

Organizing for the Long Term

Never tell people how to do things. Tell them what to do and they will surprise you with their ingenuity.

—GEORGE S. PATTON—

The new clerk in the mailroom noticed an elderly gentleman sitting in a corner, slowly sorting through a mountain of mail.

''Who's that?'' he asked the supervisor.

''That's old Charlie. He's been with the company more than forty years.''

The new clerk asked, ''Are you saying he never made it out of the mailroom?''

''He did, but then he asked to be transferred here—after spending a few years as a project manager.''

Dread. That is a common reaction most managers have to being given a project assignment. Few managers will seek out the project, and most will avoid it if possible. Why?

First, a distinction has to be made between projects and routines. The routines associated with operation of your department are repetitive in nature. Put another way, they are predictable. That means that the recurring operations you execute can be planned as a matter of course. Once you have gone through your normal cycle a few times, you know what to expect. Because they are predictable, recurring operational routines that are easier to manage than projects.

The project itself is temporary and nonrecurring in nature. It has a beginning and an end rather than a repetitive cycle. Thus, projects are by nature chaotic. Making projects even more daunting is that few companies have specialized project teams or departments. The project is assigned to a manager who seems to be a logical choice for the job. If the project is related to marketing, it will probably be assigned within the marketing area of the company. If financial in nature, the accounting or internal auditing department will be likely candidates.

Project scope and duration are impossible to define because projects arise at every level within the organization. This characteristic presents special problems for every manager because merely receiving a project assignment does not necessarily mean that you know what will be involved in the task. This makes scheduling and budgeting difficult, to say the least. A project has to be planned out, defined, and organized before you can know what you are up against in terms of actual management. Thus, you may be given an assignment, budget, and deadline before the project itself has been defined well enough to proceed. It will then be necessary to revise not only the schedule and budget, but perhaps the very definition of the project itself.

The secret to the skilled execution of a project is not found in the development of new skills, but in applying existing skills in a new environment. Projects are exceptional, out of the ordinary, and by definition, temporary in nature. So the problems, restrictions, deadlines, and budget are all outside the normal course of your operations. Some professions deal in projects continuously; for example, engineers, contractors, and architects operate in a project environment for every job they undertake. However, they have the experience to manage any problem that arises because it is part of their ''skills package'' to operate in ever-changing circumstances where similar problems arise.

You manage a series of problems in your department as an opera-

tional fact of life. Your department may be defined in terms of the kinds of problems you face each month and overcome. The controls you apply, budgets you meet, and reports you generate as a result of confronting problems within your operational cycle are the outcomes you know and expect. Assignments are made in the same or similar time sequence from month to month, and routines are performed in the same order, usually by the same employees. Even many of the problems that arise are predictable. However, when you are faced with the temporary and exceptional project, it raises several questions, all of which are related to questions of organization, planning, and control. These include:

How do I get started?

Exactly what is the project meant to achieve or discover?

Who is responsible for what, and how is the effort to be coordinated?

Beyond these are the equally important questions related to budgets, schedules, and assignments to a project team. The project presents a set of new demands that, although temporary in nature, require commitment from limited resources. Your department will be expected to continue meeting its recurring work schedule. Thus, a project places an additional burden on you and the others in your department. If the project also involves working with people in other departments, it will create even more potential problems. The point at which responsibility and work processes occur between departments often is also the point at which the smooth processing of the project routine is likely to be disrupted.

Background for Project Management

The difficulties you face as a project manager can be made to conform with a logical system for planning and execution, even when you need to continue managing your department at the same time. Much thought has gone into the science of project management on many levels. If you work regularly in a project environment, you can find

assistance and support from several sources, including the Project Management Institute (PMI).

This book adheres to the standards expressed by the Project Management Institute and attempts to present readers with a concise overview of the principles they'll need to employ as project manager. To begin, it is important to define some of the basic principles and ideas underlying the work of project management.

Spotlight on Project Management Institute (PMI)

The Project Management Institute has 265,000 members in 170 countries and was founded in 1969. PMI offers certificate programs for the credentials Project Management Professional (PMP), Certified Associate of Project Management (CAPM), Program Management Professional (PgMP), PMI Scheduling Professional (PMI-SP), and PMI Risk Management Professional (PMI-RM P).

PMI also publishes *A Guide to the Project Management Body of Knowledge*. This useful guide, often referred to as the *PMBOK*, compiles information from many sources. It has incorporated many of the standards established by project management writers, including information from the first and second editions of *The Little Black Book of Project Management* (1990 and 2002). PMBOK was first published in 1996 with revised editions in 2000 and 2004. Contact PMI at:

14 Campus Boulevard
Newtown Square PA 19073–3299
Phone 610–336–4600
E-mail: customercare@pmi.org
Website: www.pmi.org

Other Resources

To find local PMI chapters, check the PMI website and link to ''Community Membership'' and then to ''Chapter.'' All local chapters are listed.

Project Definitions

The project is best defined in two ways:

1. By comparing a project to a routine
2. By knowing the operational constraints associated with projects

A ''project'' has different meanings in each organization and may also vary from one department to another. For the purposes of proceeding with the preliminary steps in organizing your project, this book adheres to the two-part definition mentioned above: by comparison to routines and by the constraints under which projects are run.

The comparison between projects and routines can be divided into four parts as summarized in Figure 1-1 and outlined here:

1. ***A project is an exception.*** Unlike routines, projects involve investigation, compilation, arrangement, and reporting of findings in some way that provides value. The answers to the basic project questions cannot be found in the routines of your department, which is

Figure 1-1. Comparing projects and routines.

Project	Routine
Exception to the usual range of functions.	Defined within the scope of the department.
Activities are related	Routines are related.
Goals and deadlines are specific.	Goals and deadlines are general.
The desired result is identified.	No singular result is identified.

what makes it exceptional. The processes involved with the project fall outside your department's ''normal'' range of activities and functions.

2. ***Project activities are related, regardless of departmental routines.*** Projects are rarely so restricted in nature that they involve only one department. The characteristics of a department involve related routines, but projects are not so restricted. Thus, a project is likely to involve activities that extend beyond your immediate department, which also means that your project team may include employees from other departments.

3. ***Project goals and deadlines are specific.*** Recurring tasks invariably are developed with departmental goals in mind. Financial departments crunch numbers, marketing departments promote sales and develop new markets, and filing departments organize paperwork. The goals and related tasks tend to move forward primarily in terms of time deadlines. The same is true for departmental deadlines; they are recurring and dependable, tied to specific cyclical dates or events in other departments. Projects, though, have an isolated and finite number of goals that do not recur, plus identifiable starting and stopping points. Whereas departmental routines are general in nature, project activities are clearly specific.

4. ***The desired result is identified.*** A project is well defined only when a specific result is known. By comparison, departmental routines involve functions that may be called ''process maintenance.'' That means that rather than producing a specific outcome, a series of recurring routines are aimed at ensuring the flow of outcomes (e.g., reports) from one period to another. The department gets information from others, processes it, and passes it on in a refined form, and this series of steps takes place continuously. While a project involves the same basic idea—receiving information, analyzing it, and reporting conclusions—there are two clear distinctions worth keeping in mind. First, the work is nonrecurring, so the demands of a project cannot be easily identified in every case. Second, the desired result is identified in isolation from other functions of the department.

Projects are also distinguished from routines by how they operate under the constraints of result, budget, and time (see Figure 1-2).

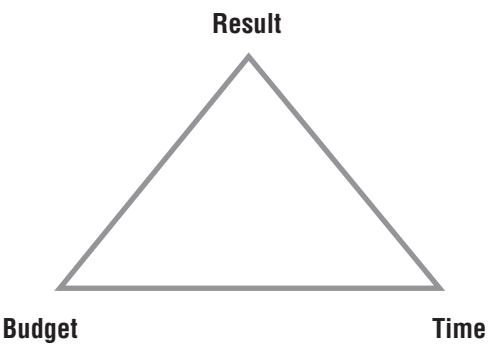
To a degree, all management functions operate within these constraints. For example, your department probably is expected to perform and produce one or more results, or outcomes; you operate within a specific budget; and by the nature of your work, you prioritize on the basis of deadlines. Without these constraints, a company would lack definition and order. We may also judge a company or department by how well it adheres to the expectations for results, budget, and time.

The same is true for projects. The constraints under which you operate also provide a means for testing and judging quality of work. The constraints, whether applied to your department or to a one-time project, are perpetual. However, emphasis on the three constraints is not always applied at the same level; some variation of emphasis should be expected, depending on the nature of the project or the work of a department.

The priority given to one constraint or another is demonstrated as part of a departmental routine. The constraints are constant and part of the nature of the work being performed in each case. However, a project, unlike a department, will succeed or fail purely on the basis of the three constraints as follows:

1. *Result.* Completion of a specific, defined task or a series of tasks is the primary driving force behind the project. Unlike the recur-

Figure 1-2. Three project constraints.



ring tasks that are faced on the departmental level, the project is targeted to the idea of a finite, one-time result.

2. ***Budget.*** A project's budget is separate from the department's budget. The project team operates with a degree of independence in terms of control and money (even though each team member may be expected to continue completion of departmental tasks). Project teams may include individuals from several different departments; thus, budgetary controls cannot always be organized along departmental lines. A project may require a capital budget as well as an expense budget. As project manager, you may also have more than the usual amount of control over variances.

3. ***Time.*** Projects have specific starting and ending points. A well-planned project is based on careful controls over completion phases, which involves careful use of each team member's time.

Definition and Control

In organizing your project within the aforementioned limitations, you must also master two components that characterize every project. To complete the project successfully, you need to define, and to control, each aspect of the project itself. Without definition and control, you will be less likely to achieve (or know) the desired final result, within budget, and by the deadline.

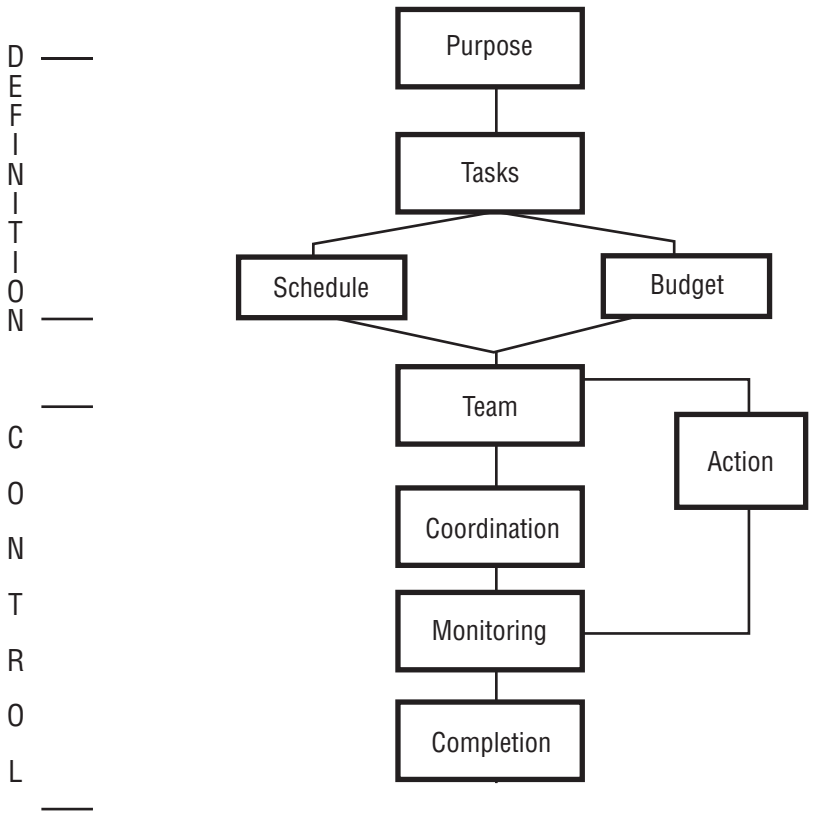
As illustrated in Figure 1-3, the definition component of the project is the proper starting point that leads through to the control phase.

Elements That Define a Project

- ***Purpose.*** What is the expectation? Why is the project being undertaken? What conclusions or answers to problems is it expected to produce?

- ***Tasks.*** How can a large project be broken down into a series of short-term progress steps? A large project can be overwhelming,

Figure 1-3. Defining and controlling the project.



whereas smaller steps can be attacked methodically and completed according to a schedule.

■ ***Schedule.*** What is the final deadline? With that deadline in mind, how should a series of smaller tasks be arranged, maintained, and timed? Effective task scheduling is the key to meeting longer-term deadlines.

■ ***Budget.*** How much should the project cost? Will the company need to invest in research, capital equipment, promotion, or market testing? What expenses will be involved, and how much money needs to be set aside for final completion? Will you be expected to complete

all or part of the project within your existing departmental budget, and is that expectation realistic?

Elements That Control a Project

- ***Team.*** You will not always be able to organize your team from your own department alone. However, before building a team, you need to develop project definitions so that you know the scope of the project.

- ***Coordination.*** By its nature, the project demands consistent and firm management. Committees do not work well if they are overly democratic, so as project manager you need to have complete responsibility for pulling together the efforts of everyone on the project team.

- ***Monitoring.*** Your schedule and budget will succeed only if you are able to spot emerging problems and correct them. Delegating work to others and creating a control system are essential, but they are only starting points. You also need to track the indicators that reveal whether your project is on schedule and within budget. So much of the job of project manager involves piloting the project that it may be your primary action; an especially complex project requires that monitoring be a constant.

- ***Action.*** If you discover that scheduling or budgetary problems are developing, action should be taken immediately to reverse those trends. If the team is falling behind schedule, the pace of work has to be accelerated. (Or, if it turns out that the original schedule was unrealistic, it should be revised right away.) If your expenses are exceeding budget, additional controls should be put into place to avoid further variances. These steps are possible only when you take action as soon as problems are discovered.

- ***Completion.*** Even when the project is effectively managed and kept on schedule for 99 percent of the time, if the final step is not taken the deadline will not be met. Even well-run projects sometimes prove difficult to close out. The final report or recommendation, the commitment to paper, often proves to be the hardest part of the entire project.

A New Look for Project Management

Project management is a *dynamic* process, and new ideas are continually entering into the methods of practice. Today's organization looks much different from the organization a decade ago, due to many factors: the Internet, information technology (IT), changing cultural beliefs, enlightened social ideas, and even experimental management techniques.

Among the trends affecting how your project will operate are four key areas:

1. ***Six Sigma.*** The management ideal has changed dramatically since widespread acceptance and use of Six Sigma. This important quality approach is not only a systematic way to tackle quality issues, but also a revised organizational culture. The inclusionary aspects of Six Sigma have vastly changed how many organizations work, including most of the Fortune 500 companies, federal and state governments, branches of the military, and not-for-profit companies. Six Sigma cannot be isolated from project management because it offers a framework for ensuring value and permanence in the output resulting from the project. Chapter 2 explains Six Sigma from a project management perspective.

2. ***Risk management.*** The concept of risk management has in the past been isolated to a rather one-dimensional view of risk itself. *Risk* used to be defined as something to be mitigated through insurance, passed on to vendors or other operating segments, or simply ignored as something unlikely to occur. Today, with an increased awareness of the expanded realm of threats, this has changed. Today, identity theft, automated system hacking, terrorism, internal sabotage, corporate espionage, pandemics, and natural disasters are but a few of the types of risks that—while always having been there—are now being more widely accepted as real and serious problems in every organization. The increased reliance on vendors overseas (often very few in number but originating in one country) augment the risks that organizations face from political unrest, strikes, transportation slowdown or disasters, and product quality control at the source.

Today, project managers have to expect to include risk management as one of the important attributes to be built into revised and improved processes and internal controls. This incorporates the concept of the *value chain*, which, like the supply chain, describes how a process evolves from start to finish. The value chain is intended as a method for building quality throughout a process, while also mitigating and preventing known risks. The value chain is the topic of Chapter 9.

3. ***Virtual project execution and integration.*** In the past, a project team normally included individuals with specific skills and experience in a closely defined area of function within an organization. This was necessary due to the limitations of communication before the Internet. So projects either were usually in one place or required travel, telephone meetings, or breakdowns of single projects into geographically distinct phases.

Today, many projects involve team members in multiple locations; this virtual team has to communicate as effectively as the single-location team of the past. Projects also include individuals from many different departments or segments. This cross-functional team is challenging because of different priorities, departmental points of view, and timing problems. Finally, managers face special problems when organizing projects that are global in nature. A multicultural team will present many challenges that projects managers have to contend with, not limited to time zones and language barriers, and including cultural differences and methods of communicating.

4. ***Outsourced suppliers and vendors as team requirements.*** The trend today is to outsource much of the work that in the past was kept internal and hands-on. As a result, much of the team activity you will lead will occur outside your physical location. Managing external team vendors or addressing the concerns of outside stakeholders presents new challenges to the modern project manager.

While project managers are concerned with control over schedules and budgets, as well as with interactions with team members, the evolving nature of today's organization presents many new efficient but challenging methods for doing business on all levels. A successful project manager has to be aware of these changing circumstances.

The Successful Project Manager

The successful project manager knows how to bring together the definition and control elements and operate them efficiently. The coordination of these two elements demands your leadership skills as well as organizational abilities.

In other words, as a qualified department manager, you already possess the attributes needed to succeed as a project manager as well. Chances are good that you will be selected to head up a project team based not only on the applicability of the project to your department, but also on your qualifications for the job. These qualifications are summarized in Figure 1-4 and elaborated on here:

1. ***Organizational and leadership experience.*** An executive seeking a qualified project manager naturally seeks an individual with a track record demonstrating basic organizational and leadership ability. These skills include the ability to:

- Manage the costs and expenses of the project
- Develop and monitor a schedule
- Lead a team well (i.e., by providing a required level of training and supervision when needed)

Figure 1-4. Project management qualifications.

1. Organizational and leadership experience.
2. Contact with needed resources.
3. Ability to coordinate a diverse resources pool.
4. Communication and procedural skills.
5. Ability to delegate and monitor work.
6. Dependability.

- Communicate well with outside resources as well as with top management
- Defuse any conflicts that arise, whether related to the work of the project or between individuals

2. ***Contact with needed resources.*** For projects involving a volume of coordination among departments, divisions, or subsidiaries, management seeks project managers who already maintain contact with those outside of their immediate department. Some refer to this skill as ''integration management,'' but in fact it is nothing more than being able to work with many different resources at the same time and in an effective way that leads to results. The manager who has demonstrated the ability to work well with those outside of the department is also suited to run a project across departmental lines.

3. ***Ability to coordinate a diverse resource pool.*** By itself, contact outside of your department may not be enough. Effective project management requires the ability to work and communicate with personnel in other departments, even when their backgrounds, disciplines, and emphases are dissimilar. For example, different types of departments may have particular points of view concerning the importance of financial information, meeting deadlines, or working on a team that crosses departmental lines. Therefore, as project manager, you'll be required to balance all perspectives and find common ground.

4. ***Communication and procedural skills.*** Project managers have to receive and convey information to and from all team members while remembering that not everyone has the same background. There is a tendency for individuals in one department to share a point of view; however, project managers have to be able to work with everyone on the team and to respect the differences that people bring to the task. Understanding the scope of a project is a first step. You also need to be able to convey the information to your core team. For example, a marketing manager who can communicate well with an accounting department employee concerning the financial aspects of a project will be more likely to succeed than a manager who is not able to cross those

communication lines. That manager also needs to be able to convey those same aspects and their importance to members of the team.

5. ***Ability to delegate and monitor work.*** Delegation by itself is not enough; you also need to ensure that:

- You delegate the work to a qualified person.
- The person you delegate to understands the assignment.
- Adequate oversight and supervision is available, if needed.
- The task is completed within budget and on schedule.

Managing time is critical for staying on schedule on two levels. You not only need to use your own time well and delegate when needed, but you also need to make sure that all individuals and subgroups of your team are working efficiently and effectively and staying on schedule. For example, a contractor building a house has to understand the processes involved in the work performed by each subcontractor, even when that work is specialized. The same is true for the project manager. If you delegate and then walk away, you have done only half the job. Delegation and monitoring have to work hand in hand, or they do not work at all.

6. ***Dependability.*** Management tests your dependability in only one way: by giving you responsibility and seeing whether you come through. Once management knows that you are able to take a project, define it, control the entire process, and deliver results, you gain the reputation for dependability. This is not limited to meeting the deadline and staying within budget; as project manager, you are also expected to set standards for quality and to meet them, as demonstrated in the final results.

These project management qualifications read like a list of evaluation points for every department manager. If you think of the aspects involved in running your department as a project of its own, then you already understand what is involved in organizing a project—the differ-

ence, of course, being that the project is finite in time, whereas your department's tasks are ongoing. Thus, every project manager is already qualified to take on a project, provided that it is related to the manager's skills, resources, and experience.

The Methodical Manager

The word *methodical* often refers to someone who is overly organized versus someone else who is more creative. However, you can be methodical and creative at the same time. A methodical approach to project management ensures consistent monitoring and adds to your chances of success.

True creativity requires discipline. A methodical, organized approach to problems ensures structure. Even when an outcome appears to be unstructured, it may well be the result of careful organization and planning. As project manager, you may need to take a creative approach to problem solving, especially considering that you may encounter problems not seen before. In this instance, the more methodically you approach the problem—that is, the more structured you are in your method of operation—the better your chances for finding creative and appropriate solutions.

The methodical manager knows the right questions to ask. When projects are assigned, your checklist should include the seven questions listed in Figure 1-5. Each is explained as follows:

1. ***What is the purpose of the project?*** From the description of your assignment, you make a series of assumptions about what is expected. But in fact, the person giving you the assignment could have something entirely different in mind. A large number of communication problems are derived from misunderstandings about definition.

2. ***What will the outcome look like?*** Be sure you know precisely what you are expected to produce at the end of the project. If you are asked to write procedures, clarify whether you are expected to produce a manual for the entire company or just provide each department with guidelines. When a project requires a written report, how much detail

Figure 1-5. A checklist of questions to ask.

1. What is the purpose of this project?
2. What will the outcome look like?
3. What problems will be encountered and solved?
4. What is my responsibility?
5. What is my authority?
6. What is my budget?
7. What is my deadline?

should be included? Will you be expected to make a presentation and, if so, in what forum?

3. ***What problems will be encountered and solved?*** Always assume that a project should be designed to identify and solve a number of well-defined problems. You cannot expect to be provided with a complete list of problems; in fact, the project process itself will invariably include a degree of discovery.

Even when you expect to encounter a range of problems beyond those mentioned in the initial assignment, a project should begin with an assumption: A specific series of problems will be identified, and your purpose is to solve them or suggest alternatives. Define your project in those terms.

4. ***What is my responsibility?*** As project manager, you deserve a clear definition of what you will be expected to do. Will you be responsible for identifying and recommending solutions, for putting them into effect, or only for comparing possible alternatives?

Be sure you understand exactly what level of responsibility you are being given. In some cases, you may be given responsibility to put changes into effect, but only in one division, subsidiary, or department.

5. ***What is my authority?*** The question of authority is perhaps of greater importance than that of responsibility. One without the other is

useless. If you need to recruit team members from other departments, change procedures, or implement a final decision related to your project, that level of authority should be explained clearly—not only to you, but to other managers whose departments will be affected.

6. ***What is my budget?*** Some projects can be executed with little expense beyond the commitment of time. Others may involve spending months conducting research, writing reports, or purchasing equipment, all of which takes up staff time as well.

Always begin the project with a clear understanding of the budget. Don't overlook the expense of staff time, since that has to be included in the total project cost required to achieve the project's desired result. In practice, projects often are assigned within one department and you are expected to execute the project without an additional budget while also continuing to perform your normal routines. Is this realistic? By clearly defining the scope of the project, you might discover that additional budgeting will be required. This has to be communicated upward to senior management so that you will be able to proceed with the resources you require.

7. ***What is the deadline?*** Always ask for a specific deadline. Only when you know the result that's expected can you establish a schedule and plan for execution of the project's phases. It often occurs that a deadline is unrealistic. If you believe you have not been provided with enough time, you need to take one of two steps. First, ask for more time, explaining why the original deadline is not practical. Or second, ask for an increased budget to hire more staff and accelerate the project's schedule.

In scheduling your project, it may be possible to overlap some phases and cut the time requirements to a degree. It is more desirable to build buffers into your phases so that schedule overruns can be absorbed without missing the final deadline. However, you are more likely to find yourself working against time without any flexibility.

Project Classification

The method you employ in planning and organizing your project depends on the type of project. If your department's routines are more

like projects than recurring tasks, then you will be more accustomed to facing new problems from day to day.

While the steps involved in defining, controlling, and finalizing a project may be the same, the effort is going to vary based on the project. Compare the different emphases for these projects:

Project scenario 1: Test marketing a new product. The method of market testing is well understood within the department, so project emphasis is concentrated in two areas: selecting a representative test region and evaluating results accurately.

Project scenario 2: Installing an automated system. In this project, the definition phase requires great care and effort. You may need to decide exactly what automation requirements are needed and which are not. The project may need to be modified to prioritize routines to be automated first, followed by those less suitable for automation or those that are excludable altogether. The scheduling of this project should also allow for transition issues, such as resistance to change among departments, the need for training and conversion time, and potential software problems that will have to be corrected during the project's final phases.

Project scenario 3: Changing departmental procedures. You may have more than the usual amount of flexibility in the deadline for this project. However, a realistic schedule should allow for time to speak with each employee. Changing procedures requires that each process be incorporated into the new system if it is to work well. The complexity of this project rests with how well your project team is able to document actual work requirements and incorporate those needs into the new procedure.

From these examples, it is obvious that every project has its own special problems. These may relate to schedule, budget, or the problems associated with working across departmental lines. Every project can be classified according to its scope and complexity based on:

- Resources you have to employ outside of your department
- The size of your project team

- The time span between inception and deadline
- Your familiarity with the information

As project manager, you must be able to stay on schedule and within budget and meet your final deadline—but all of that demands careful planning and organization. Subsequent chapters in this book explain how to put methods to work for mastering even the most complex project. No job is too large if it is first defined completely and then broken down into logical and progressive steps. Chapter 2 explains the initial phase: creating the plan and defining objectives.

WORK PROJECT

1. Explain the distinction between projects and routines according to the following criteria:
   - **a.** Range of functions
   - **b.** Relationship of activities or routines
   - **c.** Goals and deadlines
   - **d.** Project results
2. Name the three constraints under which a project is executed. Explain how these constraints define your control responsibility.
3. Compare the definition and control elements of a project. Why are both essential to the successful execution of the assignment?



The Six Sigma Approach

What is a committee? A group
Of the unwilling, picked from
The unfit, to do the unnecessary.

—RICHARD HARKNESS—

''That was a tough budget meeting, the worst I've ever seen,'' one supervisor told another. ''They cut *everything*.''

''Everything?''

''Yes, and I mean everything. They even cut back on the Six Sigma program. Now it's known as Four Sigma.''

The popular view of committees as inefficient groups prevails in all organizations, even in those depending on the consensus approach to projects, quality control, and even simple decision making. However, a committee does not have to be inefficient. By definition, a project team is a committee, but it is expected to produce results. This means that the project management team needs a system in place to make it form

effectively, unlike the traditional committee, and to achieve the desired results. This is where Six Sigma plays a role.

The Six Sigma system is an approach to quality control that has become popular in most of the Fortune 500 companies, military organizations, and throughout the American corporate world. This is so because Six Sigma produces results on two levels. Most apparent are its structure and definition. Less apparently, however, is its cultural aspect. The Six Sigma approach relies on a complete change in organizational thinking. Rather than continuing to operate on the theory that ''It's not my job,'' under the Six Sigma organizational culture, everyone is involved in quality and excellence.

Putting aside the cynicism that managers often adopt when confronted with one of many varieties of a quality control system, Six Sigma is quite different. It certainly has roots in quality control and manufacturing, but, applied universally to organizational systems, it is much more. For a project manager, Six Sigma provides a method for defining a project, tracking it, and enabling all members of the team to excel and to succeed in executing a project, whether aimed at quality control, changes in internal systems, or greater working efficiency.

The Meaning of Six Sigma

The Greek letter sigma (σ) is used to denote the statistical standard deviation, or a rate of defects in any process. The sigma formula is complex, but it has real significance in identifying how well a process works and, of equal value, how well an improved program works to change the rate of defects (known as ''standard deviation,'' ''spread,'' or ''variability'' to statisticians).

When standard deviation is taken up to six levels, the result is 3.4 defects per million, or as close to perfection as you can expect statisti-

Valuable Resource

To calculate standard deviation, use the free online calculator at http://www.easycalculation.com/statistics/standard-deviation.php

cally. The outcome of 99.9997 percent easily rounds up to 100 percent. So Six Sigma is defined as the ultimate perfection. No process is expected to change to ensure a 100 percent outcome. But the philosophy of Six Sigma states that by knowing what perfection looks like, it becomes possible to measure improvement. Following are the various Sigma levels in terms of defects per million and the representative percentages that apply:

Sigma Level	Defects per Million	Percentage (%)
6.0	3.4	99.9997
5.0	233.0	99.977
4.0	6,210.0	99.379
3.0	66,807.0	93.32
2.0	308,538.0	69.1
1.0	691,462.0	30.9

There are significant differences between degrees of Sigma. So in measuring improvements in terms of defect-free processes, changing from a 2 Sigma to a 3 Sigma is a vast improvement. This is a central theme in the six Sigma concept: It is intended as a method for measuring outcomes in a tangible and specific manner.

So when any operations are performed, you can measure the Sigma of outcomes. Before your project, for example, you might observe that out of 1,415 identified operations, 209 fell outside the acceptable range of outcomes. (This may refer to product defects, faulty repair operations, negative customer contacts, late deliveries, financial results containing errors, or any process that can be measured.) This means that 1,206 operations resulted in the acceptable range of outcomes. In Six Sigma, this is quantified as 1,206 ÷ 1,415 = 85.2 percent. This is slightly better than a 2.5 Sigma. If a project could improve the acceptable outcomes to 1,325 (meaning reducing unacceptables to 90), it

would improve to a level of over 3.0 Sigma: 1,325 ÷ 1,415 = 93.6 percent.

This approach to quality control is the perfect venue for project management. In so many instances, project managers face the dilemma of not knowing how to measure results. If the project is simply designed to cut expenses or speed up processes, outcome is easily quantified without Six Sigma. But so many projects are not as clearly defined that a starting point in a project may be to add that definition to the process. This gives the manager and the project team a scorekeeping procedure, so that everyone will know whether they are on schedule, within budget, and accomplishing their clearly stated project goals. It is immediately apparent that applying Six Sigma in the project definition adds great value to all phases of the project.

The origins of Six Sigma are traced back to the 1980s, when Motorola initiated the concept. A Motorola engineer named Mikel Harry realized that internal systems lacked a means for measuring even when improvement initiatives were put in place. Harry argued that by changing project systems so that variations could be measured, it would provide a means for identifying improvements as well. Other quality systems measure only performance; Harry designed Six Sigma to track variation (defects) in processes and to develop methods for reducing those variations.

By the 1990s the concept had been formulated, tested, and expanded, and many corporations adopted it as both a project management system and an organizational culture. Six Sigma teams are not based on rank within the corporation, in which executives oversee managers, and so forth down the line to the rank and file. Instead, a team leader and a team are set up based on qualifications to execute a project, crossing both rank and departmental lines. In many respects, this approach was revolutionary. It took form under the leadership of Jack Welch at General Electric (GE). Welch demonstrated that Six Sigma was much more than just another name for a quality-control initiative. By 1999, GE's cost savings exceeded $1 billion.

The projects GE ran were measured in terms of cost reduction, a natural way to create performance tests in any corporation. However, GE also experienced improvements in production, communications,

and supply chain processes, all contributing to the impressive annual savings that Welch attributed to the company's Six Sigma program.

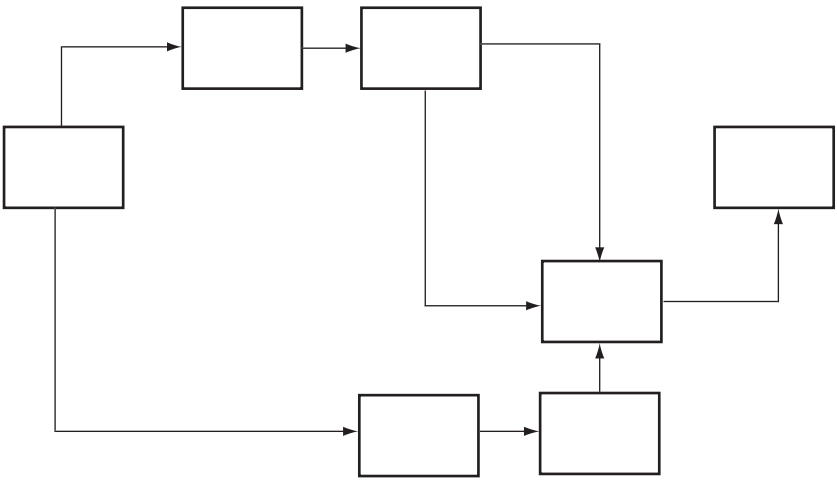
Business Process Management (BPM)

A Six Sigma approach to project management begins, like all well-run projects, with specific definitions. Business Process Management (BCM), which has also been called the Business Process Model, describes how work moves from step to step through the organization. The same model is effectively applied to describe a more focused project, so that the project team can define those processes and identify the important focus areas (weak links in the process, likely points where defects occur, or bottleneck areas within the process itself).

BPM is the basis for the visual representation of a process. The well-known flowchart is intended to break down a process into its specific steps, to identify the person, department, or team responsible for execution, and to delineate the all-important flow (where a step originates, what gets done, and where it goes next). Computer people are used to seeing processes graphically represented in a top-to-bottom format. For work flow, it makes more sense for the flow to be shown going from left to right, with the responsibility represented by levels and easily viewed and with the timeline identified along the way. This left-to-right concept makes it easy to identify all of the elements, including multiple processes that invariably come into play. It would be rare for a process to involve a single process line; it is far more likely that two or more concurrent steps are going to be undertaken. While this accelerates the possibility of error or defect, it is a reality.

Figure 2–1 shows a simplified version of the horizontal flowchart. This concept is explored in greater depth in Chapters 7, 8, and 9. In this illustration, four separate departments, teams, or individuals are involved. These are represented on the horizontal plane in the illustration. Because the execution of each step is managed by different levels (people or groups), they are referred to as *areas of responsibility*. You can also see in this simplified flowchart how a process may split into several parts. As the process moves from left to right, the interaction between areas of responsibility and the time involved is also easily ob-

Figure 2-1. Horizontal flowchart.



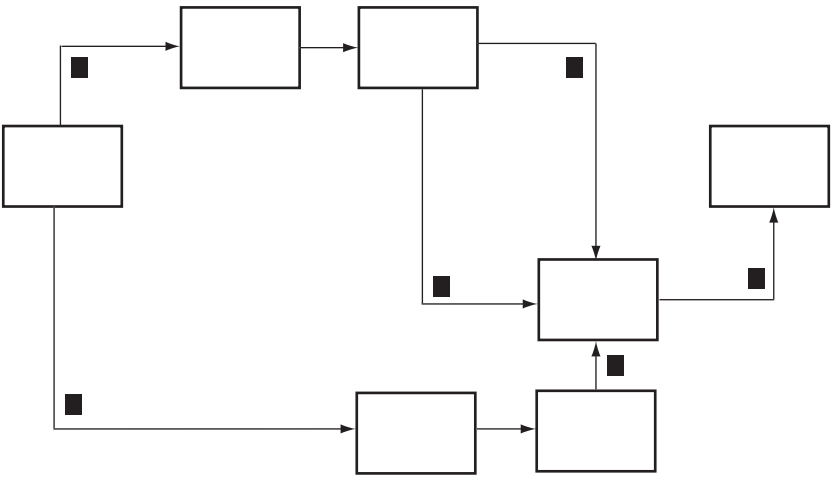
served. If each segment of the process is identified in terms of time (days or weeks required for completion), the BPM can also be relied on to identify timing of the entire project. Steps requiring more time are represented with greater space between steps.

BPM is more than a passive summary of work flow. It can and should serve as the basic outline of the whole project, allowing you to observe the areas of responsibility, time involved, multiple process flow, potential timing bottlenecks, and weak links. A so-called weak link is most likely to occur whenever the process passes from one area of responsibility to another.

The BPM approach, as a starting point in the Six Sigma approach to project management, defines all of the steps in the project, so that you can ensure that nothing has been overlooked or ignored. When you begin to analyze processes in terms of BMP flow, any omissions become apparent very quickly. You can further emphasize likely weak links by adding emphasis to the horizontal flowchart. For example, in Figure 2–2, black rectangles are used to highlight. Here, six specific places are identified where weak links occur, also meaning where defects or errors are most likely. These occur at any place on the BPM where the process moves from one area of responsibility to another.

Once you have focused on these handoff points, you will be able

Figure 2-2. Horizontal flowchart with weak link emphasis added.



to reduce the problems in any project by a significant degree. This is due to the tendency for problems to arise at those very points. It is true that weak links also arise even when processes are being executed within an area of responsibility, but the more serious weak links are far more likely in the places shown in the illustration.

Project Participants and Goal Definitions

In the Six Sigma approach to project management, a series of individual participants is involved. It is crucial to make distinctions among these individuals. Projects often fall apart due to lack of clarity about who is the actual leader, who is on the team, what each member's duties are, and who benefits from the process.

Six Sigma is quite elaborate and formal in its structure and design, and a team consists of numerous individuals. Some of these include a leadership team or council, sponsor, implementation director, coach, team leader, team member, and process owner. For many projects and teams, this formality involves excessive layers. In a formal and complex project, that level of organization might be necessary, and in that case the project team should be structured along very specific Six Sigma lines. Although this degree of formality is instructive, an assumption is

made here that fewer participation layers are adequate in a majority of cases. Projects often are short term, confined to one department or segment, and with a very limited number of people on the team. With this in mind, a few participants are identified, including:

1. ***Project manager.*** The manager, or team leader, should be one individual, clearly identified from the onset and given adequate authority to lead the team through the project. As a project manager, you define the ultimate goal in consultation with your team, set a schedule and budget, assign specific tasks, and ensure that the project goals are met.

2. ***Project team members.*** Team members may come from different departments and may even outrank the project manager in the organizational hierarchy. Each team member is assumed to be chosen by the manager due to a set of skills and knowledge essential for completion of the project. This also defines what each member will do within the team, and how each member works with other team members.

3. ***Process owner.*** In Six Sigma, the process owner is identified as the individual or department that benefits from an improved process or system or who will be responsible for executing a series of tasks in a newly defined process. This is an interesting concept often overlooked in the non–Six Sigma project management system. But it is an essential element. Process owners are often also project managers or team members, but not always. An assumption may be added to the project management concept, however, to make it work better: Being aware of the identity of a process owner largely defines how a project is defined and structured, as well as how it is organized and executed.

The identification of a project manager, team members, and process owner also shape the goals of the project. The expression, ''If you don't know where you're going, any road will get you there'' has application in project management. Defining the elements of the project has to start with identifying the essential people who will design and execute it. Goal setting is a definition phase that has to be completed before anything else can occur. Otherwise, the project team will find itself on

''any road'' without a clear objective and without the ability to know whether it is moving in the right direction.

It is very useful in defining the goals of a project to move beyond the obvious and common ideal of cutting expenses or speeding up processing time. The financial goal is important within the organization, but more may be involved. Goals such as improved safety, security, internal controls, lower rate of defects, improved customer satisfaction and response, risk mitigation and planning, and any number of additional goals can and should play a role in defining the project.

A second element in goal setting should always involve customer service. A popular belief is that employees either interact with customers or they do not. So a marketing and sales orientation identifies end user customers or clients (buyers) as the most important contact, whereas nonmarketing and nonsales employees have no contact with customers. So mailroom employees, shipping and receiving personnel, accountants, analysts, internal auditors, administrative assistants, and even top executives are set apart and viewed as belonging to the group of employees who never see a customer.

An enlightened variation of this organizational culture is to assume that everyone has a customer. Some customers, such as those known to sales and marketing, are external. Others are internal. Anyone who receives or sends mail is a customer of the mailroom, anyone getting a paycheck is a customer of the payroll department, and anyone requiring clerical help is a customer of a variety of administrative assistants, clerks, and other office employees. In other words, *everyone* has a customer, and *everyone* is in the customer service business.

This enlightened view of organizational culture, promoted by the Six Sigma philosophy, helps to broaden the project management concept as well. It helps to explain how and why one goal of every project should be to improve ''customer service'' in its many different definitions. Every project, no matter what its design or purpose, contains customer service elements under this universal definition. The inclusion of all employees and departments, as providers and customers, also clarifies all of the project goals, as well as improving overall performance and interaction.

Defining Goals in Terms of Customer Service

A project's initial stated goal is likely to be fairly simple. For example:

- Reduce costs in the department to meet the current budget and produce greater profit margins in future years.
- Identify causes of defects and reduce the defect rate.
- Improve response time to customer complaints.

These typical goals relate to the most immediate problem, and project teams often are formed with these initial problems in mind. The problem and solution may seem quite evident. But upon examination, the problems might be more complex, requiring more effective solutions. For example:

- Reducing costs in the department might require vastly improved internal controls to reduce idle time, theft, or inefficiency; these require not only improved internal controls but more effective use of human resources and improved monitoring.
- Causes of defects might include outdated equipment, poor training, or employee morale problems, so that improved processes alone will not address the underlying issues; the causes may be more complex than simply pinning outcomes to a desired goal.
- Response time to complaints most often includes poor communication between complaint sources and responsible individuals or departments, or improvement may demand higher levels of training or even revisiting the basic production or delivery of products; the goal of speeding up response time is only an attribute of a larger problem.

The Six Sigma approach to project management looks at goals in terms of underlying causes, and these drive the process (BPM). If it is driven by the desired results, many projects are not going to be permanent or effective. Keeping the customer (external or internal) in mind, the

effective design of a project has to rely on defining these root causes as part of developing solutions.

Another valuable concept within Six Sigma is called Voice of the Customer (VOC), which refers to an overlay of customer requirements as part of defining the project and its goals. Project managers who employ VOC in the defining phase of a plan continually ask themselves and their team, ''What are the customer's expectations and desires?'' (Remember, the end user may be external or internal.) In many instances, the internal customer is also the process owner, but not always. When a project is aimed at improving a working environment or process for a specific department, for example, then that department is both customer and process owner. When a project is designed to improve quality, efficiency, or response to an external customer, then the process owner will be the department, sector, or employee responsible for communication with that external customer. So VOC may be a direct link to an external consumer or a set of expectations on the part of an internal customer (process owner).

Paying attention to VOC, with a clear focus on the desired end result, is the goal for every project manager. The action plan expressed in a Six Sigma program is naturally well suited to every project; it is called DMAIC (define, measure, analyze, improve, control). This five-part study of quality as part of the project helps to deliver an excellent and successful result. It formalizes the process every project manager needs to move through. One drawback to Six Sigma is its formality and use of many abbreviations for multipart processes. These highly structured approaches to project management vary in applicability. The structure is not necessary for smaller projects, but it serves as a useful guideline for how to begin:

1. ***Define.*** In this first phase, you need to identify the crucial components of the team and study the proposed outcome from the point of view of the process owner and of any and all stakeholders. (A *stakeholder*, in six Sigma terms, is anyone with a direct interest in the project and its outcome.) You also need to express a project goal. In Six Sigma, this is called the *project charter*, used to summarize the business case, scope, and goals of the project. Finally, you need to begin filling in a process map, the elements of the project including suppliers, steps,

and output. Six Sigma calls this the SIPOC (suppliers, input, process, output, and customers). Without definition, the project cannot take shape or reach its goal. The steps in the defining process are the foundation of the project, an essential starting point on which everything else is going to be built.

2. ***Measure.*** In this phase, three specific steps are involved. First and most obvious is data collection, the activity of deciding what data will be required and then actually accumulating it, possibly from a variety of areas. All sources (input, process, output) can be used for the data that the project team will need. Second is data evaluation. To understand how a process is currently working and what is needed to make improvements, your project team will have to evaluate data, observe the rate and likelihood of defects, focus on weak links, and quantify the defect rate to decide how to reduce it. The third step is the development of systems and processes aimed at preventing defects before they occur. Six Sigma folks call this the Failure Mode and Effects Analysis (FMEA), the process of determining precisely what can go wrong and how to reduce problems. The risk management aspects of this process are crucial, even when you do not use the technical terminology for it. The risk management process may include rating possible defects or failures by (a) the potential of occurrence, (b) the ability to detect the defect, and (c) a level of severity. This risk management rating system helps in determining how best to proceed in ranking and then reducing defects.

3. ***Analyze.*** In this self-monitoring phase, a project team decides how effectively it is progressing through the project and whether its changes are effective. This should be as complex as required or as simple as necessary to be effective. The purpose is to be able to identify and rank defects *and* then to conclude whether specific changes and controls are effective. The analysis includes a study of root causes, processes, data, resources, and communications. Any or all of these may contribute to failures and often define and point to weak links.

For example, if source data are flawed, then the entire process starts out at a disadvantage and will be more failure-prone. If processes lack controls, then failures are inherently more frequent. The data are

assumed to be reliable in a controlled process, but if variables are present then weak links are inevitable. Resources (notably human resources) must be adequate to the task, so equipment must be effective and in working order, and employees have to be completely trained to keep defects or failures to a minimum. Finally, communications are essential for process control. It was a revolutionary idea a few years ago when Toyota instituted a system allowing any auto assembly worker to stop the entire line if he or she saw a defect. Yet it makes perfect sense: Stopping the problem right away prevents further problems. Although Toyota had to overcome a cultural resistance among employees monitoring one another, the ability to effectively communicate cut defects considerably.

4. ***Improve.*** Measuring and analyzing are essential steps, but they are only valuable when you take additional steps to improve current conditions. As project manager, your responsibility is not limited to getting the steps completed. If known defects or weak links are not fixed, the project will not be successful. This is where the project team becomes valuable. Team members may be encouraged to offer alternative solutions to discovered weak links or failures. If many good ideas come forward, part of the project dynamic may include experimenting with different solutions.

Part of the improve phase often overlooked is the development of plans for future changes. Today, most organizations are continually handling new technology, delivery systems, markets, and, of course, threats. Risk management requires that today's solutions be flexible enough to adjust as future threats emerge or as today's processing environment evolves. Once you identify the weak links in a process, you will also know where to plan for renovations of a newly installed system of controls and counter measures.

5. ***Control.*** This is the last phase. To many organizational leaders, the word ''control'' simply means checking and verifying. The idea here is to make sure that all steps are taken and that any security threats are countered and removed, as applied to anything from balancing a worksheet to safeguarding inventory. But this is only part of the control universe. Quality control, development, and enforcement of standards,

including reduction of defects as the most apparent version, is what Six Sigma is all about, at least initially. Every project manager will be concerned with quality control in all aspects of the work. However, control also relies on standardization. Processes are made more reliable when each step is made as uniform as possible. Value chain analysis has shown that the exceptions slow down processes, add costs, and may also lead to additional defects and failures. A standardized process reduces the problems.

Another aspect of control is development of an appropriate response. This has to be built into the entire procedure. For example, if Toyota had merely trained its assembly line employees on how to recognize defects and communicate them in a written report, the final product would have gone forward without being fixed. The system was made effective by allowing anyone on the line to pull a cord and stop everything right away. This was an appropriate response. It had the added benefit of improving a sense of teamwork among the entire crew, but, from a control point of view, it was crucial to stop the line *immediately* when a defect was recognized.

The response to discovered defects is part of your project management challenge. Whether you adhere to a strict and complex interpretation of Six Sigma or merely apply its principles informally, a project is not complete until you make specific recommendations to fix them. Some projects are passive in nature, limited to a study of the current process, but lacking authority to make changes. So a project manager may issue a report describing the flaws and providing recommendations to management. But what if no action is taken?

If you are given the job of project manager but not the authority to put changes into effect, this can be a frustrating exercise, especially if management merely files your report and nothing changes. That is a waste of resources and a misuse of your talents as well as those of your team. To make sure that Six Sigma and other systematic approaches work, remember to add value by including the following attributes to your final report:

1. First and foremost, analyze the cost savings your proposed changes offer, and lay these out on page one.

2. Propose very specific action plans that can be taken immediately. Outline them and explain how they improve the situation.
3. Unless some other department or sector is responsible for the process, volunteer to execute the changes as part of your project.
4. If you will not be given the responsibility for executing improvements, anticipate who will be given the task and recommend a step-by-step action plan.

Six Sigma is an incredible tool for managing complex projects, and it works exceptionally well in large organizations with expanded bureaucracies. However, the formality is not always appropriate. For any project limited to a single department or sector within the company, a simplified approach, using the same defining aspects of Six Sigma but without the tiers and operational rules, may be more effective. This is also true when a project team is limited in number. Some large complex projects require coordination among many departments and sectors, and in those instances Six Sigma's structure is valuable both in training and execution. A good guideline is simply that the complexity of the project's team structure should be justified by its scope and requirements, and the structure should never be more complex or more formal than circumstances demand.

WORK PROJECT

1. Describe the major aspects of the Six Sigma program in relation to its quality-control features and as part of the organizational culture.
2. Give three examples of a weak link in a system, and describe conditions within the process where these are most likely to occur.
3. Provide an example of each step in the DMAIC process, applied to a typical project that you might be asked to lead.