

5.3: Project Characteristics and Constraints

The starting point in discussing how projects should be properly managed is to first understand what a project is and, just as importantly, what it is not.

People have been undertaking projects since the earliest days of organized human activity. The hunting parties of our prehistoric ancestors were projects, for example; they were temporary undertakings directed at the goal of obtaining meat for the community. Large complex projects have also been with us for a long time. The pyramids and the Great Wall of China were in their day of roughly the same dimensions as the Apollo project to send men to the moon. We use the term “project” frequently in our daily conversations. A husband, for example may tell his wife, “My main project for this weekend is to straighten out the garage.” Going hunting, building pyramids, and fixing faucets all share certain features that make them projects.

Project Attributes

A project has distinctive attributes that distinguish it from ongoing work or business operations. Projects are temporary in nature. They are not an everyday business process and have definitive start dates and end dates. This characteristic is important because a large part of the project effort is dedicated to ensuring that the project is completed at the appointed time. To do this, schedules are created showing when tasks should begin and end. Projects can last minutes, hours, days, weeks, months, or years.

Projects exist to bring about a product or service that hasn’t existed before. In this sense, a project is unique. Unique means that this is new; this has never been done before. Maybe it’s been done in a very similar fashion before but never exactly in this way. For example, Ford Motor Company is in the business of designing and assembling cars. Each model that Ford designs and produces can be considered a project. The models differ from each other in their features and are marketed to people with various needs. An SUV serves a different purpose and clientele than a luxury car. The design and marketing of these two models are unique projects. However, the actual assembly of the cars is considered an operation (i.e., a repetitive process that is followed for most makes and models).

In contrast with projects, operations are ongoing and repetitive. They involve work that is continuous without an ending date and with the same processes repeated to produce the same results. The purpose of operations is to keep the organization functioning while the purpose of a project is to meet its goals and conclude. Therefore, operations are ongoing while projects are unique and temporary.

A project is completed when its goals and objectives are accomplished. It is these goals that drive the project, and all the planning and implementation efforts undertaken to achieve them. Sometimes projects end when it is determined that the goals and objectives cannot be accomplished or when the product or service of the project is no longer needed and the project is cancelled.

Definition of a Project

There are many written definitions of a project. All of them contain the key elements described above. For those looking for a formal definition of a project, the Project Management Institute (PMI) defines a project as a temporary endeavor undertaken to create a unique product, service, or result. The temporary nature of projects indicates a definite beginning and end. The end is reached when the project’s objectives have been achieved or when the project is terminated because its objectives will not or cannot be met, or when the need for the project no longer exists.

Project Characteristics

When considering whether or not you have a project on your hands, there are some things to keep in mind. First, is it a project or an ongoing operation? Second, if it is a project, who are the stakeholders? And third, what characteristics distinguish this endeavor as a project?

Projects have several characteristics:

- Projects are unique.
- Projects are temporary in nature and have a definite beginning and ending date.
- Projects are completed when the project goals are achieved or it’s determined the project is no longer viable.

A successful project is one that meets or exceeds the expectations of the stakeholders.

Consider the following scenario: The vice-president (VP) of marketing approaches you with a fabulous idea. (Obviously it must be “fabulous” because he thought of it.) He wants to set up kiosks in local grocery stores as mini-offices. These offices will offer

customers the ability to sign up for car and home insurance services as well as make their bill payments. He believes that the exposure in grocery stores will increase awareness of the company's offerings. He told you that senior management has already cleared the project, and he'll dedicate as many resources to this as he can. He wants the new kiosks in place in 12 selected stores in a major city by the end of the year. Finally, he has assigned you to head up this project.

Your first question should be, "Is it a project?" This may seem elementary, but confusing projects with ongoing operations happens often. Projects are temporary in nature, have definite start and end dates, result in the creation of a unique product or service, and are completed when their goals and objectives have been met and signed off by the stakeholders.

Using these criteria, let's examine the assignment from the VP of marketing to determine if it is a project:

- Is it unique? Yes, because the kiosks don't exist in the local grocery stores. This is a new way of offering the company's services to its customer base. While the service the company is offering isn't new, the way it is presenting its services is.
- Does the product have a limited timeframe? Yes, the start date of this project is today, and the end date is the end of next year. It is a temporary endeavor.
- Is there a way to determine when the project is completed? Yes, the kiosks will be installed and the services will be offered from them. Once all the kiosks are installed and operating, the project will come to a close.
- Is there a way to determine stakeholder satisfaction? Yes, the expectations of the stakeholders will be documented in the form of requirements during the planning processes. These requirements will be compared to the finished product to determine if it meets the expectations of the stakeholder.

If the answer is yes to all these questions, then we have a project.

The Process of Project Management

You've determined that you have a project. What now? The notes you scribbled down on the back of the napkin at lunch are a start, but not exactly good project management practice. Too often, organizations follow Nike's advice when it comes to managing projects when they "just do it." An assignment is made, and the project team members jump directly into the development of the product or service requested. In the end, the delivered product doesn't meet the expectations of the customer. Unfortunately, many projects follow this poorly constructed path, and that is a primary contributor to a large percentage of projects not meeting their original objectives, as defined by performance, schedule, and budget.

In the United States, more than \$250 billion is spent each year on information technology (IT) application development in approximately 175,000 projects. The Standish Group (a Boston-based leader in project and value performance research) released the summary version of their 2009 CHAOS Report that tracks project failure rates across a broad range of companies and industries (Figure 2.1).

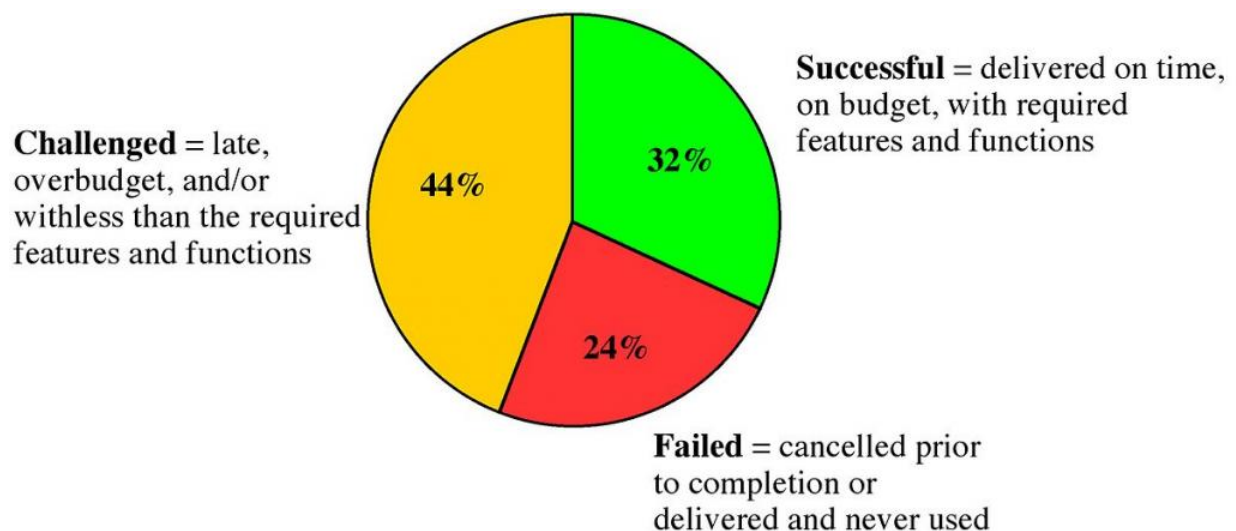


Figure 2.1: Summary of 2009 Standish Group CHAOS report.

Jim Johnson, chairman of the Standish Group, has stated that "this year's results show a marked decrease in project success rates, with 32% of all projects succeeding which are delivered on time, on budget, with required features and functions, 44% were

challenged-which are late, over budget, and/or with less than the required features and functions and 24% failed which are cancelled prior to completion or delivered and never used.”

When are companies going to stop wasting billions of dollars on failed projects? The vast majority of this waste is completely avoidable: simply get the right business needs (requirements) understood early in the process and ensure that project management techniques are applied and followed, and the project activities are monitored.

Applying good project management discipline is the way to help reduce the risks. Having good project management skills does not completely eliminate problems, risks, or surprises. The value of good project management is that you have standard processes in place to deal with all contingencies.

Project management is the application of knowledge, skills, tools, and techniques applied to project activities in order to meet the project requirements. Project management is a process that includes planning, putting the project plan into action, and measuring progress and performance.

Managing a project includes identifying your project’s requirements and writing down what everyone needs from the project. What are the objectives for your project? When everyone understands the goal, it’s much easier to keep them all on the right path. Make sure you set goals that everyone agrees on to avoid team conflicts later on. Understanding and addressing the needs of everyone affected by the project means the end result of your project is far more likely to satisfy your stakeholders. Last but not least, as project manager, you will also be balancing the many competing project constraints.

Project Constraints

On any project, you will have a number of **project constraints** that are competing for your attention. They are cost, scope, quality, risk, resources, and time.

- **Cost** is the budget approved for the project including all necessary expenses needed to deliver the project. Within organizations, project managers have to balance between not running out of money and not underspending because many projects receive funds or grants that have contract clauses with a “use it or lose it” approach to project funds. Poorly executed budget plans can result in a last-minute rush to spend the allocated funds. For virtually all projects, cost is ultimately a limiting constraint; few projects can go over budget without eventually requiring a corrective action.
- **Scope** is what the project is trying to achieve. It entails all the work involved in delivering the project outcomes and the processes used to produce them. It is the reason and the purpose of the project.
- **Quality** is a combination of the standards and criteria to which the project’s products must be delivered for them to perform effectively. The product must perform to provide the functionality expected, solve the identified problem, and deliver the benefit and value expected. It must also meet other performance requirements, or service levels, such as availability, reliability, and maintainability, and have acceptable finish and polish. Quality on a project is controlled through quality assurance (QA), which is the process of evaluating overall project performance on a regular basis to provide confidence that the project will satisfy the relevant quality standards.
- **Risk** is defined by potential external events that will have a negative impact on your project if they occur. Risk refers to the combination of the probability the event will occur and the impact on the project if the event occurs. If the combination of the probability of the occurrence and the impact on the project is too high, you should identify the potential event as a risk and put a proactive plan in place to manage the risk.
- **Resources** are required to carry out the project tasks. They can be people, equipment, facilities, funding, or anything else capable of definition (usually other than labour) required for the completion of a project activity.
- **Time** is defined as the time to complete the project. Time is often the most frequent project oversight in developing projects. This is reflected in missed deadlines and incomplete deliverables. Proper control of the schedule requires the careful identification of tasks to be performed and accurate estimations of their durations, the sequence in which they are going to be done, and how people and other resources are to be allocated. Any schedule should take into account vacations and holidays.

You may have heard of the term “triple constraint,” which traditionally consisted of only time, cost, and scope. These are the primary competing project constraints that you have to be most aware of. The triple constraint is illustrated in the form of a triangle to visualize the project work and see the relationship between the scope/quality, schedule/time, and cost/resource (Figure 2.2). In this triangle, each side represents one of the constraints (or related constraints) wherein any changes to any one side cause a change in the other sides. The best projects have a perfectly balanced triangle. Maintaining this balance is difficult because projects are prone to change. For example, if scope increases, cost and time may increase disproportionately. Alternatively, if the amount of money you have for your project decreases, you may be able to do as much, but your time may increase.

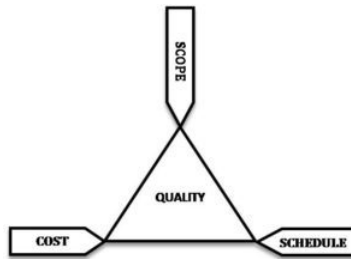


Figure 2.2: A schematic of the triple constraint triangle.

Your project may have additional constraints that you must face, and as the project manager, you have to balance the needs of these constraints against the needs of the stakeholders and your project goals. For instance, if your sponsor wants to add functionality to the original scope, you will very likely need more money to finish the project, or if they cut the budget, you will have to reduce the quality of your scope, and if you don't get the appropriate resources to work on your project tasks, you will have to extend your schedule because the resources you have take much longer to finish the work.

You get the idea; the constraints are all dependent on each other. Think of all of these constraints as the classic carnival game of Whac-a-mole (Figure 2.3). Each time you try to push one mole back in the hole, another one pops out. The best advice is to rely on your project team to keep these moles in place.

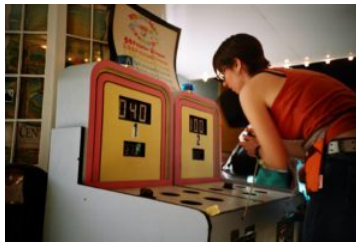


Figure 2.3: Whac-a-mole.

Here is an example of a project that cut quality because the project costs were fixed. The P-36 oil platform (Figure 2.4) was the largest floating production platform in the world capable of processing 180,000 barrels of oil per day and 5.2 million cubic metres of gas per day. Located in the Roncador Field, Campos Basin, Brazil, the P-36 was operated by Petrobras.



Figure 2.4.: The Petrobras P-36 oil platform sinking.

In March 2001, the P-36 was producing around 84,000 barrels of oil and 1.3 million cubic metres of gas per day when it became destabilized by two explosions and subsequently sank in 3,900 feet of water with 1,650 short tons of crude oil remaining on board, killing 11 people. The sinking is attributed to a complete failure in quality assurance, and pressure for increased production led to corners being cut on safety procedures. It is listed as one of the most expensive accidents with a price tag of \$515,000,000.

The following quotes are from a Petrobras executive, citing the benefits of cutting quality assurance and inspection costs on the project.

“Petrobras has established new global benchmarks for the generation of exceptional shareholder wealth through an aggressive and innovative program of cost cutting on its P36 production facility.”

“Conventional constraints have been successfully challenged and replaced with new paradigms appropriate to the globalized corporate market place.”

“Elimination of these unnecessary straitjackets has empowered the project's suppliers and contractors to propose highly economical solutions, with the win-win bonus of enhanced profitability margins for themselves.”

“The P36 platform shows the shape of things to come in the unregulated global market economy of the 21st century.”

The dynamic trade-offs between the project constraint values have been humorously and accurately described in Figure 2.5.

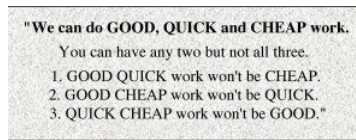


Figure 2.5: Good, Quick, Cheap: Choose two. A sign seen at an automotive repair shop. [\[Image Description\]](#)

Image Descriptions

Figure 2.5 image description: The sign says, “We can do good, quick, and cheap work. You can have any two but not all three. 1. Good, quick work won’t be cheap. 2. Good, cheap work won’t be quick. 3. Quick, cheap work won’t be good.” [\[Return to Figure 2.5\]](#)

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