independent and could be dealt with individually. At times, the projects in a portfolio are not independent. Dickinson et al. (2001) describe a model developed for the Boeing Company that optimizes a portfolio of interdependent product improvement projects. The model includes risk as well as cost/benefit analysis.

2.8 PROJECT PROPOSALS

The topic of proposals and bidding on proposals is highly relevant to the PMBOK knowledge area (9) of *Procurement*. Further discussion of procurement is included in Sections 5.2 and 6.5.

Now that project selection methods have been discussed, it is appropriate to consider what documentation is needed to evaluate a project that is being considered. The set of documents submitted for evaluation is called the *project proposal*, whether it is brief (a page or two) or extensive, and regardless of the formality with which it is presented. Several issues face firms preparing proposals, particularly firms in the aerospace, construction, defense, and consulting industries. These are:

1. Which projects should be bid on?
2. How should the proposal-preparation process be organized and staffed?
3. How much should be spent on preparing proposals for bids?
4. How should the bid prices be set? What is the bidding strategy? Is it ethical?

Generally, these decisions are made on the basis of their overall expected values, perhaps as reflected in a scoring model. In-house proposals submitted by a firm's personnel to that firm's top management do not usually require the extensive treatment given to proposals submitted to outside clients or agencies such as the Department of Defense. For the Department of Defense, a proposal must be precisely structured to meet the requirements contained in the official Request for Proposal (RFP) or Request for Quotation (RFQ)—more specifically, in the Technical Proposal Requirements (TPR) that is part of the RFP or RFQ.

The construction and preparation of a proposal to be submitted to the government or other outside funder is beyond the scope of this book. Fortunately, the subject has been well treated by Knutson (1996a, 1996b, and 1996c) in a three-part paper that begins with a discussion of the decision whether or not to seek some particular business. The series then covers the composition of a team to write the proposal and Knutson's view of how to structure, price, and submit the proposal. It should be noted that customs, practices, rules, and laws concerning proposals vary from nation to nation (e.g., see Jergeas et al., 1997).

All proposals should begin with a short summary statement (an "Executive Summary") covering the fundamental nature of the proposal in *minimally technical language*, as well as the general benefits that are expected. All proposals should be accompanied by a "cover letter." Roman (1986, pp. 67–68) emphasizes that the cover letter is a key marketing document and is worthy of careful attention. In addition to the Executive Summary and the cover letter, every proposal should deal with four distinct issues: (1) the nature of the technical problem and how it is to be approached; (2) the plan for implementing the project once it has been accepted; (3) the plan for logistic support and administration of the project; and (4) a description of the group proposing to do the work, plus its past experience in similar work.

The precise way in which the contents of a proposal are organized usually follows the directions found in the TPR or RFP, the stated requirements of a specific potential funder, the traditional form used by the organization issuing the proposal, or, occasionally, the whim of the writer. As is the case with most products, the highest probability of acceptance will occur

when the proposal meets the expectations of the "buyer," as to form and content. At times there is a tendency to feel that "nontechnical" projects (which usually means projects not concerned with the physical sciences or a physical product) are somehow exempt from the need to describe how the problem will be approached and how the project will be implemented—including details such as milestones, schedules, and budgets. To deal with nontechnical projects casually is folly and casts considerable doubt on the proposer's ability to deliver on promises. (It is all too common for projects concerned with the development of art, music, drama, and computer software, among other "nontechnical" areas, to be quite vague as to deliverables, deadlines, and costs.) On the other hand, when the proposal is aimed at another division or department of the same parent organization, the technical requirements of the proposal may be greatly relaxed, but the technical approach and implementation plan are still required—even if their form is quite informal.

The Technical Approach

The proposal begins with a general description of the problem to be addressed or project to be undertaken. If the problem is complex, the major subsystems of the problem or project are noted, together with the organization's approach to each. The presentation is in sufficient detail that a knowledgeable reader can understand what the proposer intends to do. The general method of resolving critical problems is outlined. If there are several subsystems, the proposed methods for interfacing them are covered.

In addition, any special client requirements are listed along with proposed ways of meeting them. All test and inspection procedures to assure performance, quality, reliability, and compliance with specifications are noted.

The Implementation Plan

The implementation plan for the project contains estimates of the time required, the cost, and the materials used. Each major subsystem of the project is listed along with estimates of its cost. These costs are aggregated for the whole project, and totals are shown for each cost category. Hours of work and quantities of material used are shown (along with the wage rates and unit material costs). A list of all equipment costs is added, as is a list of all overhead and administrative costs.

Depending on the wishes of the parent organization and the needs of the project, project task schedules (e.g., time charts, network diagrams, Gantt charts) are given for each subsystem and for the system as a whole. (See Chapter 8 for more about time charts, network diagrams, and Gantt charts.) Personnel, equipment, and resource usages are estimated on a period-by-period basis in order to ensure that resource constraints are not violated. Major milestones are indicated on the time charts. Contingency plans are specifically noted. For any facility that might be critical, load charts are prepared to make sure that the facility will be available when needed.

The Plan for Logistic Support and Administration

The proposal includes a description of the ability of the proposer to supply the routine facilities, equipment, and skills needed during any project. Having the means to furnish artist's renderings, special signs, meeting rooms, stenographic assistance, reproduction of oversized documents, computer graphics, word processing, video teleconferencing, and many other occasionally required capabilities provides a "touch of class." Indeed, their unavailability can be irritating. Attention to detail in all aspects of project planning increases the probability of success for the project—and impresses the potential funder.

It is important that the proposal contain a section explaining how the project will be administered. Of particular interest will be an explanation of how control over subcontractors will be administered, including an explanation of how proper subcontractor performance is to be insured and evaluated. The nature and timing of all progress reports, budgetary reports, audits, and evaluations are covered, together with a description of the final documentation to be prepared for users of the proposed deliverables. Termination procedures are described, clearly indicating the disposition of project personnel, materials, and equipment at project end.

A critical issue, often overlooked, that should be addressed in the administrative section of the proposal is a reasonably detailed description of how *change orders* will be handled and how their costs will be estimated. Change orders are a significant source of friction (and lawsuits) between the organization doing the project and the client. The client rarely understands the chaos that can be created in a project by the introduction of a seemingly simple change. To make matters worse, the group proposing the project seems to have a penchant for misleading the potential client about the ease with which "minor" changes can be adopted during the process of implementing the project. Control of change orders is covered in Chapter 11.

Past Experience

All proposals are strengthened by including a section that describes the past experience of the proposing group. It contains a list of key project personnel together with their titles and qualifications. For outside clients, a full résumé for each principal should be attached to the proposal. When preparing this and the other sections of a proposal, the proposing group should remember that the basic purpose of the document is to convince a potential funder that the group and the project are worthy of support. The proposal should be written accordingly.

SUMMARY

This chapter initiated our discussion of the project management process by describing procedures for strategically evaluating and selecting projects. We first described the strategic objective of using projects to help achieve the organization's goals and strategy, and a project portfolio process to help achieve this. We then outlined some criteria for project selection models and then discussed the general nature of these models. The chapter then described the types of models in use and their advantages and disadvantages. Considering the degree of uncertainty associated with many projects, a section was devoted to evaluating the impact of risk and uncertainty. Concluding the discussion, some general comments were made about data requirements and the use of these models. The final section discussed the documentation of the evaluation/selection process via project proposals.

The following specific points were made in this chapter:

- The role of projects in achieving the organization's goals and strategy is critical.
- The eight-step project portfolio process is an effective way to select and manage projects that are tied to the organization's goals.
- Primary model selection criteria are realism, capability, flexibility, ease of use, and cost.
- Preparatory steps in using a model include: (1) identifying the firm's objectives; (2) weighting them relative to each other; and (3) determining the probable impacts of the project on the firm's competitive abilities.
- Project selection models can generally be classified as either numeric or nonnumeric; numeric models are further subdivided into profitability and scoring categories.
- Nonnumeric models include: (1) the sacred cow; (2) the operating necessity; (3) the competitive necessity; and (4) comparative benefit.
- Profitability models include standard forms such as: (1) payback period; (2) average rate of return; (3) discounted cash flow; (4) internal rate of return; and (5) profitability index.
- Project management maturity measurement is a way of assessing an organization's ability to conduct projects successfully.