

Project Cost Management



Project Cost Management

- **PMBOK** - includes the processes involved in planning, estimating, budgeting, financing, funding, managing, and controlling costs so that the project can be completed within the approved budget.
- Primarily concerned with the cost of the resources needed to complete project activities.

Process Name	Process Group	Key Outputs
Plan Cost Management	Planning	Cost Management plan
Estimate Cost	Planning	Cost Estimates, Basis of Estimating
Determine Budget	Planning	Cost Baseline, Project Funding Requirements
Control Costs	Monitoring and Controlling	Work Performance Information, Change Requests, Cost forecasts



Project Cost Management - Terms

■ Value Engineering

- Aka, value analysis is finding a less costly way of doing work. It will look how to achieve a goal/scope the less costly way

Cost Type	Explanation
Fixed	Costs that stay same throughout the life of a project . I.E. bulldozer
Variable	Costs that vary on a project. I.E. hourly labor, fuel for bulldozer
Direct	Expenses billed directly to the project. I.E. materials used to construct bldg
Indirect	Costs that are shared & allocated among several or all projects. i.e. mgr's salary.
Sunk	Costs that have been invested into or expended upon the project. Sunk costs are like spilt milk.



Plan Cost Management

- Defining how the project costs will be estimated, budgeted, managed, monitored, and controlled.
- It provides guidance and direction on how the project costs will be managed throughout the project.



Plan Cost Management - ITTO

INPUTS

- 1. Project Charter
- 2. Project Management Plan
 - Schedule Management Plan
 - Risk Management Plan
- Enterprise Environmental Factors
- Organizational Process Assets



TOOLS AND TECHNIQUES

- 1. Expert Judgment
- 2. Data Analysis
- 3. Meetings



OUTPUTS

Cost Management Plan

Plan Cost Management - Inputs

- Project Management Plan
- Project Charter
- Enterprise Environmental Factors
- Organizational Process assets



Plan Cost Management - Tools

- Expert Judgment
- Data Analysis
 - ▶ Reviewing strategic funding such as self-funding or funding with equity.
- Meetings



Plan Cost Management - Output

- Cost Management Plan
 - ▶ How costs will be planned, structured and controlled
 - ▶ Units of measure
 - ▶ Level of accuracy
 - ▶ Reporting formats
 - ▶ Control thresholds



Estimate Costs

- Developing an approximation of the cost of resources needed to complete project work.
- Usually expressed in some form of currency, \$, Euro, Yen, Won, etc..
- Accuracy of a project estimate will increase as the project progresses through the project life cycle
- Costs are estimated for all resources that will be charged to the project including but is not limited to labor, materials, equipment, services, and facilities, as well as special categories such as an inflation allowance, cost of financing, or contingency costs.

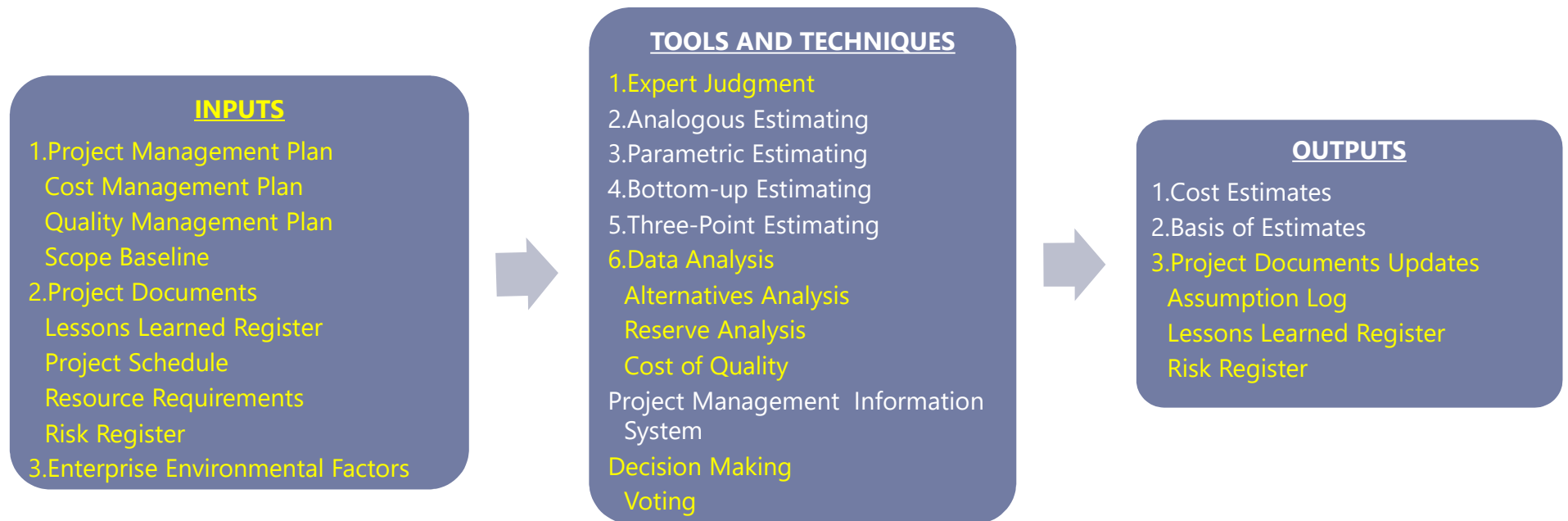


Estimate Cost - Types

- **Definitive Estimates:** –5% to +10%
- **Budget Estimates:** –10% to +25%
- **Rough Order of Magnitude Estimates:** –25% to +75%



Estimate Costs



Estimate Costs - Inputs

- The Project Management Plan
 - Cost Management Plan
 - Scope Baseline
 - Quality Management Plan
- Project Documents
 - Project Schedule
 - Risk Register
 - Lessons Learned Register
 - Resource Requirements
- Enterprise Environmental Factors
- Organizational Process Assets



Estimate Costs - Tools

- Expert Judgment
- Analogous Estimating
 - Top down, Pasted projects, Not very detailed
- Parametric Estimating
 - Statistical relationships between historical data and variables
 - 8 hour work period, lay 50 cubic feet of concrete
 - 1 hour work period, paint 32 square feet of drywall
- Bottom-up Estimating
 - Separate estimate for each activity and aggregated up to summary nodes on WBS
 - Greatest Level of specified detail
 - Highly accurate, labor intensive



Estimate Costs - Tools

- Pert, Three point Estimating (Covered in Schedule Management)
- Data Analysis
 - Reserve Analysis (Money set aside for Risk)
 - Cost of Quality
 - Failure
 - Internal caused, (may need to rework, scrap)
 - External caused, (Warranty work, Lost of business)
 - Leads to rework and increasing spend rate
 - Success
 - Training, proper equipment, inspections
- PMIS
- Decision Making



Estimate Costs - Output

- Cost Estimates
 - ▶ Costs associated with each activity. This includes labor, materials, equipment, facilities, inflation, services, etc...
- Basis of Estimates
 - ▶ Range of possible estimates
 - ▶ Confidence level of estimates
 - ▶ How estimates were developed and by whom
- Project Document Updates



Determine Budget

- Process of aggregating the estimated costs of individual activities or work packages to establish an authorized cost baseline.
- It determines the cost baseline against which project performance can be monitored and controlled.



Determine Budget - ITTO

INPUTS

- 1. Project Management Plan
 - Cost Management Plan
 - Resource Management Plan
 - Scope Baseline
- Project Documents
 - Basis of Estimates
 - Cost Estimates
 - Project Schedule
 - Risk Register
- Business Documents
 - Business Case
 - Benefits Management Plan
- Agreements
- Enterprise Environmental Factors
- Organizational Process Assets



TOOLS AND TECHNIQUES

- 1. Expert Judgment
- 2. Cost Aggregation
- 3. Data Analysis
 - Reserve Analysis
- Historical Information Review
- Funding Limit Reconciliation
- Financing



OUTPUTS

- 1. Cost Baseline
- 2. Project Funding Requirements
- 3. Project Documents Updates
 - Cost Estimates
 - Project Schedule
 - Risk Register

Determine Budget – Inputs

- The Project management Plan
 - Cost Management Plan
 - Scope Baseline
 - Resource Management Plan
- Project Documents
 - Cost Estimates
 - Basis of Estimates
 - Project Schedule
 - Risk Register
- Business Documents
 - Business Case
 - Benefits Management Plan
- Agreements
- Enterprise Environmental Factors
- Organizational Process Assets



Determine Budget - Tools

- Expert Judgement
- Cost Aggregation
 - Details on what each schedule activity is scheduled to cost. These will be rolled up to each parent work package to determined total cost and budgetary requirements
- Data Analysis
 - Reserve Analysis, Possible Contingency reserves for the project
 - Contingency Reserves: The PM determines, manages, and controls the contingency reserves, which will address the cost impact of the remaining or known/unknown risks
 - Management Reserve: The management determines the funds to cover known/unknown risks to the project
 - Designed for possible risk obstacles to the Baselines
- Historical Information Review
 - Parametric or Analogous estimates based off historical projects
 - Best used when project are very similar in nature



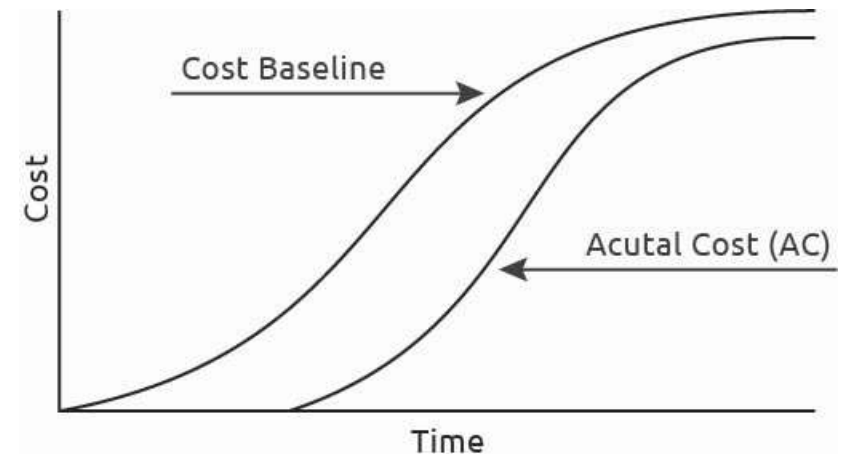
Determine Budget - Tools

- Funding Limit Reconciliations
 - ▶ Projects current run rate vs. what was planned over the life cycle of the project. Sections of the project may need to be reschedule due to budget limitations
- Financing
 - ▶ Acquiring money for the project from an external source



Determine Budget Output

- Cost Baseline
 - Includes the cost of all the activities, that are aggregated to work packages. The work packages and the contingency reserves are aggregated into control account. The sum of all control account is the cost baseline.
 - Typically displayed in a S-Curve graph.
 - The cost baseline represents the project cost, which includes the contingency reserves. The project budget is the cost baseline + management reserves.
- Project Funding Requirements
 - What gets funded when and by how much.
Is there a trigger point, Milestone point, etc..
- Project Document Updates

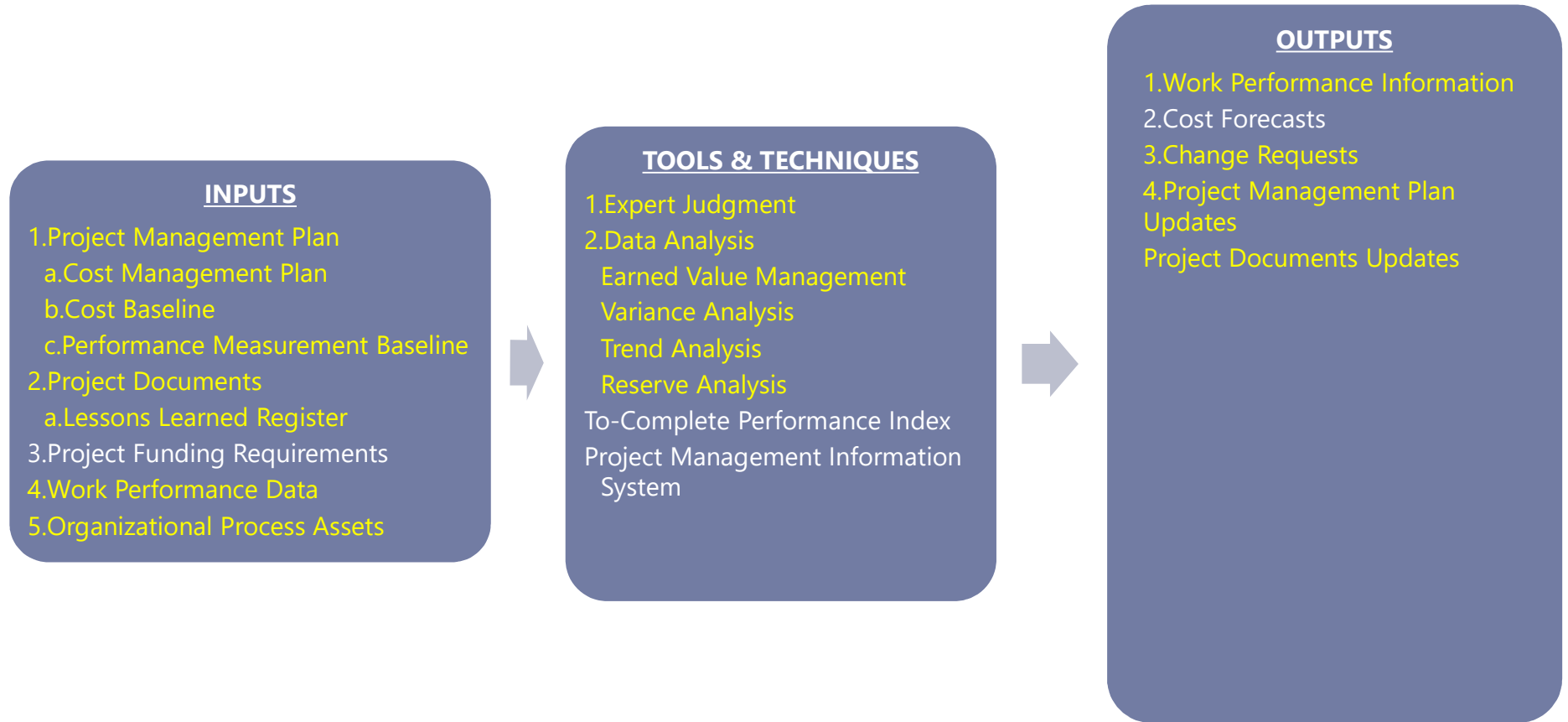


Control Costs

- Monitoring the status of the project to update the project costs and managing changes to the cost baseline.
- Primarily Concern with cost variance
- Any increase to the authorized budget can only be approved through the Perform Integrated Change Control process



Control Cost - ITTO



Control Costs - Inputs

- Project Management Plan
 - Cost Management Plan
 - Cost Baseline
 - Performance Measurement Baseline
- Project Documents
 - Lessons Learned Register
- Project Funding requirements
- Work Performance Data
- Organizational Process Assets



Control Costs - Tools

- Expert Judgement
- Data Analysis(Formulas to be covered in EVM Section)
 - ▶ Earned Value Analysis
 - ▶ Variance Analysis
 - ▶ Trend Analysis
 - ▶ Reserve Analysis
- To-Complete Performance Index (TCPI)
 - ▶ Formula to be covered in EVM Section.
- PMIS



Control Costs Continue - Outputs

- Work Performance Information
- Costs Forecasts
 - Uses the EAC (Estimate at Completion) EVM formula.
- Change requests
- Project Management plan updates
- Project Document Updates



Control Costs Continue

■ Performance Reviews

- Comparing cost performance over time, schedule activities or work packages
- Variance Analysis, compares actual project performance to planned or expected performance
- Trend Analysis, examines project performance over time to see if work levels are improving or deteriorating
- Earned Value Performance, Schedule and cost baselines compared to actual run rates



Control Costs Continue

■ Earned Value Analysis continues

- Planned Value, the budget assigned to the activity, or work package that needs to be completed at a set date and time
- Earned Value, the value of the budget assigned to the activity or work package that was completed at a set date and time
- Actual Cost, the actual spend rate of the activity or work package that was completed at a set date and time
- Schedule Variance, the scheduled difference between the earned value minus the planned value
- Cost Variance, the cost difference between the earned value minus the actual costs
- Schedule Performance Index, the measurement of progress achieved compared to what was planned progress
- Cost Performance index, the measurement of the value of work completed compared to the actual cost made on the project



Earned Value Management Formulas

- $BAC = \text{Total Budget Cost for the project}$
- $PV = \text{Planned \% Complete} \times BAC$
- $EV = \text{Actual \%} \times BAC$
- $AC = \text{Sum of the cost for the given period}$
- $CV = EV - AC$
- $CPI = EV / AC$
- $SV = EV - PV$
- $SPI = EV / PV$
- $EAC = BAC / CPI$
- $ETC = EAC - AC$
- $VAC = BAC - EAC$
 - ▶ $TCPI = (BAC - EV) / (EAC - AC)$ for Forecast
 - ▶ $TCPI = (BAC - EV) / (BAC - AC)$ for remaining funds

