

Training Video – Cost Estimation – Narrative

Slide 1

Welcome to CMS IT Governance Training – Cost Estimation. In this short video we're going to explain what cost estimation is, why it is important, and compare some cost estimation techniques.

A project's budget has the potential to impact nearly every facet of the project, making it one of the most critical responsibilities of a project manager. A poorly designed budget leads to improper asset allocation, unrealistic expectations, and potentially, a failed project. It's important to a project's success that the budget is accurate. Cost estimation is one of the most effective tools in the project manager's tool belt for planning an accurate budget.

Slide 2 What is Cost Estimation?

In the field of project management, cost estimation is the process of estimating all of the costs associated with completing a project within scope and according to its timeline.

Initial, high-level estimates are often used in the early stages of project planning which help to determine whether or not a project is ultimately pursued. Once a project is approved to move forward, more detailed cost estimates become necessary in order to appropriately allocate resources.

Slide 3: Why is Cost Estimation Important?

Reliable estimating is crucial for making informed decisions, evaluating the viability of a project, understanding project resource requirements, and monitoring the project performance. CMS uses cost estimates to:

- *Develop annual budget requests*
- *Evaluate resource requirements at key decision points*
- *Allows decision makers to evaluate proposed alternatives against each other and to prioritize funding requests*
- *Establish spending baselines which are used for ongoing project evaluation and discussion*
- *Plan for total life cycle costs*

Slide 4 Conventional Cost Estimation Techniques

Multiple techniques exist for estimating costs. Some of the most frequently used are:

Analogous / Top Down Technique: In this technique, experts derive costs based on actual dollars spent from prior projects of similar scope and sizes, adjusting for any unique aspects of the project under consideration. This is common for estimating entire projects in an early planning stage when resources are limited or not many details about the project are known.

Bottom-Up Technique: In this technique, project managers tally costs for every expense starting at the bottom and accounting for each expected cost. In sum, the total costs should equal the finished project. This is best applied in large, multifaceted projects.

Parametric Technique: The parametric technique, is a statistical method that uses regression analysis of two or more similar systems to develop cost estimating relationships (CERs) which estimate cost based on one or more system performance or design characteristics (e.g., speed, scalability, capacity).

Three Point Estimates: The Three-point estimating technique usually leverages bottom-up and analogous techniques. The concept requires three different points of estimates: the optimistic (best case), pessimistic (worst case) and the most likely cost estimate.

Based on these 3 points, a weighted average cost estimate is determined that overweighs the “most likely” point. This can be done by assuming a triangular distribution, a PERT or beta distribution.

Slide 5 Comparing Techniques

Which method to select depends on where the project is in its life cycle. Early in the project, definition is limited and costs may not have accrued. Once a project is in production, cost and technical data from the development phase can be used to estimate the remainder of the project. The chart below provides a high level view of the strengths and weaknesses of each technique.

	Analogous	Bottom-Up	Parametric	Three Point
Strengths	<p>Detailed project information not needed.</p> <p>No data manipulation or detailed cost analysis.</p> <p>Quick and cost-efficient.</p>	<p>Highly accurate means of estimating total cost.</p> <p>Gives good insight into major cost contributors.</p>	<p>Allows you to measure error from a derived Cost estimation relationship.</p> <p>Model can be reused for similar projects.</p> <p>Quickly accommodate changes in design.</p>	<p>Improves overall accuracy by taking the average.</p> <p>Takes Risk into account by applying weights</p>
Weaknesses	<p>Ignores the technical details of a project yielding inaccurate results.</p>	<p>Can be expensive and time consuming to produce.</p>	<p>Data must be normalized which is time-consuming</p>	<p>The absoluteness of the end points</p>

	Often difficult to find the detailed cost, technical, and program data required	Alternatives must be built bottom-up. Requirements must be well known and stable.	May be difficult to understand the cost-independent variable relationship.	
--	---	--	--	--

Slide 6 Cost Estimation for Agile Projects

Some conventional cost estimation practices do not adapt well to Agile Project development, given its emphasis on changing project scopes.

However, since the primary input in Agile processes is labor - not resources - and that Agile development supports fixed-time iterations, you can use parametric estimating techniques to create cost estimates. Agile development teams divide work into manageable portions for each iteration and can thus charge fixed costs depending on the number of developers needed to complete the work scheduled for each iteration.

On the whole, cost estimation for Agile development projects is best conducted as a combination of top-down and bottom-up estimating. Developmental work, which does not have a fixed scope, is better estimated using top-down techniques such as expert judgment and analogous estimating. Adaptation, which is generally well defined, can be estimated using bottom-up techniques since its scope is fixed.

Slide 7 Sources for Pricing Data

Since all cost estimating methods are data-driven, project managers need to know the best data sources.

The Acquisition Gateway built by GSA is the acquisition professional's online resource center that aims to improve and sustain Federal agency performance by empowering employees with access to acquisition information. The website includes data and tools, such as an [Independent Government Cost Estimate \(IGCE\) Tool](#) and the [Governmentwide Acquisition Contracts \(GWAC\) Prices Paid Suite of Tools](#)

Additional data sources may include:

- *Benchmarking Data*
- *Responses to Requests for Information*
- *Proofs of concept*
- *Cost Reports*

- *Experienced developers, engineers and other SMEs*
- *Other federal agencies*

Slide 8 Contact Us

For assistance with **Cost Estimation**, contact the Investment Management Team at IT_Investments@cms.hhs.gov or check out the cost estimation guidance document at www.cms.gov/TLC/TLC-Resource-Library.

For assistance with the **Target Life Cycle**, contact the IT Governance Team at IT_Governance@cms.hhs.gov or visit www.cms.gov/TLC.