

Chapter 1

Introduction to the Challenge of Cost and Value Management in Projects

Learning Objectives

After studying this chapter, you should be able to:

- Explain the challenges of cost and value management in projects.
- Describe the importance of cost and value management in projects.
- Identify the key elements of effective project cost management.
- Describe the essential features of effective value management in projects.

The past 40 years have witnessed a dramatic increase in the number and variety of organizations engaged in project-based work. In addition to “traditional” project-oriented industries, like construction, aerospace, and pharmaceuticals, service industries as diverse as finance, utilities, telecommunications, and insurance have embraced project-based ventures.

This paradigm shift is due to growing recognition that projects and their effective management can provide organizations with a significant competitive edge through cost reduction, enhanced responsiveness, and overall value to customers. Consequently, a number of organizations have adopted many of the well-known techniques of project management, and professional project management organizations have witnessed marked increases in membership.

Cost and Value Management in Projects, Second Edition.

Ray R Venkataraman and Jeffrey K Pinto.

© 2023 John Wiley & Sons, Inc. Published 2023 by John Wiley & Sons, Inc.

Despite this enormous interest in projects and project management practices, success rates in many industries are at alarmingly low levels. In addition, bad news about high-profile projects continues to dominate the headlines—in both the public and private sectors. Consider these recent examples:

When it comes to cost overruns, Honolulu's new rapid transit system is in a league of its own.

When City and County of Honolulu leaders signed a funding agreement for the project in 2009, the rapid transit rail project was slated to cost some \$5.12 billion. As of 2022, it's expected to cost more than \$12.4 billion and faces an approximately \$3.6 billion shortfall, according to recent Honolulu Authority for Rapid Transportation estimates. Officials who helped launch Honolulu rail more than a decade ago said the dramatic cost overruns that have plagued the project ever since construction started are worse than anything they've ever seen.¹

Rome joins the growing list of cities refusing to host the Olympics.

Rome's mayor, Virginia Raggi, addressed the media in late 2016 to announce her decision to cancel the city's efforts to bid for the 2024 Olympic Games. Citing the huge increase in costs for recent Olympic Games, Ms. Raggi noted that in addition to Rome, a number of other cities worldwide (including Boston, Budapest, and Hamburg) had independently decided that the costs of hosting Olympics had become prohibitive and that the billions spent on the games could more profitably be used to fund social programs. Indeed, the final estimated price tag for the 2016 summer Olympics in Rio are estimated to have cost \$14 billion, which represents a 352% cost overrun, while many of the sites created for the Games (such as the aquatic center) have since been abandoned.²

Clearly, something is going wrong.

1.1 IMPORTANCE OF COST AND VALUE MANAGEMENT IN PROJECTS

The key features that define project success are twofold: managing costs to achieve efficiencies, and creating and enhancing value. These two elements enable project stakeholders to understand the activities and resources required to meet project goals, as well as the expenditures necessary to complete the project to the satisfaction of the customer.

Unfortunately, in the field of project management today, significant cost and schedule overruns are the norm, rather than the exception. In fact, recent research that examined the success rates of information technology (IT) projects indicates that the majority of these projects neither met their cost objectives nor delivered the promised value. For example:

- IT project failure statistics show that 75% of respondents in the IT industry lack confidence in project success; i.e., they believe from the start that they are doomed to fail. Further, 55% of project managers cite budget overruns as the number-one reason for project failure. On the other hand, in organizations that develop robust project management practices, their projects are 2.5 times more likely to succeed than those of other organizations.³
- In a 2020 report on the current state of IT project implementation, the Standish Group reported on the results of over 50,000 in-depth software projects they had studied over the past five years. They identified 31% as successful, 50% as “challenged,” and 19% as failed. These numbers have remained remarkably steady for year. At the same time, a report by the Consortium for Information and Software Quality (CISQ) reports that the total cost of poor software quality in the United States is approximately \$2.1 trillion.⁴ In other words, these projects will meet neither their cost nor their value objectives.

Why do these problems persist, despite the fact that tools for cost efficiency and value enhancement are widely used, and their benefits are well understood? One key answer is the lack of an integrated cost and value management framework.

Before we explore this integration of cost and value, a brief discussion of their concepts in relationship to projects is worthwhile. Both require well-defined and structured management processes, commonly referred to as cost and value management. Project cost management focuses on issues such as cost estimation and budgeting, cash flow management, and cost control. On the other hand, the emphasis of value management is on optimizing project value—given cost, time, and resource constraints—while meeting performance requirements such as functionality and quality.

Cost and value management remains a critical but often underrepresented issue for a couple of reasons. First, in this book, we define value as the relationship between meeting or exceeding the expectations of project stakeholders, as well as the resources expended to meet or exceed those expectations. This definition clearly implies that project cost and value are inextricably linked, to the point where any attempt to enhance project value without a thorough understanding of its impact on cost and associated trade-offs is meaningless.

Second, project value is a multidimensional concept. Different project stakeholders with different vested interests have different perceptions about what constitutes value to them. For example, the expectations of top management often leave IT project teams scrambling to complete projects as quickly as possible. Internal customers, however, may request additional features that will delay completion. Each stakeholder sees value in the finished project; however, the measures they use to determine value can actually conflict. And yet, despite these differences, the one constant in any attempt to enhance project value is its cost ramifications.

The inability to clearly understand this complex relationship between project cost and value is one of the primary reasons why it is an under-represented issue. The following case example illustrates this point.

Case Study: New York City's Second Avenue Subway—Two Miles Completed for *Only* \$5 Billion Spent

Labeled “a catastrophe of cost control at every level” by the *Wall Street Journal*, the first 1.6-mile segment of the Second Avenue subway line in Manhattan—the first to open in decades—was celebrated as a feat of engineering and the ability of government to “accomplish big things for the people it serves,” according to then-New York governor Cuomo. After ceremonies marking the completion of the opening stretch of the new subway line in late 2016, harsh commentary about the cost of the subway line became louder and harder to ignore. The line, so far consisting of just three stations and two miles of track (from 96th to 72nd Streets), is costing roughly \$1.6 billion per kilometer, the most expensive train line ever built. When Phase 2, which extends the line north to Harlem and adds three additional stations, begins construction, it will cost even more: an estimated \$2.2 billion per kilometer.

The Second Avenue subway project reinforces an already unenviable record. Researchers, studying rail projects, examined dozens of projects

across 44 countries worldwide and found that the four most expensive rail projects, and six of the top 12, were American, with the Second Avenue project among them. Is this just a case of government agencies' willingness to spend public money without taking adequate care of how the funds are being used? Is there some other, more institutionally-rooted reason for the high price tag and poor cost control of the Second Avenue subway?

Trying to make sense of the skyrocketing cost of public works rail projects in the United States is complicated, but there are some reasons why we continue to see runaway budgets. Among the top four reasons for poor cost control are:

1. Regulatory statutes and other hurdles drag out the permitting process and increase costs. Environmental and workplace safety regulations, while important, slow the construction process to a crawl. On the Second Avenue subway, for example, the federal government and New York's Metropolitan Transportation Authority (MTA) fought for more than a year about whether a fire-suppression system met long-standing federal "buy America" requirements. The MTA, through a contractor, had sourced part of its fire-suppression system from Finland. With dozens of federal and state regulatory commissions holding projects hostage to lengthy approval processes, even the simplest projects can drag along for years before receiving clearance.
2. Infrastructure decisions are usually made at state and local levels, leading to multiple governing bodies. These bodies, called pluralistic authorities, must satisfy a wide range of constituent groups, often at odds with each other. Political decisions are not like technical choices; they require compromise and, occasionally, modifying the project scope to satisfy an intractable demand. All these changes lead to a delayed (and expensive) project.
3. Infrastructure spending is at the mercy of shifting political opinions. One reason why money is often quickly allocated and rapidly spent is to "fix" the project in the public's eye, so that subsequent political feelings or new appointees, even if they are opposed to the project, may feel that it is impossible to pull the plug once large sums have been spent. The motivation of politicians is to make a big "splash," especially by getting their name attached to a high-profile project.
4. Union costs are often prohibitive. Union regulations mandated large (some might argue, inefficient) levels of worker involvement throughout the project. To illustrate, the Second Avenue project employed 25 tunnel-boring machine workers for a job that Spain handles with only nine. In New York, because of both state and federal laws, a basic laborer earns \$79.63 an hour, including benefits; an ironworker earns \$96.69. While it can be argued that these are hard jobs and deserve fair compensation, these labor costs (excluding overtime rates) add up fast.

5. The subway stations are overly elaborate. Most of the Second Avenue subway project's costs come from the stations rather than the tunnels, which, although bored deliberately deep underground, did not encounter any serious problems during development. On the other hand, the decision to create stations with high mezzanine ceilings, while lofty and aesthetically pleasing, represent a much higher cost than simply adopting the London metro's lower-ceiling approach.

Originally conceived in the 1930s to relieve congestion on the current single-line subway running through that particular stretch of Manhattan, the first phase of the Second Avenue subway project was welcomed as an acknowledgment of a longstanding need that is finally getting the attention it deserves. In the past quarter century, ridership on the metro has almost doubled—it's getting close to 2 billion a year now—while capacity has hardly increased. Transportation commission estimates suggest that New York will need a new subway line every 10 years for the next hundred years just to keep up with demand. While the merits of new subway construction are beyond dispute, the costly and often outrageous price tags from their construction could cause future generations of New York politicians to weigh seriously the cost to the city and their own reputations of approving additional infrastructure investments.⁵

This book was written to explore the dynamic relationship between project value and cost, as well as the mechanisms used to achieve integration between them. Our goals are fourfold: first, to provide practicing managers with a thorough understanding of the various dimensions of cost and value in projects, the factors that impact them, and the most effective managerial approaches for achieving cost efficiency and value optimization. Unlike most project management books, which deal with this topic from a tactical perspective, this book takes a strategic approach.

Second, the book thoroughly covers the various elements of value management from a project perspective, including planning, engineering, and analysis. In addition, we examine various project management decision areas that have the potential to enhance value, along with relevant managerial approaches that can be used to optimize that value. Third, we provide an integrated framework for managing cost and value that can be useful to practicing project managers. Finally, this book contains a good deal of prescriptive advice on how to avoid common pitfalls in managing cost and value in projects.

We begin by exploring the essential features of effective cost and value management.

1.2 KEYS TO EFFECTIVE PROJECT COST MANAGEMENT

In business parlance, we can say that cost is a finite amount that is represented as a monetary value in any currency. It is consumed and transferred internally or externally in exchange for producing structures, goods, or services. In projects, cost is the monetary value expended and exchanged in the process of completing various activities through the project life cycle from start to finish when the project is handed over to the client. Some of the costs to be incurred in a project can extend to the client, depending on the nature of the contractual terms and the changes that the client may require during the project life cycle. In this context, it may be noted that cost differs from price, in that price includes cost plus gross profit. This points to a key issue in project cost management: the question of whether the project will return a profit to both the producer and the client. The project cost management plan outlines how to structure and control project costs. It is a dynamic, evolving plan that involves forecasting and refining cost estimates throughout the project life cycle. The plan helps to develop and share relevant, accurate, and timely information for decision making, while providing feedback, linking project to business objectives with detailed as well as summary information. Project cost management also helps project stakeholders to be up-to-date on schedule and cost performance.

Effective project cost management is an extremely complex process that begins very early in a project's life cycle, and long before its actual start. Among the factors that influence successful project cost management is a reasonable and accurate system for estimating costs. Table 1.1, drawn from Rodney Turner's work,⁶ highlights some of the most important considerations when creating a cost estimation system.

While this list is not all-inclusive, its elements do have a significant influence over the effectiveness of cost management for projects large and small. Of more immediate interest is the sheer complexity and breadth of an effective cost estimation system, suggesting that organizations intent on controlling their costs need to recognize that there is no such thing as a simple, quick fix. Rather, downstream project cost

Table 1.1 Keys to effective cost estimation

-
1. A clear, complete, and unambiguous definition of the project and the scope of work involved
 2. A thorough assessment of the potential risks involved, with well-thought-out action plans to minimize their possible impact
 3. A well-trained and competent project manager
 4. A thorough understanding, by all stakeholders, of the various types of costs that are likely to be incurred throughout the life of the project
 5. A project organizational culture where there is a free flow of communication, so that all project participants clearly understand their responsibilities
 6. A well-defined project work structure where work packages are broken down into manageable sizes
 7. Meaningful budgets, where each work package is allocated its appropriate share of the total budget, commensurate to the work involved
 8. An accounting system and coding scheme that are well aligned with the work breakdown structure and are compatible with the organization's management information system
 9. A cost accounting system that will accumulate costs and allocate them to their relevant cost accounts as and when they are incurred
 10. A prioritized and detailed work schedule, drawn from the work breakdown structure, which assigns and tracks the progress of individual tasks
 11. Effective management of well-motivated staff, to ensure that progress meets or beats the work schedule
 12. A mechanism for comparing actual and planned expenditures for individual tasks, with the results extrapolated to cover the entire project
 13. The ability to bring critical tasks that are late back on schedule, including providing for additional resources or taking other prompt remedial measures
 14. Adequate and effective supervision to ensure that all activities are done right the first time
 15. Supervision of staff timesheets so that only legitimate times are booked to various cost codes
 16. Proper drafting of specifications and contracts
 17. Discreet investigation to confirm that the customer is of sound financial standing, with sufficient funds to make all contracted payments
 18. Similar investigation, though not necessarily as discreet, of all significant suppliers and subcontractors (especially those new to the contractor's experience)
 19. Effective use of competitive tendering for all purchases and subcontractors to ensure the lowest cost commensurate with quality and to avoid committing to costs that exceed estimates and budgets
-

Table 1.1 Continued

-
20. Proper consideration and control of modifications and contract variations, including charging all justifiable claims for price increases to the customer
 21. Avoidance of all nonessential changes, especially those for which the project customer will not pay
 22. Proper control of payments to suppliers and subcontractors to ensure that all invoices and claims for progress payments are neither overpaid nor paid too soon
 23. Recovery of all incidental expenses allowed for in the contract charging structure (for example, expensive telephone calls, special printing and stationery, travel, and accommodation)
 24. Proper invoicing to the customer, ensuring that claims for progress payments or cost reimbursements are made at the appropriate times and at the correct levels, so that disputes that could delay payments do not arise
 25. Effective credit control to prevent payments from the customer from becoming long overdue
 26. Internal security audits to help prevent losses through theft or fraud
 27. Regular cost and progress reports to senior management, highlighting potential schedule or budget overruns in time for corrective action to be taken
 28. Cost-effective design, perhaps using value engineering
 29. Prompt action to close off accounts at the end of the project, to prevent unauthorized time bookings and other items from being charged to the project
-

Source: Turner, J. R., and Simister, S. J. (2000). *Gower Handbook of Project Management*, 3rd ed., pp. 295–297. Aldershot, Hampshire, UK: Gower.

management rests heavily on the care and accuracy of detailed estimation occurring early in the project. As the old saying suggests, “We can’t fix what we can’t see.” Taken one step further, we can’t control what we did not plan for!

1.3 ESSENTIAL FEATURES OF PROJECT VALUE MANAGEMENT

“Project value” refers to the relationship between the needs of different project stakeholders and the resources used to satisfy them. What constitutes project value, however, can be hard to pin down, because different

stakeholders have different views. The challenge of value management is to understand and reconcile these differences.

Essentially, value management focuses on enhancing project value, given cost and time constraints, without any negative impact on the project facility's functionality, reliability, or quality. Effective project value management includes the following key features:

1. *Careful analysis and identification of project needs and scope*—The first step in effective value management lies in a clear project definition and scope analysis.
2. *Thorough planning of the project and subsequent work*—Effective planning helps to ensure that the project is developed to maximum cost efficiency with no unnecessary steps or wasted effort.
3. *Identification of key areas of opportunities that can influence project value*—The project team's goal is to enhance positive features of the project while keeping control of costs. Carefully weighing the cost/benefit analysis for a project is the key to enhancing value.
4. *Development of alternatives for exploiting the identified opportunities for improving project value*—Multiple paths may be available for enhancing value, some of which are more cost effective than others.
5. *Evaluation of alternatives; development of proposals and action plans*—Performing a clear trade-off analysis can help create alternatives and select the best choices for improving value.
6. *Use of a performance monitoring system for tracking project value*—The project team must have the means to accurately monitor the project, gain timely and actionable information, and make “on-line” decisions and choices among alternatives.
7. *Ensure a free flow of communication that cuts across organizational boundaries*—To effectively manage for value, a cross-functional mindset must prevail throughout the organization, so that ideas, alternatives, and creative solutions have the widest possible arena for exploitation.

In the remainder of this chapter, we will present an overview of the various topics that are discussed in this book.

1.4 ORGANIZATION OF THE BOOK

The book's key content and order of chapters are presented in this section, with Figure 1.1 providing the model for organization. We deliberately organized the book to resemble a project activity network, to illustrate the chronological sequencing of critical cost and value management activities, as well as the manner in which they must be integrated. This approach enables us to provide guidance regarding the important elements in these activities, and to offer some suggestions for a reasonable order in which to address them. Our ultimate aim is to propose an integrated framework by which project managers can incorporate cost and value thinking into their management style.

This opening chapter has explained the importance of this topic, reviewed the book's organization, and provided examples of the nature and scope of the problem, as well as its impact on the larger economy. Chapter 2 focuses on why it is critical to identify the needs and scope of a project at the earliest possible stage. This enables a project activities framework to be developed and project performance to be monitored—both of which ensure that promised value is delivered. An

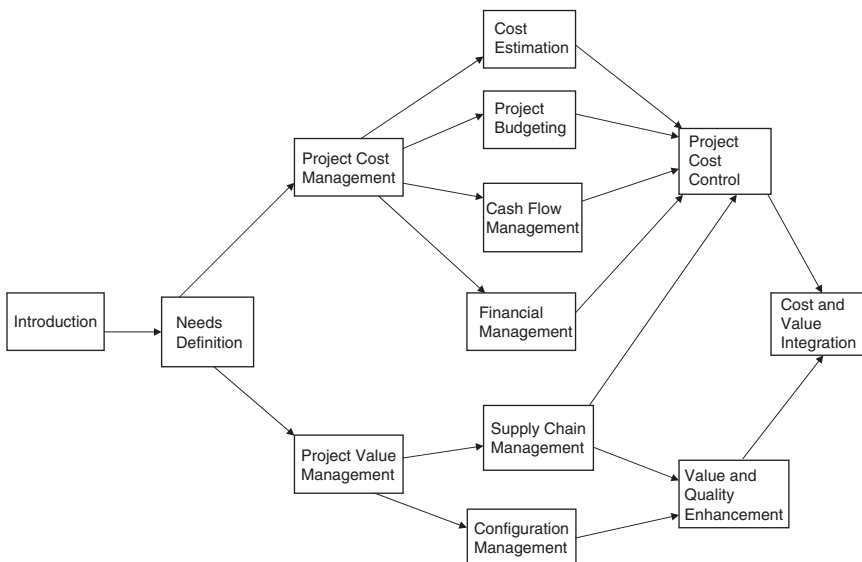


Figure 1.1 Cost and value management framework

accurate definition of project scope and needs also sets the stage for identifying resources and approximate costs for successful project completion. Finally, needs assessment can alert project stakeholders, very early in the project life cycle, that the project as assigned may not meet needs and should be modified or canceled.

The next three chapters explore the topic of project cost management. Although the actual steps involved in the cost management process will depend on the nature of the project, the most commonly used sequence consists of cost estimation, budgeting, and cost control.

Chapter 3 covers the important topic of cost estimation. Cost estimates must be made early in the project life cycle, during the conception, definition, and feasibility stages of the project. The cost estimate is the cost of all work packages and is “rolled up” to the top level as the total cost of the project (known as “bottom-up” estimating). Reasonably accurate estimates provide a useful reference for the sponsor, client, and other stakeholders. Revisions to estimates can be expected as more accurate information is received over time. Consequently, the accuracy of estimates increases through successive stages of the project. Cost estimating is therefore an ongoing process, and ballpark estimates in the early stages of the project will need to be progressively refined. As more information is made available during the progress of project planning and scope management, the accuracy of the cost estimate improves. By way of illustration, Moustafev describes the “cone of uncertainty” across the timeline of the project (see Figure 1.2).⁷

The cone of uncertainty describes the phenomenon of decreasing uncertainty over time as information becomes available through the project phases. Figure 1.2 depicts this progression as a horizontal funnel with a range of variances in accuracy. The level of uncertainty will, of course, depend on the type and size of the project, industry, historical data availability, duration of the project, expertise in forecasting, and other factors. As an example, early order of magnitude (OOM) estimates in software development projects significantly underestimate and overestimate costs. In the early phases of project initiation, the fluidity of estimates need to be considered.

Estimating the cost of projects is important for several reasons. First, it provides a standard baseline against which the actual expenditures incurred during the project can be compared. This is also the yardstick for controlling costs through the project life cycle. Second, cost estimates

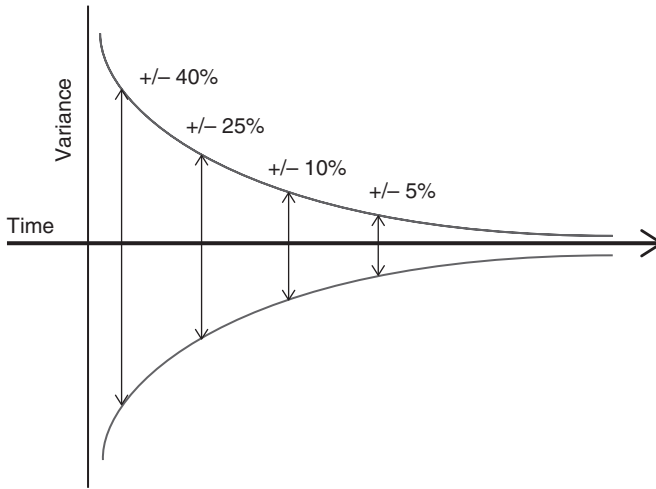


Figure 1.2 The Cone of Uncertainty

Source: Moustafaev, J. (2011). *Delivering Exceptional Project Results: A Practical Guide to Project Selection*. Plantation, FL: J. Ross Publishing.

provide a platform for assessing project feasibility. Can the costs be controlled? How likely is it that costs to be incurred will return a profit? A comparison of the cost estimates with the estimates of returns for the investment will inform feasibility studies to determine if the project is viable. This decision will determine whether to execute the project or to divert and channel these available resources to more viable projects. Third, cost estimates, along with the estimates of returns, will facilitate decision-making relating to project financing. Fourth, cost estimates provide the mechanism for managing cash flow during the course of the project. The cash flow should be as predictable as possible. Fifth, project cost estimation helps to provide the framework needed for allocation of resources as the project progresses. Human and material resources need to be allocated economically, optimally, and in a timely manner. Finally, cost estimates enable the revision of activity durations, sequences, and associated milestones. For example, as activity durations are estimated on the basis of work content and resource availability, cost estimates geared to crashing project activities will help determine overall costs for project acceleration. All of this is merely scratching the surface—we examine cost estimation in much greater detail throughout the course of the chapter.

Any discussion of project cost management must also include forecasting, which takes place at the front end of the project environment. At the early stage of the project, there is a high level of uncertainty due to the limited amount of information available. Yet, such forecasting is necessary to articulate and formalize the scope of the project. It serves as the basis for planning and funding the project, identifying key milestones, procuring equipment and materials, and identifying human resources needed. Forecasting is also the primary mechanism for ensuring that the project is on course, or for changing its direction if conditions in the project environment change. Forecasting should typically allow for inevitable changes in the execution and direction of the project when more updated and accurate information becomes available, compared to the uncertainties at the beginning of the project. In this context, both the internal and external environments can precipitate changes. For example, monitoring changes in the evolving technological environment of the project is critical to ensure that changes in technology do not make the current project obsolete. Thus, technological changes may be needed to maintain the viability of the project, and to enhance its value. In addition to technological forecasting, there are two other possible forecasting scenarios in a project environment. The first is to forecast individual events, and the second is to forecast the outcome or progress of groups of activities or the multiple, diversity processes of a project. The context of our discussion relates to accurately forecasting activity times, as well as the relationship between project time/cost (also known as an S-curve), as they both have cost implications. Various approaches to forecasting—as well as some techniques that can be useful for forecasting activity times and the project S-curve—are found in the appendix to Chapter 3.

In Chapter 4, we discuss various concepts and approaches relating to project budgeting. Project budgeting and cost estimation are strongly intertwined. Without the best cost estimates available, meaningful budgets cannot be developed. The process of developing a project budget involves a combination cost estimation, financial analysis, fine-tuning, and, to a certain extent, intuition and creativity. The key feature of developing a project budget is that it should be aligned to the overall goals of the project and parent organization. An effective project budget is essentially a plan that integrates the allocation of resources, the project schedule, and the project's goals. Meaningful budgets require

intense communication among all interested stakeholders, make use of multiple sources of data, and are developed concurrently with the project schedule to ensure that all milestones can be met.

In allocating the project budget, extra money is included to cover expected and unexpected risks. This can be classified as contingency reserve or management reserve. Contingency reserve is money assigned to the project and allocated for identified risks during risk analysis, for which specific contingency responses are developed. These risks can be predicted based on historical records, post-project reviews, and expert information. The contingency reserve is controlled by the project manager, although it may be delegated. Management reserve is money assigned to the project for unknown possible costs and funding that senior management controls and is based on the degree of uncertainty in cost estimation. Management reserve is used cover unanticipated emergencies and should not be used to cover cost overruns. Without contingency and management reserves, it is difficult to estimate the project cost and the corresponding budget to be allocated. These reserves are an integral part of the project budget and help to proactively manage project risks.⁸

Project cost control is the process of monitoring project costs and managing changes to the cost baseline. Establishing cost control in the project includes ensuring viable cost reporting systems. According to the Project Management Institute (PMI), project control involves “processes centered around planning, estimating, budgeting, financing, funding, and managing costs, so that the project can be completed within the approved budget.”⁹ The baseline project budget is generally the basis for project control. To avoid cost overruns and to ensure that the project progress is attuned to the cost estimates and forecasts to achieve the project targets, measures for project control are put in place early in the project. Simply put, control of costs will determine cost-benefit ratios, and, ultimately, the measure of project success.

The budget baseline is a common yardstick used by the project manager to monitor and control the costs of the project. Several other techniques are adopted to aid control of project costs, starting with the baseline budget based on initial estimates during the planning process. The initial estimate, although subject to some modification, remains a strong basis to control project costs, which must be apportioned in tandem with the schedule for each activity. In this context, deadlines and

milestones for completion of activities in the projects become critical, as time translates into money, thus making delays costly. Even in the face of inevitable changes in the project, such changes need to be strictly controlled. Regular reviews, reports, and meetings are needed to maintain control of project costs. Feedback on progress at regular intervals enables control over any real or potential cost overruns. Such cost escalation against the baseline budget can precipitate financial risk to the project and needs to be monitored rigorously throughout the project life cycle.

When it comes to project cost control, a frequently made mistake is to compare the predicted rate of expenditures over time with the actual costs incurred. Without factoring in some measure of the work completed for expenditures incurred, any comparison for the purposes of cost control will lead to erroneous conclusions. The earned value management (EVM) method solves this problem. In essence, EVM requires that not merely the planned expenditure and actual cost incurred are measured, but also the *value of the work is actually accomplished at the cost rates set out in the original budget*. In addition, the information EVM provides about the efficiency with which budgeted money is used relative to realized value makes it possible to create forecasts about the estimated cost and schedule to project completion. The topic of project cost control, along with the concepts of EVM and S-curves, are examined in detail in Chapter 5.

In the next two chapters, we discuss two other topics that can have a direct influence on overall project costs: cash flow management and financial management. Cash flow management is a vital process that is inextricably linked to the project cost management process—without it, effective cost management cannot be achieved. Simply defined, cash flow is the net difference between the flows of money in and out of the project. Cash flow management is important from the perspectives of both the project sponsor and its contractors. The sponsor must have access to funds to pay the contractor, and must be able to keep track of expenses and project progress. The contractor, on the other hand, should accurately monitor costs as they are incurred, bill the sponsor at the appropriate time, and have appropriate control systems to ensure that payments are received without excessive delays. The topic of managing cash flow is the focus of Chapter 6.

Projects cannot survive without adequate funding and yet very few project managers have even a rudimentary understanding of project

financing and its management. The ways in which a project is funded, and its finances are managed will have a significant impact on project cost, its cash flow, and, most importantly, on the success of the project. Hence, managing project finance is very much an important element of the overall project strategy. Project financing and its management is a vast subject area that cannot be examined in a single chapter. However, Chapter 7 covers some very important elements relating to the features and sources of project financing, and includes some key issues to consider in managing project finances. These are important elements of the overall project strategy—the ways in which a project is funded and its finances are managed have a significant impact on project cost, cash flow, and, most importantly, success. Sometimes, these outlays can be enormous and extremely risky: Boeing, for example, routinely commits well over \$1 billion in nonrecoverable R&D expenses for new project ventures. If the parent organization borrows the finances needed for the project, the money has to be repaid—regardless of success or failure.

The next series of chapters deal with how to manage and enhance value in projects. The topics include value management, change control and configuration management, project supply chain management, and quality management.

Chapter 8 explores the topic of value management in projects. Value management is the art and science of managing stakeholder expectations by balancing needs and wants and the management of resources to optimize competing considerations of diverse stakeholders. The net impact of value management is to reconcile the various priorities of stakeholders to deliver the best value for all. This is, of course, easier said than done. Part of the reason is that projects often suffer from poor definition due to inadequate time and deliberation given during the earlier stages of a project. This often results in cost and time overruns, claims, client dissatisfaction, and excessive operating costs. In addition, any project should be initiated only after a careful analysis of the need for the project and its strategic viability. One of the primary tasks of value management (VM), therefore, is to identify at the earliest possible stage, the need for the project as well the viability of its scope. In addition, VM focuses on enhancing overall business performance through innovation, skills development, and people motivation, and by creating synergies. In this context, value management is synonymous

with benefits realization management as a plan is developed to outline how to deliver the benefits step-by-step in the project. Some of the key elements of a benefits realization management plan include:¹⁰

- Target benefits—the benefits or value to be realized at a project's conclusion.
- Coherent strategy—one that aligns well with organizational strategy that justifies the benefits/value realized from the project.
- Time frame—when the benefits will be realized.

Value management encompasses all value-enhancing techniques, including *value planning*, *value engineering*, and *value analysis*. In this chapter, we discuss issues such as the relationship between value management and value engineering, value planning, and value analysis, the difference between value and cost management, and various VM techniques.

A configuration is a set of characteristics that define a final product or deliverable. This includes all functional and physical specifications of the product. The essence of configuration management (CM) is to gain the continual agreement of stakeholders regarding configuration and functionality of the project's end product throughout the project's life cycle. By doing so, value to the project's stakeholders is enhanced. Specifically, configuration management is the process by which the configuration of individual components manages the functionality of those components, as well as the functionality of the total product. Configuration management is also used to manage the work methods by which each component is made and built into the product. When applied to projects, this means the management of the products, processes, facilities, and strategic assets of the project such as the project management plan and baselines. Configuration management also incorporates change management as the project configuration typically changes during the project life cycle. We will learn about CM and its various features in Chapter 9.

Chapter 10 covers supply chain management (SCM), a process that attempts to fully integrate the network of all organizations and their related activities in an efficient manner. The focus of SCM is to add value to the product or service at each stage of the chain, so that it meets or exceeds customer expectations. (For this reason, supply chains

are often referred to as “value” chains.) While it has enjoyed great popularity elsewhere, SCM has only recently gained ground among many project organizations. Consequently, project organizations not employing supply chain processes are continually plagued by problems of poor quality, low profit margins, and schedule and cost overruns. The reality is that project organizations with their multitude of suppliers have an urgent need to adopt SCM-related practices. To that end, we discuss the unique nature of project supply chains in this chapter, as well as some strategies for applying SCM-related concepts and techniques to projects.

The concept of “quality” is multidimensional. What constitutes quality, and how quality is defined, may vary among different customer groups. For example, luxury car buyers, who are interested in performance quality (such as the fastest automobile in the world), are more likely to buy a super sport version of the Bugatti Veyron EB 16.4. On the other hand, price-conscious consumers, who are generally more interested in consistent quality, will more likely buy a sedan such as a Toyota Camry or a Honda Accord.¹¹ In our chapter on value management, the concept of project quality is dealt with indirectly under the umbrella term “value.” Similarly, the quality dimensions of performance and functionality are addressed in the material on configuration management. However, given the uniqueness of a project-based environment, the role of quality and its contribution in enhancing the overall value of projects takes on added importance. We examine the various aspects of a project’s quality and quality management in Chapter 11.

The final chapter is organized in a capstone format that provides an integrated framework incorporating the entire scope of this book. It can be applied to many project environments and the framework provides a forum for discussing the project plan’s cost and value components, along with its strengths and weaknesses. Our discussion focuses on the required processes that should be in place to effectively manage cost, time, value, and risk aspects of a project. For example, we explore how risk management approaches can be used to protect project value from inevitable uncertainties.

As we have said, one of the greatest challenges facing project managers today is the need to develop a better understanding of the roles that cost and value management play in successful project implementation.

Project management texts touch the surface of these duties, but it is a rare work that gives them their due. This is a pity, particularly given the numerous projects that fail due to the inability of project teams and organizations to effectively manage these twin requirements.

Readers will find that we offer a sequential methodology for addressing cost and value management. First, it is necessary to effectively plan for them. Just as we plan for a project's development through sophisticated means such as work breakdown structures and network diagrams, we must include effective cost and value planning in our project management repertoire. Second, cost and value must be controlled on an ongoing basis. Projects, as we know, do not succeed or fail solely on the basis of sound planning—project execution requires us to apply those plans in a meaningful way. Likewise, cost and value management include a definite “control” process to monitor the ongoing status of cost and value and make necessary corrections. Finally, good project management also requires an evaluation stage, in which we analyze what went right and what went wrong. For cost and value management, the analysis component is equally critical. It is only through critical analysis that we learn. It is only through learning that we improve.

We believe that an updated edition of this book comes at an opportune time in the continuing advancement of project management knowledge and processes. In recent years, projects have become one of the key means by which organizations add to their bottom lines—making it critical to master project-based skills, including cost and value management. Proficiency in these two areas will confer an important advantage on organizations competing with each other for profits, market share, and technical innovations. We hope that readers find much of “value” for themselves and their organizations in these pages.

CHAPTER SUMMARY

This chapter introduces the second edition of our book, *Cost and Value Management in Projects*. We argue that project success is chiefly a function of the effective control of project costs while enhancing value. These criteria help us understand the nature of managing projects to maintain internal control (“project management success”) while achieving the business case for the project (“project outcome success”),

through aligning the project with its stakeholders. We identify some of the challenges in cost control and value development for projects in modern organizations and examine why cost and value management are so critical and yet so challenging. We consider—briefly—some of the keys to effective project cost management and identify essential features of value management for projects. Finally, this chapter provides the organization of the book, including a brief overview of the subsequent chapters.

REFERENCES

1. Honore, M. (2021). For cost overruns, Honolulu rail is in a league of its own, new data shows. *Honolulu Civil Beat*, August 9. Retrieved from <https://www.civilbeat.org/2021/08/for-cost-overruns-honolulu-rail-is-in-a-league-of-its-own-new-data-shows/#:~:text=When%20City%20and%20County%20of,Authority%20for%20Rapid%20Transportation%20estimates>.
2. Italy suspends Rome's 2024 Olympic bid. (2016). *Wanted in Rome*, October 12. Retrieved from <https://www.wantedinrome.com/news/italy-suspends-romes-2024-olympic-bid.html>; McCarthy, N. (2012). The massive costs behind the Olympic games. *Forbes*, July 21. Retrieved from <https://www.forbes.com/sites/niallmccarthy/2021/07/21/the-massive-costs-behind-the-olympic-games-infographic/?sh=7e396b9d46b0>.
3. Project Management Institute (2022). *The Pulse of the Profession: Project Management Statistics: Trends and common mistakes in 2022*. Retrieved from <https://teamstage.io/project-management-statistics/>.
4. Standish Group (2020). *Chaos 2020: Beyond Infinity*. Boston, MA: The Standish Group International.
5. Pinto, J. K. (2019). *Project Management: Achieving Competitive Advantage*, 5th ed., pp. 274–275. Upper Saddle River, NJ: Pearson Prentice Hall.
6. Turner, J. R., and Simister, S. J. (2000). *Gower Handbook of Project Management*, 3rd ed. Aldershot, Hampshire, UK: Gower.
7. Moustafaev, J. (2011). *Delivering Exceptional Project Results: A Practical Guide to Project Selection*. Plantation, FL: J. Ross Publishing.
8. PM Study Circle. (2019). Contingency reserve vs. management reserve. Retrieved from <https://pmstudycircle.com/2012/02/contingency-reserve-vs-management-reserve>.
9. PMI (2019). Cost control. Retrieved from <https://www.pmi.org/learning/featured-topics/cost-control>.

10. Benefits realization management. Retrieved from <https://www.toolshero.com/project-management/benefits-realisation-management/>.
11. Venkataraman, R., and Pinto, J. K. (2020). *Operations Management: Managing Global Supply Chains*, 2nd ed. Thousand Oaks, CA: SAGE Publications.