

Project Cost Management : An Overview of Concept, Techniques and Process

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What is Project Cost Management?

Project cost management is the process of estimating, budgeting and controlling costs throughout the project life cycle, with the objective of keeping expenditures within the approved budget. Beginning with estimating, a vital tool in PCM, actual historical data is used to accurately plan all aspects of the project. As the project continues, job control uses data from the estimate with the information reported from the field to measure the cost and production in the project. From project initiation to completion, project cost management has an objective to simplify and cheapen the project experience.

For a project to be called successful, it's necessary that

- it delivers on the requirements and scope
- its execution quality is of a high standard
- it's completed within schedule and
- it's completed within budget.

Project Cost is the total funds needed to complete the project or work that consists of a Direct Cost and Indirect Cost. The Project Costs are any expenditures made or estimated to be made, or monetary obligations incurred or estimated to be incurred to complete the project which are listed in a project baseline. Hence, project cost management is one of the key pillars of project management and is relevant regardless of the domain, be it manufacturing, retail, technology, construction and so on. It helps to create a financial baseline against which project managers can benchmark the current status of their project costs and realign the direction if needed.

Calculating Total Project Cost (TPC) is a vital step for any project. TPC should include all the costs (fixed and variable) of the project. The calculation should include total estimated cost (TEC) and other project costs (OPC). I.e., it includes but not limited to activities Costs such as pre-planning, feasibility, operating cost, commissioning, risk analysis, contingency, design, development, maintenance etc.

Steps in Project Cost Management

While cost management is viewed as a continuous process, it helps to split the function into four steps: resource planning, estimation, budgeting and control. They are mostly sequential, but it's possible that some resource changes happen midway through the project, forcing the budgets to be adjusted. Or, the variances observed during the control process can call for estimate revisions. Let us look at each of these four steps in detail.

1. Project Resource Planning : Resource planning is the process of identifying the resources required to execute a project and take it to completion. Examples of resources are people (such as employees and contractors) and equipment (such as infrastructure, large construction vehicles and other specialized equipment in limited supply). Resource planning is done at the beginning of a project, before any actual work begins. To get started, project managers first need to have the work-breakdown structure (WBS) ready. They need to look at each subtask in the WBS and ask how many people, with what kind of skills are needed to finish this task, and what sort of equipment or material is required to finish this task?

By adopting this task-level approach, it becomes possible for project managers to come up with an accurate and complete inventory of all resources, which is then fed as an input into the next step of estimating costs. A few tips to consider during the process:

- **Consider historical data :** past schedules and effort—before determining sub-tasks and the corresponding resources.
- **Take feedback from team members:** a collaborative approach works well especially in projects that do not have past data to use.
- **Assess the impact of time on resource requirements:** For instance, a resource may be available only after a few months, dragging the project's schedule. This could have an impact on cost estimation.
- **Account for ground realities :** For example, you may identify the need for a resource with certain expertise, but if such a resource is not available within the organization, you have to consider hiring a contractor or training your team to get them up to speed. All these real variables impact cost management.

2. Cost Estimation : Cost estimation is the process of quantifying the costs associated with all the resources required to execute the project. To perform cost calculations, we need the following information:

- Resource requirements (output from the previous step)
- Price of each resource (e.g., staffing cost per hour, vendor hiring costs, server procurement costs, material rates per unit, etc.)
- Duration that each resource is required
- List of assumptions
- Potential risks
- Past project costs and industry benchmarks, if any

- Insight into the company's financial health and reporting structures

Estimation is arguably the most difficult of the steps involved in cost management as accuracy is the key here. Also, project managers have to consider factors such as fixed and variable costs, overheads, inflation and the time value of money. The greater the deviation between estimation and actual costs, the less likely it is for a project to succeed. However, there are many estimation models to choose from. Analogous estimation is a good choice if you have plenty of historical cost data from similar projects. Some organizations prefer mathematical approaches such as parametric modeling or program evaluation and review technique (PERT).

Then there is the choice between employing a top-down versus bottom-up approach. Top-down typically works when past costing data are available. In this, project managers usually have experience executing similar projects and can therefore take a good call. Bottom-up works for projects in which organizations do not have a lot of experience with, and, therefore, it makes sense to calculate a cost estimate at a task-level and then roll it up to the top.

There are three effective cost estimating methods which can be used to calculate project cost.

- **Parametric Estimation:** This estimation uses the historical data to calculate the cost estimation. Most of the time this estimation works well as it's based on the real data and saves lots of time. Eg: In a construction project, how much cost spent per square feet in the same locality for a similar project, would help to calculate the cost estimation for the new project.
- **Bottom-up approach:** Bottom-up approach otherwise called as definitive technique is all about breaking up all the activities of the project to the micro level and do the cost estimation. This is the most accurate method to calculate the cost estimation. However might be time-consuming and a costly technique.
- **Three-point Estimation:** This estimation is commonly called as PERT (Program Evolution and Review Technique). It includes all the possibilities, assumptions and uncertainties in cost estimation. They are,
 - Most Likely cost (Cm): It refers the regular case where everything goes well.
 - Pessimistic Cost (Cp): It refers the worst case where everything goes against the plan.
 - Optimistic Cost (Co): It refers to the scenario where everything works better than planned.

PERT formula is Expected cost = $(Co + Cp + 4 Cm) / 6$.

This method is considered as a best and accurate method to calculate the project cost estimation.

Cost Estimation as a Decision Enabler

It's useful to remember that cost estimation is done at the planning stage and, therefore, everything is not yet set in stone. In many cases, project teams come up with multiple solutions for a project, and cost estimation helps them decide which way to go. There are many costing methodologies,

such as activity-based costing, job costing, and lifecycle costing that help perform this comparative analysis.

Lifecycle costing, for instance, considers the complete end-to-end lifecycle of a project. In IT projects, for example, maintenance costs are often ignored, but lifecycle costing looks long-term and accounts for resource usage until the end of the cycle. Similarly, in manufacturing projects, the goal is to minimize future service costs and replacement charges. Sometimes the estimation process also allows teams to evaluate and reduce costs. Value engineering, for example, helps to gain the optimal value from a project while bringing costs down.

Importance of identifying risks:

While discussing cost estimation precisely at the beginning of the project, it's also important to identify all the possible risks at the beginning of the project itself. Most of the times only these unidentified risks cause project failure. Risks cause lots of issues and resolving issues needs money. Not only money might need more time and scope expansion. Hence project manager has to involve the project team and experts to identify all the risks at the initial stage itself.

3. Project Cost Budgeting : Cost budgeting can be viewed as part of estimation or as its own separate process. Budgeting is the process of allocating costs to a certain chunk of the project, such as individual tasks or modules, for a specific time period. Budgets include contingency reserves allocated to manage unexpected costs. Budgeting creates a cost baseline against which we can continue to measure and evaluate the project cost performance. If not for the budget, the total estimated cost would remain an abstract figure, and it would be difficult to measure midway. Evaluation of project performance gives an opportunity to assess how much budget needs to be released for future phases of the project. Another reason to firm up budgets is that organizations often rely on expected future cash flows for their funding. During the initial phases, the project manager has a limited financial pool and has to set targets accordingly. It's similar to building the foundation and one floor of the house in the initial few months and later completing the rest of the project, as you save more.

To determine the cost budget, consider the following techniques:

- **Cost aggregation:** requires you to aggregate or combine costs from an activity level to a work package level. The final sum of the cost estimates is applied to the cost baseline.
- **Reserve analysis:** requires you to create a buffer or reserve to protect against cost overruns. The degree of protection should be equivalent to the risk foreseen in the project. The buffer is part of the project budget, but not included in the project baseline.
- **Historical data:** requires you to think about estimates from closed projects to determine the budget of the new project. This is very similar to analogous estimation described earlier.
- **Funding limit reconciliation:** requires you to adhere to the constraints imposed by the funding limit. The

funding limit is based on the limited amount of cash dedicated to your project. To avoid large variations in the expenditure of project funds, you may need to revise the project schedule or the use of project resources.

4. Project Cost Control : Cost control is the process of measuring cost variances from the baseline and taking appropriate action, such as increasing the budget allocated or reducing the scope of work, to correct that gap. Cost control is a continuous process done throughout the project lifecycle. The emphasis here is as much on timely and clear reporting as measuring. Along with the cost baseline, the cost management plan is an essential input for cost control. This plan contains details such as how project performance will be measured, what is the threshold for deviations, what actions will be done if the threshold is breached, and the list of people and roles who have the executive authority to make decisions.

To effectively control project costs, consider these tools and techniques:

- **Earned value management:** uses a set of formulas to help measure the progress of a project against the plan.
- **Forecasting:** uses the current financial situation to project future costs. The forecast is based on budgeted cost, total estimated cost, cost commitments, cost to date, and any over or under budgeted costs.
- **To-complete performance index (TCPI):** represents the level of project performance that future work needs to be implemented to meet the budget.
- **Variance analysis:** involves analyzing the difference or variance between the budgeted costs and the actual costs to indicate whether the project is on budget.
- **Performance reviews:** used to check the health of a project. Includes an analysis of project costs, schedule, scope, quality, and team morale. By learning how to estimate costs, determine budgets, and control costs, you can be a better project manager and leader. Effective cost management will help you get projects done on time and under budget, the golden ticket for any successful project manager

Cost Management Plan Outline

A cost management plan sounds simple. It's an outline of the cost estimation for the project but that includes all allocations and how the project manager will control those costs to bring the project in as budgeted. The following are key considerations for an effective cost management plan:

- Precision and accuracy is important, especially if you're rounding numbers, which might seem insignificant but can result in a deviation of cost estimates on projects big and small. It is critical that your figures be as precise and accurate as possible.
- You'll also want to define the units of measurement, because size matters and can make a big difference in your cost estimation.
- Know the cost variations and where you have wiggle room and where you don't—this is called control thresholds.
- Establish how the project performance will be measured in order to see if you're meeting the goals and expectations of the project.

- You need to have a format to report your findings as you monitor the project's progress and present this data to your stakeholders.

Tips for Managing Project Cost

The following are some tips to keep in mind as you're working on managing your project costs.

- **Plan for Inflation:** Inflation is persistent phenomenon and any good budget takes this into account by allowing for a range of costs.
- **Account for Natural Disasters or Potential Events:** Expect the unexpected might sound silly, but you must have room in your budget for a weather event, personal issue or some other unknown that will delay the project.
- **Other Unexpected Costs:** Not all unexpected costs are random. There can be legal issues, penalties associated with the project or unexpected labor costs, all of which you can't budget for, but can prepare your budget for.
- **Track in Real-Time:** Having software to monitor the budget as you execute the project is key for managing costs. However, if you're looking at data that is not current, you won't be able to act swiftly enough to resolve issues. Therefore, you want to have software with real-time data tracking.
- **Respond Promptly:** Regardless of how you discover a discrepancy in your project cost, you must act immediately. The longer you wait, the more money is wasted.
- **Size does not matter:** Some people think smaller projects don't need project cost management. But small or large, you'll want to manage costs.

In order to best manage project costs, you have to know your project inside and out. The best way to do that is at the start of the project by creating a thorough project charter.

Conclusion

By implementing efficient cost management practices, project managers can : Set clear expectations with stakeholders, Control scope creep due to transparencies established with the customer, Track progress and respond with corrective action at a quick pace, Maintain expected margin, increase ROI, and avoid losing money on the project, Generate data to benchmark for future projects and track long-term cost trends.

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