Mastering Project Time Management, Cost Control, and Quality Management
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Proven Methods for Controlling the Three Elements that Define Project Deliverables

Randal Wilson
I dedicate this book to my wife Dusty and son’s Nolan, Garrett, and Carlin, for their support and patience through this project.
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About the Author

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Introduction

Organizations will structure their operations based on strategic objectives and through acquisitions and management of resources. They will conduct daily work activities to produce products that will accomplish goals consistent with their strategic objectives. To be effective in structuring the organization and in acquiring and managing resources to perform daily activities, the project manager requires a management structure to design, organize, and manage resources to accomplish daily objectives. Management will be most concerned about the type of resources that will be selected—the cost of resources, materials, equipment, and facilities as well as the time to set up the operation and conduct daily work activity. Establishing an operation is typically an enormous amount of work. Further, once completed, management has the task of overseeing all resources to conduct daily work activities to manage three primary concerns: the cost incurred to conduct the operation and produce daily deliverables or products, the amount of time it takes to produce products, and the overall quality of the products when completed.

The operation is considered successful when it can produce products that can be sold at a market value that is higher than the cost to create the product—therefore, the products are profitable and beneficial to the organization. Part of this cost includes the amount of time it takes to create the product and whether the quality is acceptable within the marketplace at the price being offered. Operations managers, therefore, are given an operations budget for each department to manage all purchases to stay on budget and secure profit margins. Operations managers also have a schedule of deliveries for products and need to manage resources to ensure products are being created within a specific time frame to ensure quality and throughput are
maintained, which can also influence profitability. Managers need to utilize quality controls to ensure products are being maintained to a quality expectation of customers within the marketplace, which will also ensure ongoing sales and profitability.

Projects are similar to the structure of an operation; managers acquire resources to produce a deliverable where time, cost, and deliverable quality have to be managed to be successful. Project managers have the same responsibility as functional managers, but they are focused on a specific project to manage specific work activities for a single, unique deliverable. The exception with projects is that they are unique and typically performed only one time, so project managers have to go through all the tasks of designing and organizing a project structure that will only be conducted once and, therefore, have only one shot at effectively managing time, cost, and quality for one project deliverable. Organizations hire professional project managers to oversee projects because project management tools and techniques are typically used to ensure projects are managed for success. In the world of project management, project managers are primarily focused on designing a system of management plans that address all the aspects required to manage the “big three”: time, cost, and quality.

The Triple Constraint

As project managers assess the resources, materials and equipment, and facilities requirements, time, cost, and quality are the big three items they must consider not only in the selection, but also in the management of all resources throughout the project life cycle. This ensures a project is completed on schedule, on budget, and meeting the customer’s expectations of quality. An important aspect of managing time, cost, and quality for project work activities is the interconnection of these three elements. Any change to one of these elements has an effect on one or both of the others, which introduces constraints the project manager must manage. This is called the triple constraint (see Figure I.1).

The triple constraint imposes a project management dilemma. Not only does the project manager have to manage each component
of the triple constraint, but he also has to assess any changes to one and how it affects the other two.

![Triple Constraint Diagram]

**Figure I.1** Triple constraint

**Case Application**

A project manager is overseeing a construction project in which the design of a custom, single-family home requires expensive custom-made windows that will need to be installed within a specific time frame of construction. The windows were designed in advance of the project, and orders were placed to ensure they will be completed and delivered to the jobsite when required. The project budget included the cost of the custom windows as approved by the homeowners. The project manager also selected a manufacturer that would be capable of producing the quality that the homeowners required. Shortly before the windows were to be delivered to the jobsite, the manufacturer notified the project manager that they were running behind schedule because of a delay in receiving exotic materials required in the custom windows. The windows would be two weeks late. The project manager reviewed the project schedule and determined that this would increase the duration of that segment of project work activity, which would in turn create other problems on the jobsite. Therefore, the windows would need to be installed as originally scheduled. The project manager communicated this to the manufacturer, and the manufacturer said an expedite fee could be paid so that would push the windows up in
the manufacturer’s schedule, ensuring they would be at the jobsite when required. A second option was that the manufacturer had a lesser-quality window that was already in stock and could be delivered on time. The project manager had to decide how to manage the triple constraint of staying on schedule, evaluating a potential budget increase, and managing quality for this particular situation. To keep the project on schedule, the project manager had the choice to pay a higher price to expedite the correct windows to be on the jobsite when needed or reduce the quality of the windows to ensure the schedule was maintained. The homeowners elected to pay the higher price to maintain the higher-quality windows and to stay on schedule.

In this example, the project manager had the typical dilemma of making choices to manage the three elements of the triple constraint to maintain a project schedule, budget, and level of quality. A change in one element had an impact on one or two of the other elements, which formed a constraint. Decisions then had to be made to manage the triple constraint.

To manage the triple constraint, the project manager must understand the overall scope of each work activity. He must also understand changes that may be allowed or elements of the triple constraint that cannot change. These changes or elements can force the decisions as to which changes will actually be made, which might affect one or both of the other two elements. In most cases, the project manager does have to consider some form of change, and the second important aspect of managing the triple constraint is the consideration and management of changes that will be required.

**Managing Change Requirements**

One of the aspects of managing projects that many project managers wish they did not have to contend with is the reality of changes that need to be made throughout the project life cycle. In most cases, the assessment of change requires the project manager to evaluate the
effects on the triple constraint and the best course of action allowed by either the schedule, budget, or customer demands. The project manager must be informed as to the importance of certain components of the triple constraint that might be more important and others that might be less important, allowing him the flexibility to make changes and decisions based on this knowledge. If a particular project has been designed in which the customer requirement is the project deliverable being available for delivery to the customer within a specific time frame, based on specific customer requirements, then the project has a high priority of schedule and possibly a lesser priority of cost or quality. In other cases, a project might have an open window of deliverability, but the quality of the product has to be maintained to specific customer requirements; therefore, the schedule and possibly the cost can fluctuate to manage the customer’s demand for quality.

A project manager must understand the scope of the project as it relates to the triple constraint and specific requirements that need to be met for cost, schedule, or quality so that he knows how to make changes and project decisions based on hard requirements that have to be met within the triple constraint. The focus then shifts to the management and control of change. This is a common problem seen on many projects; the project manager, although excellent at managing normal daily work activities, faces serious challenges in managing changes that may be required. One of the biggest risks on a project is the project manager causing problems due to a lack of experience or development of critical tools and techniques to manage and control change.

Project managers are successful in managing project work activities because they have an arsenal of tools and techniques as well as proven processes that will be selected at the beginning of the project and utilized throughout the project life cycle to ensure various elements of managing the triple constraint are performed correctly. One of the most important processes the project manager can have is a change management system that outlines an organized and specific course of events required to effectively manage change within a project environment. A sample template of a change control process can be found in Appendix A, “Change Control Process.” Using a tool such as the change analysis matrix shown in Figure I.2, you can see an illustration
of the effects that change can have within the triple constraint. The circle represents the deliverable and its associated quality (better quality = bigger circle; less quality = smaller circle) and changes in slowing or speeding up the schedule as well as increases or decreases in budget and how each potentially can affect the other two. For instance, an action that might be needed to improve quality may slow the schedule and cost more. Likewise, something required to speed up the schedule can reduce quality and cost less (see Figure I.2).

![Change analysis matrix](image)

**Figure I.2** Change analysis matrix

If change is required to manage the triple constraint, it must be done efficiently and effectively to ensure the change is carried out without causing other problems within the work activity and to ensure that the change made was effective in accomplishing the goal of the change. All too often, project managers make changes but do not carry out the second component of monitoring and measuring the effects of the change to ensure it has accomplished what it was designed to do. In other cases, changes are made that clearly accomplish the immediate goal but have adverse effects on other work activities or components.
of the project that create more problems than the changes originally solved. Project managers need to ensure they are using a comprehensive and proven change management plan to make certain that changes to the project are evaluated, approved, and controlled. In addition, project managers should ensure that others within the organization who might have an expert assessment or managerial approval are included so that changes are appropriate. The ultimate goal in managing change reverts to the project manager’s requirement to manage the triple constraint and keep a project on schedule, within budget, and at the expected quality.

Managing Time, Cost, and Quality

In managing the triple constraint, project managers will discover other aspects of the project that have time, cost, and quality associated but are not directly involved in a work activity task or element of a project deliverable. Areas such as managing the project and product scope can introduce challenges in managing the triple constraint. Other areas, such as the cost of quality, the project manager’s time management system, and the management of risk, introduce areas of influence to the triple constraint the project manager must manage. These are difficult areas to quantify at the beginning of the project but nonetheless will be present throughout the project life cycle. The project manager should simply be aware of their existence and, when possible, design aspects of these influences into the schedule, budget, and quality management plan to ensure they are accounted for in some way.

Managing Project and Product Scope

The project manager has an incredible task at the beginning of a project to understand the overall project scope as well as the product scope to determine the boundaries of what the project is intending to accomplish as well as the specific requirements in developing a project deliverable. In some cases, the project manager will find the project drifting off into tangents that were not originally required but are utilizing resources and causing certain aspects of work activity to
fall behind schedule. The project manager must understand the importance of managing the scope of the project to ensure the triple constraint does not have to be managed because of unnecessary work that was not originally part of the project. The project manager also has to monitor the development of a project deliverable to ensure unnecessary additions to the deliverable—that were not originally required and that can increase costs and delay the schedule—are discovered and addressed through a change control process.

**Time Management**

One of the first components of developing an overall project management plan is to decipher all the individual components required as work activities to develop an overall project schedule. Once all the individual work activities have been identified, other elements, such as the project budget and quality management plan, can then be developed. Because the project manager develops a project schedule based on individual work activity durations, she needs to consider other factors that will influence both the work activity durations and the overall success of completing a project on schedule, such as the following:

- Time management of the project manager
- Time management of the project staff
- Time management of unrelated project activities

Depending on his organizational skills, a particular project manager might be very good at managing work activity schedules but struggle with his own time management for various reasons. In some cases, a project manager’s disorganization can influence the schedule of a project. For example, a project manager is responsible for critical tasks in the project and does not complete them on time. This could include the management of various meetings required for the project and throughout the organization, critical communications with project staff and other organizational human resources staff, or the preparation of critical documentation that is required either on the project or for other departments within the organization. All these can affect a project schedule if they’re not completed on time.
Another important aspect that project managers can struggle with is the management of project staff. This can include the timely direction of tasks that need to be performed, reports that need to be generated, or the inclusion to meetings where critical information from certain project staff will be required for project updates. The project manager must be good at managing project staff to ensure this does not become an influence to the overall project schedule. Project managers and project staff can sometimes be caught up in unrelated activities within the organization and external to the organization that can put the project work activity schedule at risk. Project managers must be aware that their number-one priority is the management of project work activities to stay on schedule. They must manage other nonrelated activities to ensure they do not influence the primary project schedule.

**Cost Management**

Much like the influences of time management, costs can be incurred throughout the project life cycle that the project manager simply did not consider as part of direct work activity costs but that do influence the project budget. Most of the project costs directly related to work activities are part of the budget baseline of estimates; however, added costs that happen throughout the project life cycle do occur, and the project manager must address these types of costs and their effect on the triple constraint and project budget. Other costs that are not related directly to the project work activity may include the price of quality and certain elements of risk or uncertainty that can introduce added expenses. This book addresses these added expenses so that the project manager is aware of not only the direct costs involved in estimating a project budget, but also the added costs to consider when evaluating all the costs in developing a project budget.

**Quality Management**

One of the most important aspects of the triple constraint that project managers need to address is ensuring quality expectations are being met in producing the deliverable required at each work activity
throughout the project life cycle to guarantee the completed project deliverable will be acceptable to the customer. This book also introduces several areas in which information can be gathered to define what quality requirements and expectations will be required for a project deliverable. At times, a project deliverable has been completed, but a customer refuses acceptance based on certain aspects of form, fit, or function that do not meet his requirements.

The first step in managing quality is to make sure the project manager understands the customer’s expectations. Customers do not always express all the specific requirements at the beginning of a project, which can be a challenge to the project manager and project team completing a project deliverable. Project managers and other project staff should be proactive in making sure they understand as much detail of the project deliverable, from a quality standpoint, as possible at the beginning to avoid quality expectation issues when the project is completed. It is also important for the project manager to understand the difference between a customer’s quality expectations and a customer’s quality requirements.

What Does the Customer Really Want?

When the project manager sets out to design a project that will produce a project deliverable, it is standard practice to review documents and communication outlining customer requirements at the beginning of a project. These documents should contain specific characteristics required by the customer. Documents such as a statement of work (SOW) or customer specification are typically used at the beginning of a project and should outline exactly what a customer is asking of the organization. But these documents might not always articulate exactly what the customer really wants. Therefore, the project manager has to expand the scope of understanding customer quality and must be proactive with soliciting as much information from the customer as she can to discern a more detailed quality expectation.

Customers can outline what the “requirements” might be for a specific project deliverable in the form of an SOW or specification. In some cases, however, customers might have assumptions about a particular level of quality, or items that might be included
as “industry-standard and normal to this type of project deliverable,” and the organization misinterprets unwritten quality expectations or does not understand them at all. Project managers and those assessing the initial statement of work at the beginning of a project might not be aware of these types of assumptions or certain industry standards, and these quality expectations will not be included as requirements. It is incumbent on the project manager and project staff to engage in communication outlining as much detail as possible and in some cases asking for details of various characteristics of a project deliverable that may stimulate the customer to articulate other expectations that can now be documented as requirements. The most important component in developing and approving a project is to understand what the customer really wants. In most cases, this is simply the organization’s ability to effectively communicate with a customer to develop a comprehensive and accurate project deliverable requirement.

As the project manager begins the process of developing the project schedule, budget of estimates, and quality management plan, it is imperative she begin with as much detailed information as possible to make these project artifacts accurate, which will allow her to effectively manage the triple constraint. Success in completing a project on schedule, on budget, and at the customer’s expected quality starts with accurate information at the beginning of the project. Project managers should acquire as much accurate and relevant information as possible to define the project deliverable to ensure project success at completion. This book explores the details involved in gathering information, analyzing work activity details, and developing comprehensive and accurate project schedules, budgets, and quality management processes using various tools and techniques.
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