FT PRESS PROJECT MANAGEMENT SERIES

A COMPREHENSIVE GUIDE TO PROJECT MANAGEMENT SCHEDULE AND COST CONTROL

Methods and Models for Managing the Project Lifecycle

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Randal Wilson

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I would like to dedicate this book to my wife, Dusty,
and sons, Nolan, Garrett, and Carlin,
for their continued support and patience on this project.

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About the Author

Randal Wilson, MBA, PMP, serves as Visiting Professor of Project Management, Keller Graduate School of Management, at the Elk Grove, California, DeVry University campus. His teaching style is one of addressing project management concepts using academic course guidelines and text and includes in-depth discussions in lectures using practical application from industry experience.

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Introduction

Schedule and Cost of Projects

Most organizations are formed for a purpose that results in producing goods or services. The success of the organization's endeavor is in the management of resources and how the founders of the organization have structured the operation to achieve its strategic objective. Because most organizations require resources to facilitate the ability to accomplish daily tasks in the operation, on some occasions special activities are required to accomplish certain things the operation needs that are not part of the daily tasks, but require resources from within the organization. These types of special tasks are called *projects,* and if they are structured and managed well, they will provide opportunities for the organization to make improvements that are necessary in the ongoing improvement of the operation.

Depending on the type and size of the organization, projects may be sporadic and used only in special development situations, whereas other organizations may use projects integrated into its business structure as a main part of its daily operation. Regardless of how projects are utilized in the organization, they require resources that may include human resources, equipment and materials, facilities, and financial resources. When special projects require these types of resources, it is important to note that most of these resources are utilized in normal daily operation tasks; if they are used on a special project, they have to be allocated such that they do not impact daily operations and create conflicts. Most resources used within an organization have a cost component associated with how they are used; how a resource is expensed for a special project also is a consideration.

Organizations can generally benefit from special projects, but the structure, organization, and utilization of resources become a very important element not only in the success of the project, but in minimizing the impact to the organization and daily operations. Before a special project can be authorized, management within the organization needs to know how much the project will cost, how much of the organization's resources will be required, what are the expected deliverables or benefit to the organization, and how long the project will take to complete. Because it is usually easier to identify how a project deliverable will benefit the organization, it can be difficult to ascertain how much the project will cost, how long it will take, and how many and what types of resources will be required to complete the project objective. At this point, project management tools and techniques can be utilized to define cost and schedule requirements.

Project Balance

When an organization embarks on a special project, generally, the first task is to define what the project objective will be as it relates to expected deliverables. This task is usually accomplished fairly quickly by initial stakeholders; they include operations managers and other staff interested in the benefit the project deliverables will bring to the operation. Problems generally begin to arise when the project has been approved and the process of defining how to create the project deliverable, what costs will be associated, what resources will be required, and how to schedule these resources for a special project in addition to their normal daily tasks must be considered. Projects have to be structured and managed, maintaining a balance between utilizing the organization's resources for daily operations and for required tasks to complete work activities on a project.

Resources can be human resources and any other resources, including financial requirements, that will be needed on a project; however, they have to be defined, showing how they can be utilized in the balance of daily operations tasks and special project tasks. This can create a challenge for operations managers because they have an obligation to daily work activities but want to see special projects completed and struggle with ways to balance human resources and other resources within their department to complete both of these tasks. Part of this dilemma stems from the department manager being loyal to his obligation in the daily operations and will typically err to ensuring operations are not impacted, thus creating constraints for utilizing resources on special projects. The other part of this dilemma might be the department manager's inexperience with scheduling resources for both departmental tasks and project tasks. Project managers who are separated from operational departments do not share the same loyalty and, in fact, are probably more loyal to completing project tasks and will negotiate with departmental managers in scheduling resources for project tasks. Project managers can also solicit the use of resources from outside the organization to complete project activities if internal resources are simply not available.

The second component that presents a challenge with special projects in an organization is defining all the costs associated with project activities and developing an overall budget for a special project. Typically, the error in costing projects is looking at project activities at a high level and trying to associate a more "generalized" cost to complete the entire activity, not taking into account all the specifics within each activity. Although this approach can be used in cost estimating a project, it is typically the reason that projects go over budget and that project activity costs are difficult to control. If project activity costs have been established based on the overall activity, as the activity plays out and specific tasks have resource, material, and equipment requirements that have not been accounted for, these requirements can add costs. Because these resources are needed, these costs present challenges in trying to control costs for the overall activity. Project managers typically have more time and techniques to break down activities to understand all the associated costs to derive a more accurate work activity cost and project budget.

Organizations that do not have project management capabilities will ultimately struggle with the implementation of projects in defining project costs, scheduling resources, and controlling project work activities. The key element, in addition to properly costing and scheduling a project, is in the control of costs and scheduling of activities and resources to ensure a project completes an objective at the estimated cost and within the allotted schedule.

What Is Control?

Projects can be developed and managed within an organization under the direction of the department manager for the sole purpose of completing a unique objective for that department. Projects also can be developed in an environment where several resources throughout the organization can be used to complete project activities. Either a department "functional" manager or a project manager can manage projects. These projects experience similar project life-cycle phases. One aspect of projects is consistent no matter what type of organizational structure or how big the project is: Projects have costs and schedules and need oversight and adjustments made to keep project activities within budget and on schedule. This is called *project control.*

Reporting Versus Managing

Overseeing project activities puts managers in a position of responsibility to ensure that project activities are completed. How managers view their responsibility plays a large role in whether the project is controlled or simply monitored. Managers will find themselves in one of two managerial roles with regards to projects: (1) monitoring and reporting activities; or (2) assigning, monitoring, and controlling activities. When managers simply report the status of project activities, this is not a control function. It is simply an observation of what is happening and reporting of status. *Control* in project management is defined as *having a means of measurement and initiating adjustments in the course of an activity to address unwanted changes to cost, schedule, quality, or risk elements that have influenced the activity.*

The Manager's Role in Control

Project managers are educated and/or trained in the need to provide control within the activities of a project. This requires the project managers' active participation in not only monitoring activities against a baseline of estimated cost and schedule, but also initiating adjustments that bring activities back in line with budget and schedule if problems arise. Either functional or project managers can achieve control over a project as long as they understand what control is designed to do for activities within a project. Control of the project is one of the most important roles project managers can have with oversight of project activities. One might say that anyone can observe project activities and report on status, but real management of a project has an element of control such that actively adjusting activities results in improvements to cost or schedule. Inasmuch as project managers utilize tools and techniques not only to monitor but also to control project activities, other forces and influences within the organization can present challenges to the success of a project. Project managers and/or functional managers must be aware of influences unique to the organization that can impose restrictions, constraints, and even conflicts for special projects operating within an organization.

Organizational Influences

Projects can play an important role in the success of an organization, but the development and management of these structures alone will not result in isolated entities within the organization. However, these roles are still subject to other internal and external influences that can make or break the goal of completing objectives. Projects simply give the organization focus and the ability to control activities required to complete special objectives within the organization. Because the organization typically has established departments to complete certain activities for daily operations, some of these areas produce things for profit, called profit centers; other areas within the operation complete tasks to support the profit centers, such as administration, accounting, and human resources. Because special projects can utilize resources throughout the organization primarily from within the profit centers, projects are connected to other areas within the organization not associated with profit centers to facilitate completion of strategic objectives. Although these areas are needed, they can present either positive or negative influences on the success of completing projects; therefore, project managers should take them into consideration. Three primary areas within the organization can have a significant influence on how projects are structured, scheduled, budgeted, and controlled, and they have to do with the organization's leadership, culture, and structure.

Organizational Leadership

There is a consistent rule within most organizations that everything starts from the top and rolls down. This rule also is true in the area of managing projects. Whether it is perception or actual fact, the impact this rule will have on an organization starts with the general maturity of the organization and senior staff as well as specific management styles of those overseeing projects. If the executive staff does not understand the importance and benefits of projects, they will not always be supportive of what managers are trying to accomplish and the approach they are taking in using projects to manage activities within the organization. This can come across in several forms, behaviors, attitudes, and actions such as

- Poor selection of key managers in critical roles
- Approval or nonapproval of certain projects and activities
- Unnecessary timelines or budget constraints creating undue stress on projects and activities
- Misunderstanding or ignorance of critical activity update information
- Personality conflicts with project managers
- Hidden agendas that drive inconsistent or confusing decisions

It is important that executive management understand their role in leading by example. They also must understand the impact their leadership can have on the organization if it is not performed at the highest level of integrity, professionalism, and cooperation among themselves and with those reporting to them. It is also important that they understand their actions are seen not only by those reporting to them but by many in the organization; and their leadership can be a large part of the culture established within the organization.

Organizational Culture

When having discussions about the culture of organizations, people can go in several directions to assess, label, and/or stereotype organizations for a perceived culture. When we talk about culture, the general idea is not only the DNA makeup of how the organization structures itself, but also its management style and personality. It is interesting that an organization, in many ways, has a reputation or is known in the industry by its personality and how it conducts business. Some of this personality and management style are a direct result of those who started the organization or are currently senior officers within the organization, whereas other traits of organizational personality might be a result of how the organization conducts its business based on market demands and customer relations. Because these areas are typically seen as high level and generally broad-based perceptions or interpretations of business operations, the same DNA is found at the department and project levels.

It is important that project managers understand the DNA or personality of the organization in the form of a management style so that they can be consistent with the way the organization conducts business internally and externally. This helps project managers be consistent in their management style with the general culture of the organization and can make it easier to gain the approval of senior management. DNA is a complex strand of several elements, and the organization is similar because it is made up of several areas that ultimately define its personality and culture. Some of these areas include

- Type of business and market position
- Senior management experience, personality, and management style
- Hierarchical command structure
- Maturity in customer and supplier relationships
- High-level investment strategies and risk tolerance
- Senior management's perception of lower-level workforces
- Organizational approach to customer service
- General working conditions and environment within the organization

Understanding what makes up the DNA and personality of an organization can help project managers not only understand their place in the organization, but also understand the importance of a successful management style that is in sync with the culture of the organization. This also allows for managers to be more consistent with other peer management styles. The project managers can also benefit in better understanding the mindset and possible perceptions of the workforce, which can help in the project managers' management style and approach with their staff. One element of the organization's DNA is in the type of organization and how it is structured functionally based on the type of business it conducts. The type of management structure used can play a large role in defining how the organization conducts business, its relationships with customers, and the general role project managers will ultimately have.

Organizational Structures

Organizational structure is the foundation of how business is conducted both internally and externally. It plays a large role in how daily operations are carried out and how projects are integrated within daily operations. Some organizations utilize projects at a very low level, accomplishing small tasks, whereas other organizations utilize projects, and their main course of business in the organization is structured with emphasis on these large projects. Depending on how organizations utilize projects within daily operations, organizations are structured using one of three basic structures. These structures are called *functional, projectized,* and *matrix.*

> **Functional organizations** employ the classic structure used to establish managerial hierarchy with the organization divided into traditional functional departments. These departments can include accounting, human resources, purchasing, engineering, manufacturing, quality control, inventory, and warehousing, as well as shipping and receiving. The general idea with this structure is each department has a specific objective with a clear chain of command wherein each department has a manager overseeing the work activities of that department. The manager of each department reports to a higher-level manager who may be overseeing several departments, and the chain of command continues all the way up to the highest level of management in the structure. Although organizations have found this structure to be successful in the general operation of business, it has inherent strengths and weaknesses with regard to efficiency, accountability, and resource management, as well as the management of projects and the role of the project manager.

The main strength of functional organizations is each department performing its activities as a unit and requiring little or no direct involvement with other departments to achieve its objectives. Each department's strength builds on the collective knowledge and experience of its members and processes it has developed to maximize the efficiency of work activities in completing its normal objectives. Likewise, projects developed within an individual department are most efficient using only its department members and overseen by the department manager.

The weakness of this structure is apparent when the organization selects a functional manager to oversee projects and that person may or may not have the experience of a project manager in structuring projects with regard to cost, schedule, resource management, and control. The project can suffer as a result. If a project manager is used in conjunction with this type of project, the project manager carries little or no authority and acts more like an activity expediter.

Projectized organizations use a completely different type of business structure than that of functional organizations where staff members are grouped into workforces that may include representatives from several traditional departments and are tasked with a unique project objective. This organization only has project groups and very few, if any, functional departments. This type of structure also places a high level of importance on project objectives; therefore, projectized organizations hire project managers to structure and oversee projects. The project manager carries a much higher level of authority with oversight of all resources, budget, and scheduling, and responsibility for completion of the project objective.

Most projectized organizations were originally structured in this form as a result of their business strategic objectives. These objectives are based on groups of activities that result in unique output deliverables. Another big advantage of projectized organizations is the flexibility available in the business strategy. Because this structure emphasizes large projects as its main output, these organizations can respond quickly to changes in market demand, allowing them to be successful in both stable and unstable market environments.

Project management within a projectized organization requires management of activities utilizing different types of resources that can be permanently assigned to the project, borrowed from several departments within the organization, and possibly contracted from resources external to the organization. Unlike a specific project designed to accomplish a goal within a single department, projects are now the goal of the entire organization and may require only a few actual departments such as administration and engineering. Because the organization is structured for projects, human resources are assigned tasks based on the requirements of their skill for specific activities on the project. After they complete their activities, they are reassigned to another project to provide their skills for activity requirements on that project. Human resources in this type of organization spend all their employment moving from project to project.

Matrix organizations are a blend of functional and projectized structures using the benefits of each in completing the organization's objectives. Matrix organizations typically have a combination of routinely produced deliverables as well as unique and specialized projects. This allows for traditional departments led by functional managers to manage output deliverables of their individual departments; the organization also is able to use these same resources in special projects. The functional manager still holds authority over her department, but the project manager can hold an equal level of authority in overseeing resources from several departments in managing a project.

Matrix organizations have the advantage of structure and stability found in functional organizations through established departments. They also use key resources within these departments on projects that allow the organizations the flexibility to produce deliverables in response to changing market conditions. This capability gives senior management a unique opportunity to assess market conditions and in parallel create a stable and predictable product delivery environment and a quick response project environment that are both successful in the marketplace.

Solutions to Schedule and Cost Control

Projects ultimately are the utilization of organizational resources identified for specific tasks that have been organized in a sequence of work activities that will accomplish the project objective. Although most organizations have management staff who are very good at utilizing resources for specific tasks within the operation, the trick in *project management* is not only to specifically identify all required resources, correctly sequence work activities, and accurately estimate costs of all specific work activity requirements, but also to design and initiate schedule, cost, and quality controls. As functional managers can probably accomplish some of these project-related tasks, their responsibility is not in directing daily work activities of the department. As we have seen, if a project is unique to a particular department, functional managers can actually be the best people to carry out that specific project as the scope management will be isolated to their department. If projects require resources from multiple departments or projects occupy a primary structure within the organization, project managers typically have the knowledge and experience to accurately develop and implement projects.

If project managers want to ensure that a project is developed properly, they must be knowledgeable of tools and techniques that will assist in correctly and accurately gathering and evaluating project information to develop a comprehensive project management plan. The success of projects is typically the result of having well-documented project work activity requirements, accurate scheduling of resources and work activities, and accurate cost estimation of all specific activity requirements to develop the project budget. One of the primary success factors in project management is the attention to detail in work activity requirements and scheduling.

The goal of successfully developing and controlling a project would be understanding how to get the most detail of work activities to accurately assess cost and resource requirements and what types of controls can be implemented to ensure work activities stay on schedule and within budget. In most cases, the more accurate the project manager and project staff are in estimating schedule duration and cost for work activities, the better chance the project will have staying on schedule and within budget. Because there typically is a margin of error in schedule and cost estimating and the reality of the impact of organizational processes and risk or uncertainty, the project manager also needs to utilize some control to adjust for these abnormalities in the project life cycle.

The success of the project ultimately depends on how well the project manager is armed with tools and techniques for project development. This book is a comprehensive compilation of common project management tools and techniques used in project development, specifically with regard to scheduling, cost estimating, and project control. These tools are simple and can be used easily in the development, implementation, and control of a project. It should be the goal of all those tasked with the development and oversight of a project to be armed with tools that will assist in projects being documented and controlled effectively and accurately to ensure project objectives are completed on schedule and on budget.

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