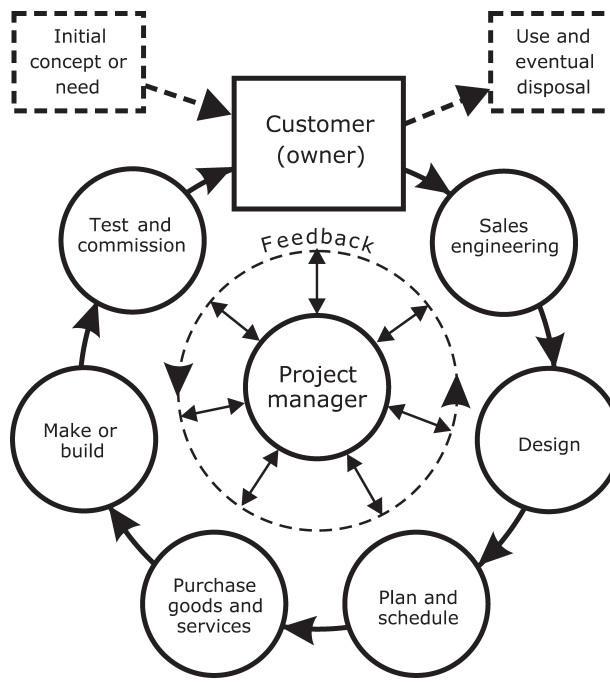

Figure 1.1 The active part of a project life cycle

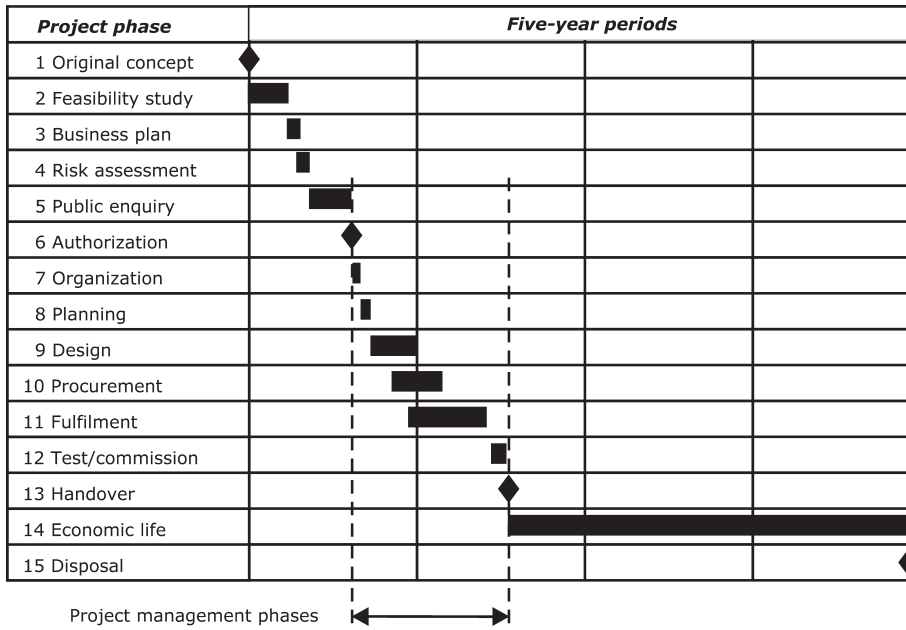

Figure 1.2 The project life cycle (life history) of a larger project

FACTORS FOR ASSESSING PROJECT SUCCESS OR FAILURE

The success of the contractor and the project manager will usually be judged according to how well they achieve the three primary objectives, which are:

1. Project completion within the cost budget;
2. the project delivered or handed over to the customer on time;
3. good performance, which requires that all aspects of the project are finished in accordance with the customer's project specification.

Factors necessary for achieving these three objectives include the following:

- Good project definition and a sound business case;
- appropriate choice of project strategy;
- strong support for the project and its manager from higher management;
- availability of sufficient funds and other resources;
- firm control of changes to the authorized project;
- technical competence;
- a sound quality culture throughout the organization;
- a suitable organization structure;
- appropriate regard for the health and safety of everyone connected with the project;
- good project communications;

- well motivated staff;
- quick and fair resolution of conflict.

These issues are all important for good project management.

An apt definition of a successful project is that it should satisfy all the stakeholders. This is an ideal that might be difficult to achieve because stakeholders often view a project from different perspectives but it is a worthwhile goal.

RELATIONSHIP BETWEEN THE THREE PRIMARY OBJECTIVES

It is occasionally necessary to identify one of the three primary objectives as being of special importance. This emphasis can affect the priority given to the allocation of scarce resources and the way in which management attention is concentrated. It can also influence the choice of project organization structure (discussed in Chapter 5).

A management decision to place greater emphasis on achieving one or two of these objectives must sometimes be made at the expense of the remaining objectives. The outcome of such a trade-off decision can be indicated by placing a spot or blob within a triangle which has one primary objective placed at each of its corners (shown in Figure 1.3). For example, if cost is the greatest consideration, the blob will be placed in the cost corner. If all the objectives are regarded as equal (balanced), the blob will be put in the middle of the triangle.

A project for a charitable organization with limited funds would have to be controlled very much with budgets in mind so that costs must be the project manager's chief concern. Industries such as aerospace and nuclear power generation have to place high emphasis on safety and reliability so performance should be the most important objective. A project to set-up and stock a stand at a trade exhibition, for which the date has been announced and the venue booked, is so dependent on meeting the time objective that it might be necessary to overspend on budgets to avoid missing the date.

The quality/cost relationship

It is a mistake to believe that there can be a simple and acceptable trade-off between quality and cost. Those who promote total quality management argue, correctly, that quality can be achieved without extra cost. However, there is an even more fundamental reason why quality can not be downgraded or compromised to save money. This becomes clear when we accept the definition of quality as a service or product that is 'fit for the purpose for which it was intended'. No contractor or project manager should ever contemplate a result that is not 'fit for purpose'. Therefore downgrading quality is not an option. That is why performance or level of specification is placed at the corner of the triangle of objectives rather than quality.

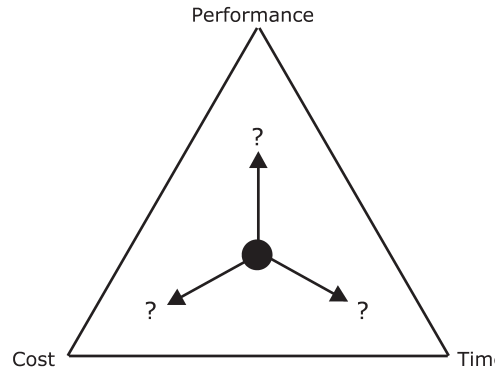

Figure 1.3 The triangle of objectives

This distinction between quality and specification is illustrated by the following example. Suppose that the initial estimates for a new building are too high and that construction costs must be reduced. One option might be to build on relatively simple foundations instead of using deep sunk piles, which could save thousands of pounds. But if the ground conditions demand piling for the building to be safe, that cost-saving option is ruled out on the grounds of reliability and safety. It would compromise quality and is not a viable option. The building would not be fit for its intended purpose.

However, suppose that the same developer reviews the specification for interior finishes and finds that marble floors could be replaced with carpeted floors at a substantial cost saving. The floors would still be serviceable and fit for purpose. Carpeting would, therefore, be an option that would not compromise quality. Quality has not been changed but the specification has.

The time/cost relationship

TIME IS MONEY!

(Benjamin Franklin, in *Advice to a Young Tradesman*, 1748).

There is usually a direct and very important relationship between time and money. If the planned timescale is exceeded, the original cost estimates are almost certain to be overspent. A project costs money during every day of its existence, working or non-working, weekday or weekend, from day one of the programme right through until the last payment has exchanged hands. These costs arise for a variety of reasons, some of which will now be explained.

The effect of project delays on direct costs

The variable or direct costs of labour and materials are time-related in several ways. Cost inflation is one factor, so that a job started and finished later than planned

might cost more that the original estimate because of price rises in materials and increases in wages, salaries and other costs.

There are other less obvious causes where late working implies inefficient working, perhaps through lost time or waiting time (often the result of materials shortages, missing information or poor planning, communications and organization). If any project task takes longer to perform than its planned duration, it is probable that the budgeted man-hours will be exceeded. This is true not only for a single task but also for the project as a whole.

The effect of project delays on indirect (overhead) costs

The fixed or overhead costs of management, administration, accommodation, services and general facilities will be incurred day by day, every day, regardless of work done, until the project is finished. If the project runs late these costs will have to be borne for a longer period than planned. They will then exceed their budget.

The effect of project delays on the costs of financing

Another important time-related cost is financing. Where the contractor has an overdraft at the bank or relies on other loan financing, interest has to be paid on the loan. Even if the contractor finances the project from available funds there is still a notional cost of financing equivalent to the interest or dividends that the same funds could have earned had the contractor invested the money elsewhere (such as in a bank deposit account). If a project runs late, the financing period is extended and the amount of interest or notional interest payable must increase correspondingly.

Much of the money for a large project is likely to be invested in work in progress as the project proceeds. This work in progress includes not only the tangible results of a project, such as construction or manufacture, but also intangible elements such as planning and engineering or design. In many projects the contractor can only charge the customer for work that can be certified as finished. For example, in construction projects the amount of work completed usually has to be inspected and certified by an independent quality surveyor or engineer before it can be billed to the customer. The customer will not pay without the receipt of certified invoices to show that the work claimed has been done. Certified invoices are often linked to planned events or milestones. If a milestone has not been reached, a certified invoice cannot be issued. Payment of the contractor's revenue is then delayed which means that the contractor must continue to finance the mounting costs of the project. The contractor could then suffer severe cash flow problems and even financial ruin.

Cost penalties

Some contracts contain a penalty clause which provides the customer with the sanction of a cost penalty against the contractor for each day or week by which the contractor fails to meet the contracted delivery obligation.

The total cost effect of project delays

All these time/cost considerations mean that delays on a project can easily cause additional costs amounting to thousands of pounds per day. It is clear that if work can be managed so that it proceeds without disruption against a sensible and achievable plan, much of the battle to control costs will have been won.

PERCEPTIONS OF PROJECT SUCCESS OR FAILURE BEYOND THE THREE PRIMARY OBJECTIVES

Most project managers are expected to complete their projects so that they satisfy the three primary objectives of time, performance and cost. These are usually the most important factors that drive the project contractor and they should align with the foremost expectations of the project owner. Most project management procedures (and this book) are directed towards achieving these goals which could be summarized as delighting the customer while creating a commercial success for the contractor. In this context the contracting organization and the customer are both primary stakeholders in the project.

However, most projects have to satisfy more than two primary stakeholders. For example, a bank that has provided loan finance for a project will have a keen interest in whether the project succeeds or fails. There will always be people and organizations who, while not being principal stakeholders, nonetheless have an interest in how the outcome of a project might affect them. Subcontractors and suppliers are an example. Staff working on a project have a stake in the outcome because project success or failure can (apart from contributing to job satisfaction) have implications for their future employment and careers.

Identifying and ranking the stakeholders

Stakeholders are the people and organizations who affect, or will be affected by, the project. The principal stakeholders in most projects are as follows:

1. The customer or client;
2. the contractor that must perform all the project tasks, either directly or through suppliers and sub-contractors;
3. the investor – for small projects the customer might be able to finance the project without external help but larger projects often need financing support from one or more banks or from other sources such as shareholders.

In management projects and all other projects carried out internally within a company or group of companies, the company is the customer or client and the internal department principally responsible for carrying out the work is effectively the contractor.

In some projects the initial customer purchases the project with the intention of selling it on to a third party. A common example is the property developer who commissions a new building from a contractor with the intention of selling it on (or leasing it) to occupiers. In that case the occupiers are sometimes known as the project end-users. Another example would be a customer that orders a batch of specially manufactured goods for selling on to retail customers. Those retail customers would also be end-users.

The range and nature of stakeholders will vary greatly from one project to another but the principle of stakeholder identification can be illustrated by an example. Suppose that a project has been proposed to redevelop a derelict urban area. This project will provide a shopping mall, offices, cinema and other leisure facilities, new roads and so on. The primary stakeholders for this project will certainly include the main project contractor and the project owner. The banks or other organizations financing the project will also have a considerable primary interest in the project's success or failure. Not least of the stakeholders are those who hold shares or have otherwise invested in participating companies that, by accepting an element of risk, stand to make a profit or loss from the project.

Sub-contractors, suppliers, staff, artisans and labourers can all be considered stakeholders although these could be placed in the second rank. Intended occupiers of the shops, offices and other premises also have a stake in the project.

There are others who will be dependent on the secondary stakeholders. These are the wholesale suppliers of merchandise to be sold in the new shops, service staff such as car park attendants, shop and office workers, companies expecting to provide security, cleaning and maintenance services and so on.

Public transport organizations must consider how the development will affect their passenger numbers: some of their existing services might need to be changed to suit the new travel patterns (and take advantage of the new business generated).

Then there are the various regulatory authorities such as the local building inspectors, planning office and many other official organizations. These are all stakeholders whose decisions and actions can affect the project.

People living near the proposed development will benefit from the new shopping and leisure facilities but might resent the inconvenience of construction works and the prospect of increased traffic and noise when the new premises start to function. Parents might be concerned that their schoolchildren will have to cross streets that are busier and more hazardous. Motorists and other road users will be interested in how the new road layouts will affect their journeys. The new entertainments facilities will provide wider opportunities for live artistes.

This discussion could be carried on at length to identify still more stakeholders. Some will have power to influence the project while others will be able only to voice opinions. All stakeholders might be ranked (primary, secondary, tertiary and so on) according to the power that they can wield and the impact that the project will have on them.

BENEFITS REALIZATION

In most industrial and manufacturing projects the project owner should start to realize the expected benefits immediately or shortly after the project is successfully finished and handed over (Phase 13 in Figure 1.2). A chemical plant, once successfully commissioned, should be capable of producing saleable product. A successful new office building should provide a pleasant working environment that can immediately improve staff satisfaction (and thus productivity). However, business change and IT projects can be different because their most significant benefits tend to be realized much later in the project life history, during the first months (or even years) of the period shown as Phase 14 in Figure 1.2.

Consider, for example, a large-scale project that is intended to replace and standardize the customer service and invoicing systems of all the companies in an international group. The execution phase of the project is finished when the IT designers have developed, documented and tested the software. If the IT was contracted out, the IT specialist contractor might have had a successful project outcome with all three primary objectives of cost, performance and time satisfied at the time of hand over to the user company. However, there is much more to the success of a management change project than the technical excellence and performance of the IT. It is only when the new system is up, running and accepted by the managers and staff of all the companies in the group that the project owner can begin to regard the project as a success. Implementing new systems and procedures can be very difficult in any organization where the staff resist change, have understandable concerns about possible redundancies, come from a rich mixture of different cultures or resent having to cope with all the teething problems that significant changes create.

In recent years these difficulties have led to new ways of assessing and managing the benefits realization of management change and IT projects. It is now recognized that the benefits realization process should start during early project definition by establishing benchmarks that can be put into place in the business plan. These benchmarks have some similarity with the milestones set in the project execution plans of all projects but for management change and IT projects there are two important differences:

1. The most important benchmarks often occur some time after initial handover and commissioning of the project from the contractor to the customer (remembering that the contractor and owner can be in the same company).
2. Each benchmark must be directly associated with a cash inflow, cost saving or other real benefit that can be tracked to a favourable entry in the company's accounts or management reports.

Benefits realization is appreciated among the more enlightened management fraternity as the most important driver in a management change or IT project so that the intended long-term benefits are kept in the minds of the project manager and the other project stakeholders.

There is no reason why some of these new and specialized benefits realization management processes should not be applied or adapted for use in industrial and management projects.

ORGANIZATIONS REPRESENTING THE PROFESSION OF PROJECT MANAGEMENT

The International Association of Project Management (IPMA)

The profession of project management is represented by the International Association of Project Management (IPMA) which is European based but has branches internationally. The UK corporate member is the Association for Project Management (APM) with the following headquarters address:

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The Project Management Institute (PMI)

Based in the US, the PMI is the world's largest project management association, with branches (which they call chapters) in many countries. For more information, contact PMI at:

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