CHAPTER

1

What Is a Project?

Things are not always what they seem.
— Phaedrus, Roman writer and fabulist

CHAPTER LEARNING OBJECTIVES

After reading this chapter, you will be able to:

- **Define a project**
- **List a project's characteristics**
- **Distinguish a project from a program, activity, and task**
- **Understand the three parameters that constrain a project**
- **Know the importance of defining and using a project classification rule**
- **Understand the issues around scope creep, hope creep, effort creep, and feature creep**
- **Be able to explain the project from the perspective of goal and solution clarity or lack of clarity**
- **Understand the characteristics of the complexity/uncertainty domain that define the project**

Defining a Project

To put projects into perspective, you need a definition — a common starting point. All too often people call any work they have to do a "project." Projects actually have a very specific definition. If a set of tasks or work to be done does

not meet the strict definition, then it cannot be called a project. To use the project management techniques presented in this book, you must first have a project.

A *project* is a sequence of unique, complex, and connected activities having one goal or purpose and that must be completed by a specific time, within budget, and according to specification.

This definition tells you quite a bit about a project. To appreciate just what constitutes a project take a look at each part of the definition.

Sequence of Activities

A project comprises a number of activities that must be completed in some specified order, or *sequence*. An *activity* is a defined chunk of work.

CROSS-REF **I expand on this informal definition of an activity later in Chapter 4.**

The sequence of the activities is based on technical requirements, not on management prerogatives. To determine the sequence, it is helpful to think in terms of inputs and outputs.

- What is needed as input in order to begin working on this activity?
- What activities produce those as output?

The output of one activity or set of activities becomes the input to another activity or set of activities.

Specifying sequence based on resource constraints or statements such as "Pete will work on activity B as soon as he finishes working on activity A" should be avoided because they establish an artificial relationship between activities. What if Pete wasn't available at all? Resource constraints aren't ignored when you actually schedule activities. The decision of what resources to use and when to use them comes later in the project planning process.

Unique Activities

The activities in a project must be *unique*. A project has never happened before, and it will never happen again under the same conditions. Something is always different each time the activities of a project are repeated. Usually the variations are random in nature — for example, a part is delayed, someone is sick, a power failure occurs. These are random events that can happen, but you never are sure of when, how, and with what impact on the schedule. These random variations are the challenge for the project manager.

Complex Activities

The activities that make up the project are not simple, repetitive acts, such as mowing the lawn, painting the house, washing the car, or loading the delivery truck. They are *complex*. For example, designing an intuitive user interface to an application system is a complex activity.

Connected Activities

Connectedness implies that there is a logical or technical relationship between pairs of activities. There is an order to the sequence in which the activities that make up the project must be completed. They are considered connected because the output from one activity is the input to another. For example, you must design the computer program before you can program it.

You could have a list of unconnected activities that must all be complete in order to complete the project. For example, consider painting the interior rooms of a house. With some exceptions, the rooms can be painted in any order. The interior of a house is not completely painted until all its rooms have been painted, but they may be painted in any order. Painting the house is a collection of activities, but it is not considered a project according to the definition.

One Goal

Projects must have a single *goal*, for example, to design an inner-city playground for ADC (Aid to Dependent Children) families. However, very large or complex projects may be divided into several *subprojects*, each of which is a project in its own right. This division makes for better management control. For example, subprojects can be defined at the department, division, or geographic level. This artificial decomposition of a complex project into subprojects often simplifies the scheduling of resources and reduces the need for interdepartmental communications while a specific activity is worked on. The downside is that the projects are now interdependent. Even though interdependency adds another layer of complexity and communication, it can be handled.

Specified Time

Projects have a specified *completion date*. This date can be self-imposed by management or externally specified by a customer or government agency. The deadline is beyond the control of anyone working on the project. The project is over on the specified completion date whether or not the project work has been completed.

Within Budget

Projects also have *resource limits*, such as a limited amount of people, money, or machines that are dedicated to the project. While these resources can be adjusted up or down by management, they are considered fixed resources to the project manager. For example, suppose a company has only one Web designer at the moment. That is the fixed resource that is available to project managers. Senior management can change the number of resources, but that luxury is not available to the project manager. If the one Web designer is fully scheduled, the project manager has a resource conflict that he or she cannot resolve.

CROSS-REF **I cover resource limits in more detail in Chapter 7.**

According to Specification

The customer, or the recipient of the project's deliverables, expects a certain level of functionality and quality from the project. These expectations can be self-imposed, such as the specification of the project completion date, or customer-specified, such as producing the sales report on a weekly basis.

Although the project manager treats the specification as fixed, the reality of the situation is that any number of factors can cause the specification to change. For example, the customer may not have defined the requirements completely, or the business situation may have changed (this happens in long projects). It is unrealistic to expect the specification to remain fixed through the life of the project. Systems specification can and will change, thereby presenting special challenges to the project manager.

CROSS-REF **I show you how to handle changing client requirements effectively in Chapter 10.**

What Is a Program?

A *program* is a collection of projects. The projects must be completed in a specific order for the program to be considered complete. Because programs comprise multiple projects, they are larger in scope than a single project. For example, the United States government has a space program that includes several projects such as the Challenger project. A construction company contracts a program to build an industrial technology park with several separate projects.

Unlike projects, programs can have many goals. The NASA space program is such that every launch of a new mission includes several dozen projects in the form of scientific experiments. Except for the fact that they are all aboard the same spacecraft, the experiments are independent of one another and together define a program.

Establishing Temporary Program Offices

As the size of the project increases it becomes unwieldy from a management standpoint. A common practice is to establish a temporary program office to manage these large projects. One of my clients uses a team size of 30 as the cut-off point. Whenever the team size is greater than 30, a program office is established. That program office consists of nothing more than the management structure needed for the project. There will be a program director and one or more program administrators as support. The program administrators support the program manager as well as the teams. Even for teams of size 30 there will often be a subteam organization put in place to simplify the management of the team. Each subteam will be led by a subproject manager. When the project is completed, the program office disbands.

Establishing Permanent Program Offices

A permanent program office is established to manage an ongoing and changing portfolio of projects. The portfolio consists of projects that have something in common — for example, all might be funded from the same budget, might be linked to the same goal statement, or might use the same resource pool. The permanent program office, unlike the temporary program office, manages a continuously changing collection of projects.

Project Parameters

Five constraints operate on every project:

- Scope
- Quality
- Cost
- Time
- Resources

These constraints form an interdependent set; a change in one can require a change in another constraint in order to restore the equilibrium of the project.

In this context, the set of five parameters form a system that must remain in balance for the project to be in balance. Because they are so important to the success or failure of the project, I want to discuss them individually.

Scope

Scope is a statement that defines the boundaries of the project. It tells not only what will be done but also what will not be done. In the information systems industry, scope is often referred to as a *functional specification*. In the engineering profession, it is generally called a *statement of work*. Scope may also be referred to as a document of understanding, a scoping statement, a project initiation document, and a project request form. Whatever its name, this document is the foundation for all project work to follow. It is critical that scope be correct. I spend considerable time discussing exactly how that should happen in Chapter 3 where I talk about Conditions of Satisfaction.

Beginning a project on the right foot is important, and so is staying on the right foot. It is no secret that scope can change. You do not know how or when, but it will change. Detecting that change and deciding how to accommodate it in the project plan are major challenges for the project manager.

CROSS-REF **Chapter 3 is devoted to defining project scope, and scope management is discussed in Chapter 10.**

Quality

Two types of quality are part of every project:

- The first is *product quality*. This refers to the quality of the deliverable from the project. The traditional tools of quality control, discussed in Chapter 2, are used to ensure product quality.
- The second type of quality is *process quality*, which is the quality of the project management process itself. The focus is on how well the project management process works and how can it be improved. Continuous quality improvement and process quality management are the tools used to measure process quality. These are discussed in Chapter 5.

A sound quality management program with processes in place that monitor the work in a project is a good investment. Not only does it contribute to customer satisfaction, it helps organizations use their resources more effectively and efficiently by reducing waste and rework. Quality management is one area that should not be compromised. The payoff is a higher probability of successfully completing the project and satisfying the customer.

Cost

The dollar cost of doing the project is another variable that defines the project. It is best thought of as the budget that has been established for the project. This is particularly important for projects that create deliverables that are sold either commercially or to an external customer.

Cost is a major consideration throughout the project management life cycle. The first consideration occurs at an early and informal stage in the life of a project. The customer can simply offer a figure about equal to what he or she had in mind for the project. Depending on how much thought the customer put into it, the number could be fairly close to or wide of the actual cost for the project. Consultants often encounter situations in which the customer is willing to spend only a certain amount for the work. In these situations, you do what you can with what you have. In more formal situations, the project manager prepares a proposal for the projected work. That proposal includes an estimate (perhaps even a quote) of the total cost of the project. Even if a preliminary figure has been supplied by the project manager, the proposal allows the customer to base his or her go/no-go decision on better estimates.

Time

The customer specifies a time frame or deadline date within which the project must be completed. To a certain extent, cost and time are inversely related to one another. The time a project takes to be completed can be reduced, but costs increase as a result.

Time is an interesting resource. It can't be inventoried. It is consumed whether you use it or not. The objective for the project manager is to use the future time allotted to the project in the most effective and productive ways possible. Future time (time that has not yet occurred) can be a resource to be traded within a project or across projects. Once a project has begun, the prime resource available to the project manager to keep the project on schedule or get it back on schedule is time. A good project manager realizes this and protects the future time resource jealously.

CROSS-REF **I cover this topic in more detail in Chapter 5, Chapter 7 (where I talk about scheduling project activities), and Chapter 9.**

Resources

Resources are assets, such as people, equipment, physical facilities, or inventory, that have limited availabilities, can be scheduled, or can be leased from an outside party. Some are fixed; others are variable only in the long term. In any

case, they are central to the scheduling of project activities and the orderly completion of the project.

For systems development projects, people are the major resource. Another valuable resource for systems projects is the availability of computer processing time (mostly for testing purposes), which can present significant problems to the project manager with regard to project scheduling.

The Scope Triangle

Projects are dynamic systems that must be kept in equilibrium. Not an easy task, as you shall see! Figure 1-1 illustrates the dynamics of the situation.

The geographic area inside the triangle represents the scope and quality of the project. Lines representing time, cost, and resource availability bound scope and quality. Time is the window of time within which the project must be completed. Cost is the dollar budget available to complete the project. Resources are any consumables used on the project. People, equipment availability, and facilities are examples.

NOTE **While the accountants will tell you that everything can be reduced to dollars, and they are right, you will separate resources as defined here. They are controllable by the project manager and need to be separately identified for that reason.**

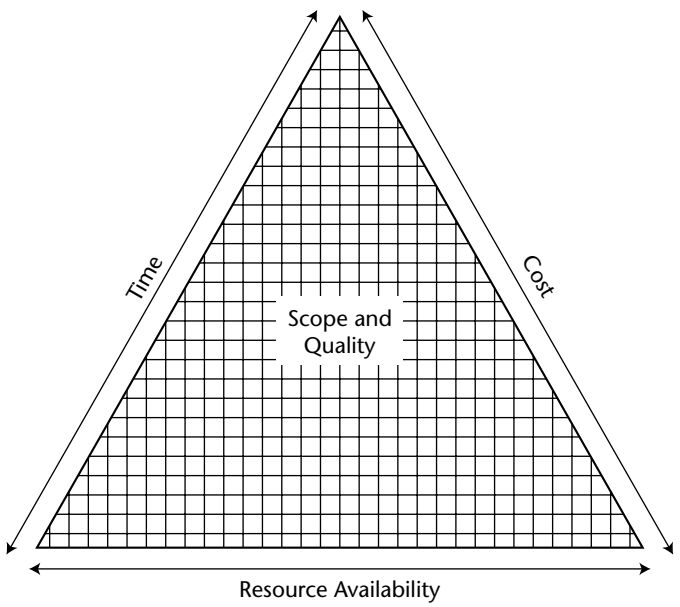

Figure 1-1 The scope triangle

The project plan will have identified the time, cost, and resource availability needed to deliver the scope and quality of a project. In other words, the project is in equilibrium at the completion of the project planning session and approval of the commitment of resources and dollars to the project. That will not last too long, however. Change is waiting around the corner.

The scope triangle offers a number of insights into the changes that can occur in the life of the project. For example, the triangle represents a system in balance before any project work has been done. The sides are long enough to encompass the area generated by the scope and quality statements. Not long after work begins, something is sure to change. Perhaps the customer calls with an additional requirement for a feature that was not envisioned during the planning sessions. Perhaps the market opportunities have changed, and it is necessary to reschedule the deliverables to an earlier date, or a key team member leaves the company and is difficult to replace. Any one of these changes throws the system out of balance.

The project manager controls resource utilization and work schedules. Management controls cost and resource level. The customer controls scope, quality, and delivery dates. These points suggest a hierarchy for the project manager as solutions to accommodate the changes are sought. I return to this topic in greater detail in Chapter 10.

Scope Creep

Scope creep is the term that has come to mean any change in the project that was not in the original plan. Change is constant. To expect otherwise is simply unrealistic. Changes occur for several reasons that have nothing to do with the ability or foresight of the customer or the project manager. Market conditions are dynamic. The competition can introduce or announce an upcoming new version of its product. Your management might decide that getting to the market before the competition is necessary.

Your job as project manager is to figure out how these changes can be accommodated. Tough job, but somebody has to do it! Regardless of how the scope change occurs, it is your job as project manager to figure out how, if at all, you can accommodate the change.

Hope Creep

Hope creep is the result of a project team member's getting behind schedule, reporting that he or she is on schedule, but hoping to get back on schedule by the next report date. Hope creep is a real problem for the project manager. There will be several activity managers within your project, team members who manage a hunk of work. They do not want to give you bad news, so they

are prone to tell you that their work is proceeding according to schedule when, in fact, it is not. It is their hope that they will catch up by the next report period, so they mislead you into thinking that they are on schedule. The activity managers hope that they will catch up by completing some work ahead of schedule to make up the slippage. The project manager must be able to verify the accuracy of the status reports received from the team members. This does not mean that the project manager has to check into the details of every status report. Random checks can be used effectively.

Effort Creep

Effort creep is the result of the team member's working but not making progress proportionate to the work expended. Every one of us has worked on a project that always seems to be 95 percent complete no matter how much effort is expended to complete it. Each week the status report records progress, but the amount of work remaining doesn't seem to decrease proportionately. Other than random checks, the only effective thing that the project manager can do is to increase the frequency of status reporting by those team members who seem to suffer from effort creep.

Feature Creep

Closely related to scope creep is *feature creep*. Feature creep results when the team members arbitrarily add features and functions to the deliverable that they think the customer would want to have. The problem is that the customer didn't specify the feature, probably for good reason. If the team member has strong feelings about the need for this new feature, formal change management procedures can be employed.

CROSS-REF **The change management process is discussed in Chapter 10.**

An example illustrates the point. The programmer is busy coding a particular module in the system. He or she gets an idea that the customer might appreciate having another option included. The systems requirements document does not mention this option. It seems so trivial that the programmer decides to include it rather than go through the lengthy change process.

While this approach may seem rather innocent, look at some possible consequences. First of all, because the feature is not in the system requirements document, it is also not in the acceptance test procedure, the systems documentation, the user documentation, and the user training program. What will happen if something goes wrong with the new option? How will another programmer know what to do? What will happen when the user discovers the option and asks for some modification of it? You can see the consequences of

such an innocent attempt to please. The message here is that a formal change request must be filed, and if it is approved, the project plan and all related activities will be appropriately modified.

Applications of the Scope Triangle

There are only a few graphics that I want you to burn into your brain because of their value throughout the entire project life cycle. The scope triangle is one such graphic. It will have at least two major applications for you: as a problem escalation strategy and as a reference for the project impact statement in the scope change process.

Problem Escalation

The scope triangle enables you to ask the question, "Who owns what?" The answer will give you an escalation pathway from project team, to resource manager, to customer. The project team owns how time, budget, and resources are used. Within the policies and practices of the enterprise any of these may be moved within the project to resolve problems that have arisen. In solving a problem the project manager should try to find a solution within the constraints of how the time, budget, and resources are used. They do not need to go outside of their sphere of control.

The next step in the escalation strategy would be for the project manager to appeal to the resource managers for problem resolution. The resource manager owns who gets assigned to a project and also owns any changes to that assignment that may arise.

The final step in the problem escalation strategy is to appeal to the customer. They control the amount of time that has been allocated to the project. They control the amount of money that has been allocated. Finally, they control the scope of the project. Whenever the project manager appeals to the customer, it will be to get an increase in time or budget and some relief from the scope by way of scope reduction or scope release.

Project Impact Statement

The second major application of the scope triangle is as an aid in the preparation of the Project Impact Statement. This is a statement of the alternative ways of accommodating a particular scope change request of the customer. The alternatives are identified by reviewing the scope triangle and proceeding much along the same lines as discussed in the previous paragraph. Chapter 10 has a detailed discussion of the scope change process and the use of the Project Impact Statement.

Project Classifications

In this section, I characterize projects in terms of a detailed set of variables. The value of these variables is used to determine which parts of the project management methodology must be used and which parts are left to the discretion of the project manager to use as he or she sees fit.

Classification by Project Characteristics

Many organizations choose to define a classification of projects based on such project characteristics as these:

- **Risk** — Establish levels of risk (high, medium, low)
- **Business value** — Establish levels (high, medium, low)
- **Length** — Establish several categories (e.g., 3 months, 3 to 6 months, 6 to 12 months, etc.)
- **Complexity** — Establish categories (high, medium, low)
- **Technology used** — Establish several categories (well-established, used somewhat, basic familiarity, unknown, etc.)
- **Number of departments affected** — Establish some categories (one, few, several, all)
- **Cost**

The project profile determines the classification of the project. The classification defines the extent to which the project management methodology is to be used.

I strongly advocate this approach because it adapts the methodology to the project. "One size fits all" does not work in project management. In the final analysis, I defer to the judgment of the project manager. Apart from the parts required by the organization, the project manager should adopt whatever parts of the methodology he or she feels improves his or her ability to help successfully manage the project. Period.

Project types are as follows:

Type A projects. Projects of Type A are the high-business-value, high-complexity projects. They are the most challenging projects the organization undertakes. Type A projects use the latest technology, which, when coupled with high complexity, causes risk to be high also. To maximize the probability of success, the organization requires that these projects

utilize all the methods and tools available in their project management methodology. An example of a Type A project is the introduction of a new technology into an existing product that has been very profitable for the company.

Type B projects. Projects of Type B are shorter in length, yet they still are significant projects for the organization. All of the methods and tools in the project management process are probably required. The projects generally have good business value and are technologically challenging. Many product development projects fall in this category.

Type C projects. Projects of Type C are the projects occurring most frequently in an organization. They are short by comparison and use established technology. Many are projects that deal with the infrastructure of the organization. A typical project team consists of five people, the project lasts six months, and the project is based on a less-than-adequate scope statement. Many of the methods and tools are not required for these projects. The project manager uses those tools, which are optional, if he or she sees value in their use.

Type D projects. Projects of Type D just meet the definition of a project and may require only a scope statement and a few scheduling pieces of information. A typical Type D project involves making a minor change in an existing process or procedure or revising a course in the training curriculum.

Table 1-1 gives a hypothetical example of a classification rule.

These four types of projects might use the parts of the methodology shown in Figure 1-2. The figure lists the methods and tools that are either required or optional given the type of project.

Table 1-1 Example Project Classes and Definitions

CLASS	DURATION	RISK	COMPLEXITY	TECHNOLOGY	LIKELIHOOD OF PROBLEMS
Type A	> 18 months	High	High	Breakthrough	Certain
Type B	9–18 months	Medium	Medium	Current	Likely
Type C	3–9 months	Low	Low	Best of breed	Some
Type D	< 3 months	Very low	Very low	Practical	None

Project Management Process	Project Classification			
	A	B	C	D
Define				
Conditions of Satisfaction	R	R	O	O
Project Overview Statement	R	R	R	R
Approval of Request	R	R	R	R
Plan				
Conduct Planning Session	R	R	O	O
Prepare Project Proposal	R	R	R	R
Approval of Proposal	R	R	R	R
Launch				
Kick-off Meeting	R	R	O	O
Activity Schedule	R	R	R	R
Resource Assignments	R	R	R	O
Statements of Work	R	O	O	O
Monitor/Control				
Status Reporting	R	R	R	R
Project Team Meetings	R	R	O	O
Approval of Deliverables	R	R	R	R
Close				
Post-Implementation Audit	R	R	R	R
Project Notebook	R	R	O	O

R = Required O = Optional

Figure 1-2 The use of required and optional parts of the methodology by type of project

Classification by Project Type

There are many situations in which an organization repeats projects that are of the same type. Following are some examples of project types:

- Installing software
- Recruiting and hiring
- Setting up hardware in a field office
- Soliciting, evaluating, and selecting vendors
- Updating a corporate procedure
- Developing application systems

These projects may be repeated several times each year and probably will follow a similar set of steps each time they are done.

CROSS-REF **You will look at the ramifications of that repetition when I discuss Work Breakdown Structure templates in Chapter 4.**

It is important to note then that you can classify project by type of project. The value in doing this is that each type of project utilizes a specific subset of the project management methodology. For example, projects that involve updating a corporate procedure are far less risky than application systems development projects. Therefore, the risk management aspects of each are very different. Risk management processes will be less important in the corporate procedure project; conversely, they will be very important in the applications development project.

The Changing Face of Projects

NOTE **This section is adapted from a similar work by the author, *Effective Software Project Management* (Wiley, 2006).**

When I think of the project landscape, I think of it in very simple terms. I see it as a two-dimensional grid like the one shown in Figure 1-3.

The first dimension relates to the goal of the project. The goal is either clearly specified (therefore known) or it is not clearly specified (therefore not known). It's an all-or-nothing situation. The boundary between clear and not clear is more conceptual than actual. The same is true of the second dimension, which relates to the solution or how you expect to reach the goal. That also has two categories. The solution is either clearly specified (and therefore known) or it is not clearly specified (and therefore not known). If you intersect these two dimensions as shown in the figure, then you have defined a four-category classification of projects. This classification is simple but inclusive of every project. That is, every project that ever has been or ever will be must fall into one and only one of these four categories.

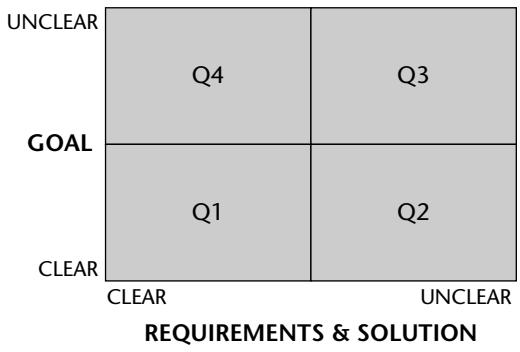

Figure 1-3 The project landscape

Why is this important? First and foremost, the characteristics of the deliverables or solution to be developed will play an important role in determining the model that will be used. Each of these quadrants presents the project team with a number of decisions regarding how to go forward. The next sections briefly examine each quadrant and the salient aspects of clarity or lack thereof with respect to goal and solution.

Quadrant 1: Goal and Solution Are Clearly Specified

How could it be any better than to clearly know the goal and the solution? This is the best of all possible worlds, but it is also the least likely to occur in today's fast-paced, continuously changing business world. Projects that fall into this quadrant are familiar to the organization. Perhaps similar projects have been done several times before. There are no surprises. The client has clearly specified the goal and how to reach that goal. Little change is expected. A variety of plan-driven approaches are in use for such projects. The limiting factors in these plan-driven approaches are that they are change-intolerant, are focused on delivering according to time and budget constraints, and rely more on compliance to plan than on delivering business value. The plan is sacred, and conformance to it is the hallmark of a successful project team.

Because of the times we live in, these approaches are rapidly becoming dinosaurs. At least the frequency of their application is diminishing rapidly. They are giving way to a whole new collection of approaches that are more customer-focused and deliver business value rather than adhere to a schedule and budget plan.

In addition to a clearly defined goal and solution, projects that correctly fall into this quadrant have several identifying characteristics as briefly identified below.

Low Complexity

Other than the fact that the project really is simple, this will often be attributable to the fact that the project rings of familiarity. It might be a straightforward application of established business rules and therefore take advantage of artifacts produced in previous projects. To the team it might look like a cut-and-paste exercise. In such cases integration and testing will be the most challenging phases of the project. You will still find situations where the project is complex but still well-defined. However, these are rare.

Well-Understood Technology Infrastructure

A well-understood technology infrastructure is one that is stable and has been the foundation for many projects in the past. That means that the accompanying

skills and competencies to work with the technology infrastructure are well-grounded in the teams.

Low Risk

The total environment for projects in this quadrant is that it is known. All that could happen to put the project at risk has occurred in the past, and you have well-tested and well-used mitigation strategies in place. Experience has rooted out all of the mistakes that could be made. The customer is confident that they have done a great job identifying requirements, functions, and features, and they are not likely to change. Except for acts of nature and other unavoidable events, the project is protected from avoidable events. You find few unanticipated risks in development projects in this quadrant.

Experienced and Skilled Developer Teams

Past projects have been good training grounds for the teams. They have had opportunities to learn or to enhance their skills and competencies.

Quadrant 2: Goal Is Clearly Specified but Solution Is Not

You have a host of incremental, iterative, and adaptive approaches to project management that can be used when the goal is clearly defined but how to reach the goal — the solution — is not. As you give some thought to where your projects would fall in this landscape, consider the possibility that many if not most of them are these types of projects. If that is the case, shouldn't you also be considering using an approach to managing these projects that accommodates the goal and solution characteristics of the project rather than trying to force-fit some other approach that was designed for projects with much different characteristics?

I contend that the adaptive and iterative class of projects is continuously growing. I make it a practice at all "rubber chicken" dinner presentations to ask about the frequency with which the attendees encounter Quadrant 2 projects. With very small variance they say that at least 75 percent of all their projects are Quadrant 2 projects. Many of them try to adapt Quadrant 1 approaches to Quadrant 2 projects and meet with very little success. The results have ranged from mediocre success to outright failure. Quadrant 2 projects present a different challenge and need a different approach. For years I have advocated that the approach to the project must be driven by the characteristics of the project. To reverse the order is to court disaster.

Quadrant 3: Goal and Solution Are Not Clearly Specified

Quadrant 3 extends to the remotest boundaries of project types. Quadrant 3 projects are those projects whose goal and solution cannot be clearly defined. What little planning is done is done just in time, and the project proceeds through several iterations until it converges on an acceptable goal and solution. If instead there isn't any prospect of convergence, the customer might pull the plug and cancel the project at any time and look for alternative approaches.

Quadrant 4: Goal Is Not Clearly Specified but the Solution Is

The fourth category represents projects whose goal is not known but whose solution is. This is an impossible situation. It would be equivalent to solutions that go looking for problems. Nevertheless, we all have had experiences working with professional services organizations that practice such approaches. They advocate a one-size-fits-all approach, which has never shown to be very successful. I have always discouraged a one-size-fits-all approach with my clients. Most see the wisdom in adopting this position.

The Complexity/Uncertainty Domain of Projects

Each quadrant of the project landscape has different profiles when it comes to risk, team, communications, customer involvement, specification, change, business value, and documentation. This section examines the changing profile of each domain as you move from quadrant to quadrant.

Complexity and uncertainty are positively correlated with one another. As projects become more complex, they become more uncertain. That follows from at least four other relationships, as commented on in the next four sections.

In the Quadrant 1 model you know where you are going, and you know precisely how you are going to get there. It's all in the requirements, functionality, and features. Your plan reflects all of the work, the schedule, and the resources that will get you there. No complexity here. As soon as you move away from a clearly specified solution and are in Quadrant 2, the world is no longer as kind to you as it was while you were in Quadrant 1. The minute you have uncertainty anywhere in the project, complexity increases. You have to devise a plan to fill in the missing pieces. There will be some added risk — you might not find the missing piece, or when you do, you find that it doesn't fit in with what you already have built — go back two steps, undo some previous work, and do the required rework. The plan changes. The schedule changes. A lot of the effort spent earlier on developing a detailed plan has gone to waste. By circumstance it has become non-value-added work. If you had only known.

As less and less of the solution is known, the realities of non-value-added work becomes more and more a factor. Time has been wasted. Quadrant 2 models are better equipped to handle this uncertainty and the complexity that results from it. The models are built on the assumption that the solution has to be discovered. Planning becomes less of a one-time task done at the outset to a just-in-time task done as late as possible. You have less and less reliance on a plan and more reliance on the tacit knowledge of the team. That doesn't reduce the complexity, but it does accommodate it. So even though complexity increases as you move from Quadrant 1 to 2 to 3, you have a way to deal with it for the betterment of your customer and your sanity as a project manager.

Requirements

As project complexity increases, the likelihood of nailing requirements decreases. This follows logically from the fact that the human brain can retain in memory only about seven pieces of information at a time. The dimensions of complexity are likely to far exceed that constraint. In a complex product the extent of the number of requirements, functionality, and features can be staggering. Some will conflict with each other. Some will be redundant. Some will be missing. Many of these might not become obvious until well into the design, development, and even integration-testing tasks.

Flexibility

As project complexity increases so does the need for process flexibility. Increased complexity brings with it the need to be creative and adaptive. Neither is comfortable in the company of rigid processes. Quadrant 2 projects are easily compromised by being deluged with process, procedure, documentation, and meetings. Many of these are unrelated to a results-driven approach. They are the relics of plan-driven approaches. Along with the need for increased flexibility in Quadrant 2 and 3 projects is the need for increased adaptability. Companies that are undergoing a change of approach that recognizes the need to support not just Quadrant 1 projects but also Quadrant 2 projects are faced with a significant and different cultural and business change. For one, the business rules and rules of the project engagement will radically change. Expect resistance.

Flexibility here refers to the project management process. If you are using a one-size-fits-all approach, you have no flexibility. The process is the process is the process. Not a very comforting situation if the process gets in the way of common sense behaviors and compromises your ability to deliver value to your customer. Wouldn't you rather be following a strategy that allows you to adapt to the changing situations?

Quadrant 1 projects generally follow a traditional project management methodology. The plan is developed along with a schedule of deliverables and other milestone events. A formal change management process is part of the game plan. Progress against the planned schedule is tracked, and corrective actions are put in place to restore control over schedule and budget. A nice neat package isn't it? All is well until the process gets in the way of product development. For example, if the business situation and priorities change and result in a flurry of scope change requests to accommodate the new business climate, then an inordinate amount of time is then spent processing change requests at the expense of doing value-added work. The schedule slips beyond the point of recovery. The project plan, having changed several times, becomes a contrived mess. Whatever integrity there was in the initial plan and schedule is now lost among the changes.

Quadrant 2 is altogether different. Project management is really nothing more than organized common sense, so when the process you are using gets in the way, you adapt. The process is changed to maintain focus on doing what makes sense to protect the creation of business value. Unlike Quadrant 1 processes, Quadrant 2 processes expect and embrace change as a way to a better solution and as a way to maximize business value within time and budget constraints. That means choosing and continually changing the approach to increase the business value that will result from the project. Realize that to some extent scope is a variable in these types of approaches.

Quadrant 3 projects are even more dependent upon flexible approaches. Learning and discovery take place throughout the project, and the team and customer must adjust how they are approaching the project at a moment's notice.

Adaptability

The less certain you are of project requirements, functionality, and features, the more need you have to be adaptable with respect to process and procedure. Adaptability is directly related to the extent to which the team members are empowered to act. The ability of the team to adapt increases as empowerment becomes more pervasive. Remember to make it possible for the team members to be productive, and stay out of their way. Don't encumber the team members with the need to get sign-offs that have nothing to do with delivering business value. Pick them carefully and trust them to act in the best interest of the customer.

Change

As complexity increases so does the frequency and need to receive and process change requests. A plan-driven project is not designed to effectively respond

to change. Change upsets the order of things as some or all of the project plan is affected. Resource schedules are compromised. The more that change has to be dealt with, the more time is spent processing and evaluating the changes. That time is lost to the project. It should have been spent on value-added work. Instead it was spent processing change requests.

You spend so much time developing your project plan for a Quadrant 1 project that the last thing you want is to have to change it, but that is the reality in Quadrant 1 projects. Scope change always seems to add more work. Did you ever receive a scope change request from your customer that asked you to take something out? Not too likely. The reality is that the customer discovers something else they should have asked for in the solution. They didn't realize that or know that at the time. That leads to more work, not less. The call to action is clear — choose Quadrant 1 models when specifications are as stable as can be. The architects of the Quadrant 2 and 3 models knew this and so designed approaches that expected change and were ready to accommodate it.

Risk

Risk increases as you move from Quadrant 1 to 2 to 3. In Quadrant 1 you clearly know the goal and the solution and can build a definitive plan for getting there. The exposure to risks associated with product failure is low. The focus can then shift to process failure. A list of candidate risk drivers would have been compiled over past similar projects. Their likelihood, impact, and the appropriate mitigations are known and documented. Like a good athlete, you have anticipated what might happen and know how to act if it does.

As the project takes on the characteristics of Quadrant 2, two forces come into play. First, the project management approach becomes more flexible and lighter. The process burden lessens as more attention is placed on delivering business value than on conformance to a plan. At the same time the product risk increases. Risk increases in relation to the extent to which the solution is not known. On balance that means more effort should be placed on risk management as the project moves through Quadrant 2 and looks more like a Quadrant 3 project. You will have less experience with these risks because they are specific to the product being developed. In Quadrant 3, risk is the highest because you are in a research and development environment. Process risk is almost nonexistent because the ultimate in flexibility has been reached in this quadrant, but product risk is extremely high. You will have numerous product failures because of the highly speculative nature of Quadrant 3 projects, but that is okay. Those failures are expected to occur. Each product failure gets you that much closer to a functional solution, if such solution can be found within the operative time and budget constraints. At worst those failures eliminate one or more paths of investigation and so narrow the range of possible solutions.

Team Cohesiveness

In Quadrant 1, the successful team doesn't really have to be a team at all. You assemble a group of specialists and assign each to their respective tasks at the appropriate times. Period. The plan is sacred, and the plan guides them through their task. It tells them what they need to do, when they need to do it, and how they know they have finished their task. They are a group of specialists. They each know their discipline and are brought to the team to apply their discipline to a set of specific tasks. When they have met their obligation, they often leave the team to return later if needed. Period.

The situation quickly changes when the project is a Quadrant 2 or 3 project. First of all, you have a gradual shift of the team make-up from a team of specialists to a team of generalists. The team takes on more of the characteristics of a self-directed team. They become self-sufficient and self-directing as the project moves from a Quadrant 2 to a Quadrant 3 project. Quadrant 1 teams are not co-located. They don't have to be. Quadrant 2 and 3 teams are co-located. Research has shown that co-location adds significantly to the successful completion of the project.

Communications

Lack of timely and clear people-to-people communications has been shown to be the single most frequent reason for project failure. In this discussion I include both written and verbal communications media in making that statement. As you move in the direction of increased complexity and heightened uncertainty, communication requirements increase and change. When complexity and uncertainty are low, the predominant form of communications is written. Status reports, change requests, meeting minutes, issues reporting, problem resolution, project plan updates, and other written reports are commonplace. As uncertainty and complexity increase, written communications give way to verbal communication. The burden of plan-driven approaches is lightened, and the communications requirements of value-driven approaches take over.

Value-driven communications approaches are the derivatives of meaningful customer involvement, where discussions generate status updates and plans going forward. Because projects that are high in complexity and uncertainty depend on frequent change, they have a low tolerance of written communications. In these project situations, the preparing, distributing, reading, and responding to written communications is viewed as non-value-added work. It is to be avoided, and the energy spent on value-added work.

Customer Involvement

Consider for a moment a project from your experience in which you were most certain of the goal and the solution. You would probably be willing to bet your first-born child that you had nailed requirements and that they would not change. Yes, that type of project might just be a pipe dream but give me the benefit of the doubt. For such a project you might ask: Why do I need to have my customer involved except for the ceremonial sign-offs at milestone events? A fair question, and ideally you wouldn't need their involvement. How about a project at the other extreme — where the goal is very elusive and no solution would seem to be in sight? In such cases the complete involvement of the customer, as a team member perhaps, would be indispensable. What I have painted here are the extreme cases in Quadrant 1 and Quadrant 3.

Quadrant 1 projects are team-driven projects. Customer involvement is usually limited to clarifying questions as they arise and giving sign-offs and approvals at the appropriate stages of the project life cycle. It would be accurate to say that customer involvement in Quadrant 1 projects is reactive and passive. But all that changes as you move into Quadrant 2 projects. Now the customer must take a more active role than they did in Quadrant 1 projects. For Quadrant 3 projects, meaningful customer involvement is essential. In fact, the customer should take on a proactive role. The project goes nowhere without that level of commitment from the customer.

Finding the solution to a project is not an individual effort. In Quadrant 1 the project team under the leadership of the project manager is charged with finding the missing parts of the solution. In some cases the customer is passively involved, but for the most part the team solves the problem. The willingness of the customer to even get passively involved depends on how you have dealt with them so far in the project. If you bothered to include them in the planning of the project, they might have some sympathy and help you out. But don't count on it. Beginning with Quadrant 2 and extending through Quadrant 3, you find more and more reliance on meaningful customer involvement. In your effort to maintain a customer focus and deliver business value you are dealing with a business problem, not a technology problem. You have to find a business solution. Who is better equipped to help than the customer? After all, you are dealing with their part of the business. Shouldn't they be the best source of help and partnership in finding the solution? This involvement is so critical that without it you have no chance of being successful with Quadrant 3 projects.

Meaningful customer involvement can be a daunting task for at least the three reasons cited below.

The Customer's Comfort Zone

The customer has been trained ever since the 1950s to take up a passive role and let the technical gurus do their job. That training went well, and now you have to retrain them. In many instances their role was more ceremonial than formal. They didn't understand what they were approving but had no recourse but to sign. The sign-off at milestone events was often a formality because the customer didn't understand the techie-talk, was afraid not to sign-off because of the threat of further delays, and didn't know enough about development to know when to ask questions and when to push back. Now you are asking them to step into a new interactive role and become meaningfully engaged in the project life cycle. Many are not poised to take up that responsibility, one that is ratcheted up a notch as the project moves further into Quadrant 2 toward Quadrant 3, with less and less known about the solution. The project team is faced with a critical success factor of gaining meaningful customer involvement throughout the project. In Quadrant 3 their involvement is even more proactive and engaging. Quadrant 3 projects require that the customer take a co-leadership role with the project manager to keep the project moving forward and adjusted in the direction of increasing business value.

At the same time, the customer's comfort zone is growing. They have become smarter. It is not unusual to find customers who were once more technically involved. They go to conferences where presentations often include technical aspects. They know how to push back. They know what it takes to build solutions. They've built some themselves using spreadsheet packages and other applications tools. That knowledge has two possible consequences: These customers can be supportive or they can be obstacles to progress.

Ownership by the Customer

Establishing ownership by the customer of the project product and process is critical. I often ensure that ownership by organizing the project team around co-managers — one from the provider side and one from the customer side. These two individuals are equally responsible for the success of the project. That places a vested interest squarely on the shoulders of the customer manager. This sounds really good, but it is not easily done. I can hear my customers saying, "This is a technology project, and I don't know anything about technology. How can I act in a managerial capacity?" The answer is simple, and it goes something like this, "True, you don't have a grasp of the technology involved, but that is a minor point. Your real value to this endeavor is keeping the business focus constantly in front of the team. You can bring that dimension to the team far better than any one of the technical people on the team. You will be an indispensable partner in every decision situation faced in this project."

This ownership is so important that I have postponed starting customer engagements because the customer can't send a spokesperson to the planning meeting. When they do, you have to be careful that they don't send you a weak representative who merely wasn't busy at the time or who doesn't really understand the business context of the project. Maybe there's a reason that person wasn't busy.

Customer Sign-Off

This is often the most anxiety-filled task that you ever ask of your customer. Some customers think that they are signing their lives away when they approve a document or a deliverable. You are going to have to dispel that perception. This world is one of constant change, high speed, and high risk. Given that, how could anyone reasonably expect that what works today will work tomorrow? Today's needs might not even appear on the radar screen next week. No matter how certain you are that you have nailed the requirements, you wouldn't expect them to remain static for the length of the project. It simply won't happen. That means that you had better anticipate change as a way of life in almost every project.

Specification

What does this mean? Simply put it advises you that the choice of project management approach should be based on an understanding of the confidence you have that the specifications have been completely and clearly defined and documented and that scope change requests will not arise from any shortcomings in the specifications documents. As that specification certainty diminishes, your best options lie in the iterative strategies that populate Quadrant 2 — those that allow the solution to become more specific and complete as the project commences or that allow you to discover the solution as the project commences. Finally, if you have very little confidence that you have clearly and completely documented the specifications, then your choice of a project management approach takes on the flavor of the research and development strategies that populate Quadrant 3.

The project management approaches that require a high level of specification certainty tend to be change intolerant. Consider the situation where a significant change request comes early in the project life cycle. That could render much of the planning work obsolete. A large part of it will have to be redone. That contributes to the non-value-added work expenditure of the approach you have chosen. If changes like that are to be expected, an approach that is more tolerant and supportive of change should be chosen. The non-value-added work could have been greatly diminished or removed all together.

If you look inside the specifications document, you can find more detailed information that might help you decide on the best project management approach. Specifications are composed of requirements, functions, and features. These array themselves in a hierarchical structure much like the one shown in Figure 1-4.

Uncertainty at the requirements level has more impact on choice of development approach than does uncertainty at the functionality level, which has more impact than that at the features level. Despite all of these efforts, you still have changes on any of those fronts that could significantly impact your best efforts. That's life.

Change

The less you know about requirements, functionality, and features, the more you have to expect change. In Quadrant 1 you know everything there is to know about requirements, functionality, and features for this project. The assumption is that there will be little or no internal forces for change during the project. Externally, however, that is not the case. Actions of competitors, market forces, and technological advances can cause change, but that is present in every project and can only be expected. The best the enterprise can do is maintain a position of flexibility in the face of such unpredictable but certain events.

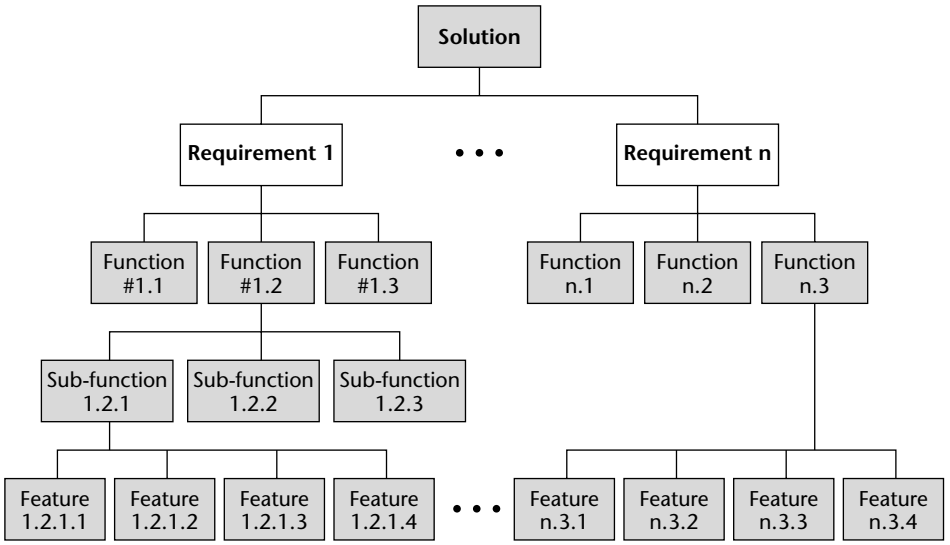

Figure 1-4 The requirements, functionality, and features breakdown structure

Quadrant 2 is a different story altogether. Any change in this quadrant comes about through the normal learning process that takes place in any Quadrant 2 project. When the customer has the opportunity to examine and experiment with a partial solution, they will invariably come back to the project team with suggestions for other requirements, functionality, and features that should be part of the solution. These suggestions can be put into one of two categories: "wants" or "needs."

Wants might be little more than the result of a steak appetite on a baloney budget. It is up to the project manager to help the customer defend their want as a true need and hence get it integrated into the solution. If they fail to do that, their suggestion should be relegated to a wish list. Wish lists are seldom revisited. If, conversely, they demonstrate its value and hence transfer it to a true need, it is up to the project manager to accommodate that new requirement, functionality, or feature into the solution set. It might have to be prioritized in the list of all needs.

In Quadrant 3 you have a further reliance on change to affect a good business-valued product. In fact, Quadrant 3 projects require change in order to have any chance of finding a successful solution. Change is the only vehicle that will lead to a solution.

Business Value

This domain would seem to be trivial. After all, aren't all projects designed to deliver business value? These projects were commissioned based on the business value they would return to the enterprise. This is all true. However, traditional project approaches focus on meeting the plan-driven parameters: time, cost, scope. When originally proposed, the business climate was such that the proposed solution was the best that could be had. In a static world that condition would hold. Unfortunately the business world is not static, and the needs of the customer aren't either. Bottom line: What will deliver business value is a moving target. Quadrant 1 development projects aren't equipped with the right stuff to deliver business value.

It follows then that Quadrant 1 projects deliver the least business value and that business value increases as you move from Quadrant 1 to Quadrant 2 to Quadrant 3. At the same time, however, as you move from quadrant to quadrant, risk increases, which means that higher-valued projects need to be commissioned as you move across the quadrants. Remember that the expected business value of a project is the product of (1-risk) and value. Risk here is expressed as the probability of failure, and the probability of success is therefore (1-risk).

CASE STUDY – PLEASANTOWN PLAYGROUND
PROJECT BACKGROUND

Pleasantown is a southern California city of 80,000 residents located just outside Los Angeles. Playground space has been at a premium for many years, and many families have had no choice but to let their children play in the neighborhood streets. Because of minor accidents and, recently, one near miss, concerned parents are ready to take action to rectify the situation.

There is a vacant parcel of city-owned land measuring 200' by 200'. It has been in disrepair for over 30 years, accumulating old tires, discarded appliances, broken bottles, and all sorts of trash. You have been informed that it is available to be turned into a playground. Because of significant pressure by various citizen groups, the city entertained proposals for converting the parcel into usable space for children. You and a group of six concerned neighbors submitted a proposal that was accepted by the city. According to the terms of the proposal, your group of seven will head up a fundraiser, recruit volunteers, and build the playground. The city expects the project to be finished by September 1. As part of the terms and conditions, your group has agreed that the city can dedicate the new facility with a gala event that they will plan and hold on City Founders Day on September 1. Because it is now April 1, you have a very tight schedule.

In addition to the time constraint, you have tentatively established the budget at $30,000 because that is approximately the most you can hope to raise through activities such as car washes, bake sales, and so on. In addition, you hope to get local merchants to donate materials and other non-cash resources.

What does this mean? Simple: Whatever project management approach you adopt for the project, it must be one that allows redirection as business conditions change. The more uncertainty present in the project, the more you need to be able to redirect to take advantage of changing conditions and opportunities.

As projects move through Quadrants 1 to 2 to 3, they become more customer-facing. The focus changes from conformance to plan to delivery of business value. The Quadrant 1 models focus on conformance to plan. If they also happen to deliver maximum business value it would be more the result of an accident than the result of a clairvoyant project plan. The focus on delivery of business value is apparent in all of the Quadrant 2 and 3 models. It is designed into the models.

Putting It All Together

You now should know that I advocate a very specific definition of a project. If a collection of work is to be called a project, it must meet the definition. Once you know that you have a project, it will be subjected to a specific set of requirements regarding its management. That is the topic of the next chapter.

Discussion Questions

1. Suppose the scope triangle were modified as follows: Resource Availability occupies the center. The three sides are Scope, Cost, and Schedule. Interpret this triangle as if it were a system in balance. What is likely to happen when a specific resource on your project is concurrently allocated to more and more projects? As project manager, how would you deal with these situations? Be specific.
2. Where would you be able to bring about cost savings as a program manager for a company? Discuss these using the standard project constraints.
3. Discuss ways in which scope creep occurred on projects with which you have been associated. Was the project manager able to reverse scope creep? Is it possible to reverse scope creep? Defend your yes or no answer.
4. Identify projects from your experiences that you would classify as Q1, Q2, and Q3 projects. Explain your choices.