

# Cost Management

---

CS413 - Software Engineering Project Management

---

Department of Computer Engineering, Bilkent University

Dr. Mustafa Değerli



**Bilkent University**

## Key Terms

- **Budget.** The approved estimate for the project or any work breakdown structure component or any schedule activity
- **Budget at Completion (BAC).** The sum of all budgets established for the work to be performed



## Key Terms

- **Cost Baseline.** The approved version of the time-phased project budget, excluding any management reserves, which can be changed only through formal change control procedures and is used as a basis for comparison to actual results



## Key Terms

- **Cost Management Plan.** A component of a project or program management plan that describes how costs will be planned, structured, and controlled



## Key Terms

- **Cost of Quality (CoQ).** All costs incurred over the life of the product by investment in preventing nonconformance to requirements, appraisal of the product or service for conformance to requirements, and failure to meet requirements



## Key Terms

- **Cost Performance Index (CPI).** A measure of the cost efficiency of budgeted resources expressed as the ratio of earned value to actual cost
- **Cost Variance (CV).** The amount of budget deficit or surplus at a given point in time, expressed as the difference between the earned value and the actual cost



## Key Concepts

- Project Cost Management is primarily concerned with the cost of the resources needed to complete project activities, but it should also consider the effect of project decisions on the subsequent recurring cost of using, maintaining, and supporting project deliverables



## Key Concepts

- Different stakeholders will measure project costs in different ways and at different times. Stakeholder requirements for managing costs should be considered explicitly





## Key Concepts

- Predicting and analyzing the prospective financial performance of the project's product may be performed outside the project, or it may be part of Project Cost Management



# Project Cost Management

- 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



# Cost Management Processes

- **1 Plan Cost Management**
- The process of defining how the project costs will be estimated, budgeted, managed, monitored, and controlled



# Cost Management Processes

- **2 Estimate Costs**
- The process of developing an approximation of the monetary resources needed to complete project work



# Cost Management Processes

- **3 Determine Budget**
- The process of aggregating the estimated costs of individual activities or work packages to establish an authorized cost baseline



# Cost Management Processes

- **4 Control Costs**
- The process of monitoring the status of the project to update the project costs and manage changes to the cost baseline



## Plan Cost Management

### Inputs

- .1 Project charter
- .2 Project management plan
  - Schedule management plan
  - Risk management plan
- .3 Enterprise environmental factors
- .4 Organizational process assets

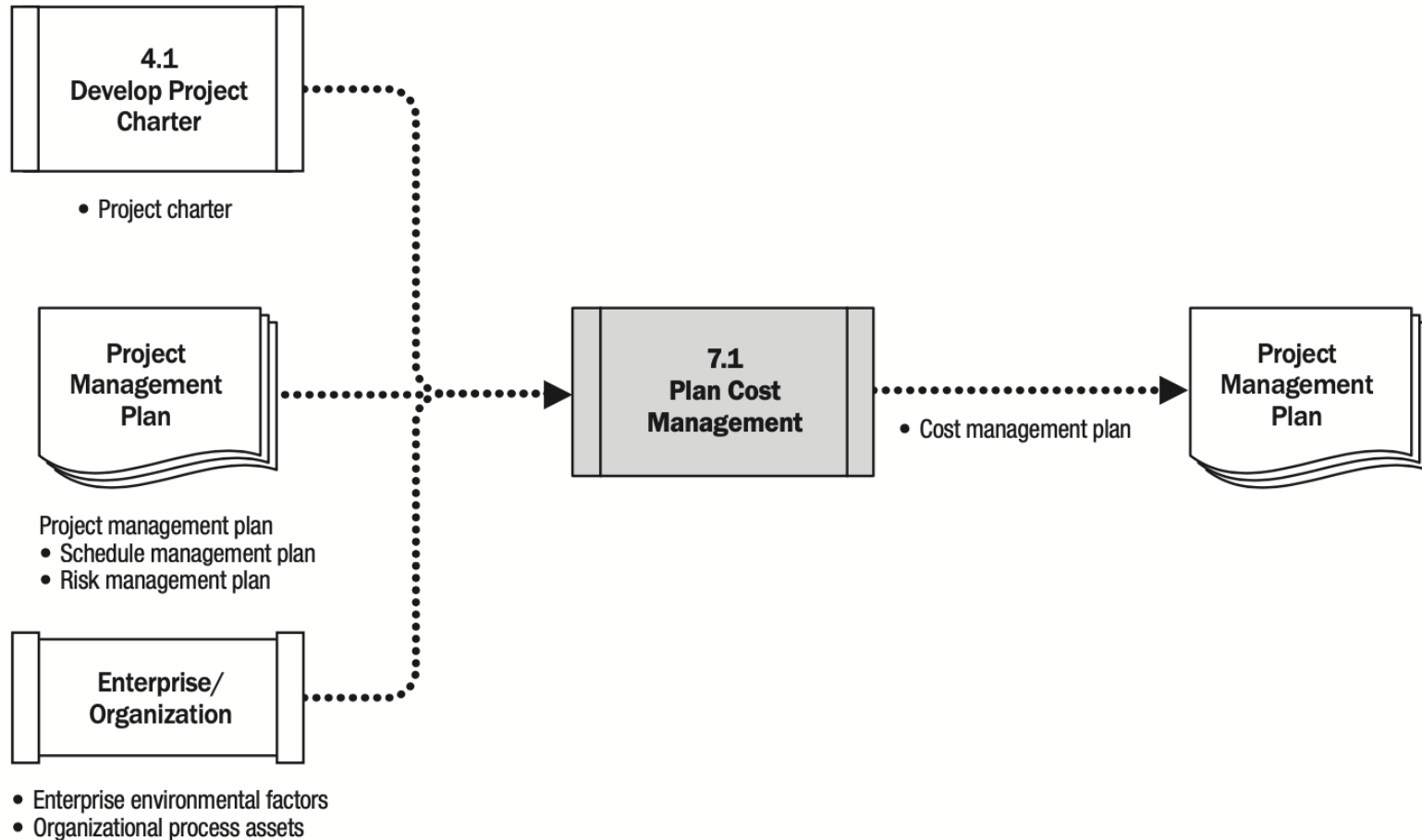
### Tools & Techniques

- .1 Expert judgment
- .2 Data analysis
  - Alternative analysis
- .3 Meetings

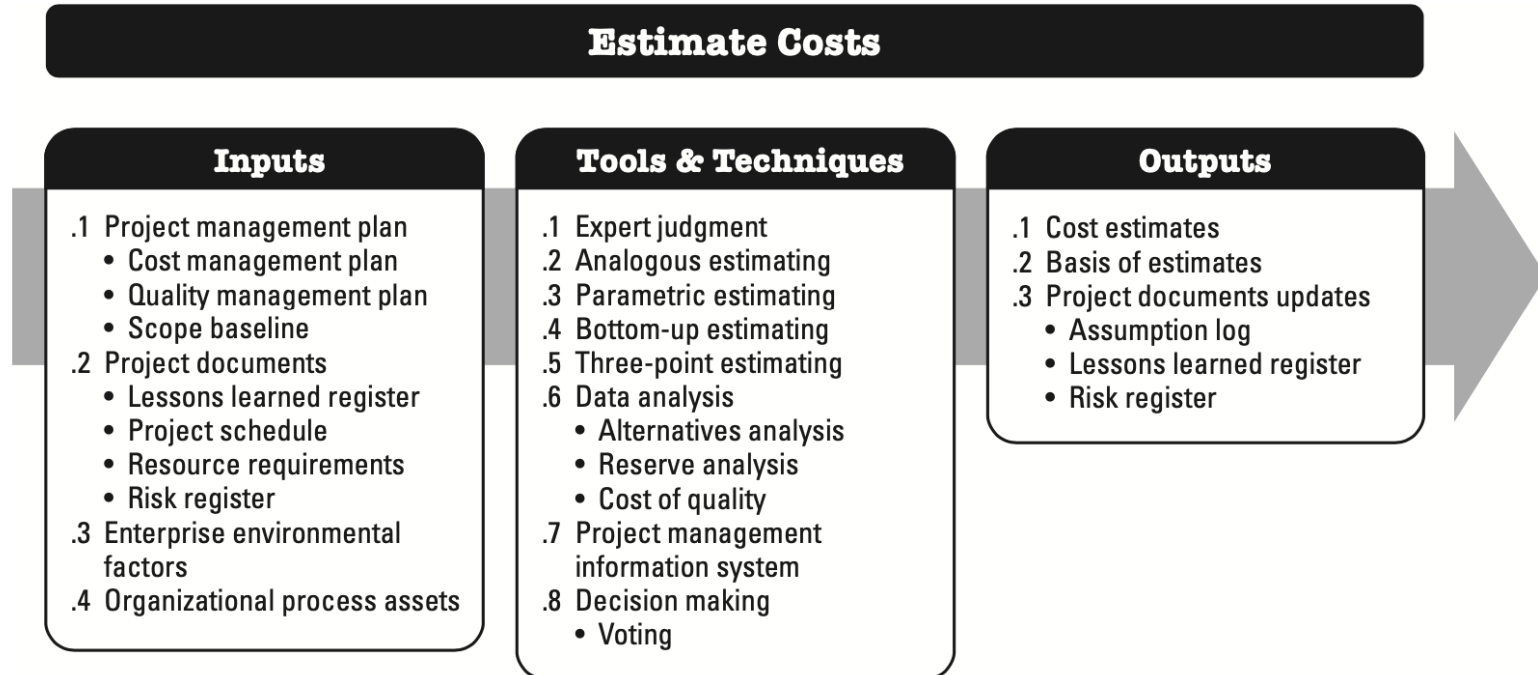
### Outputs

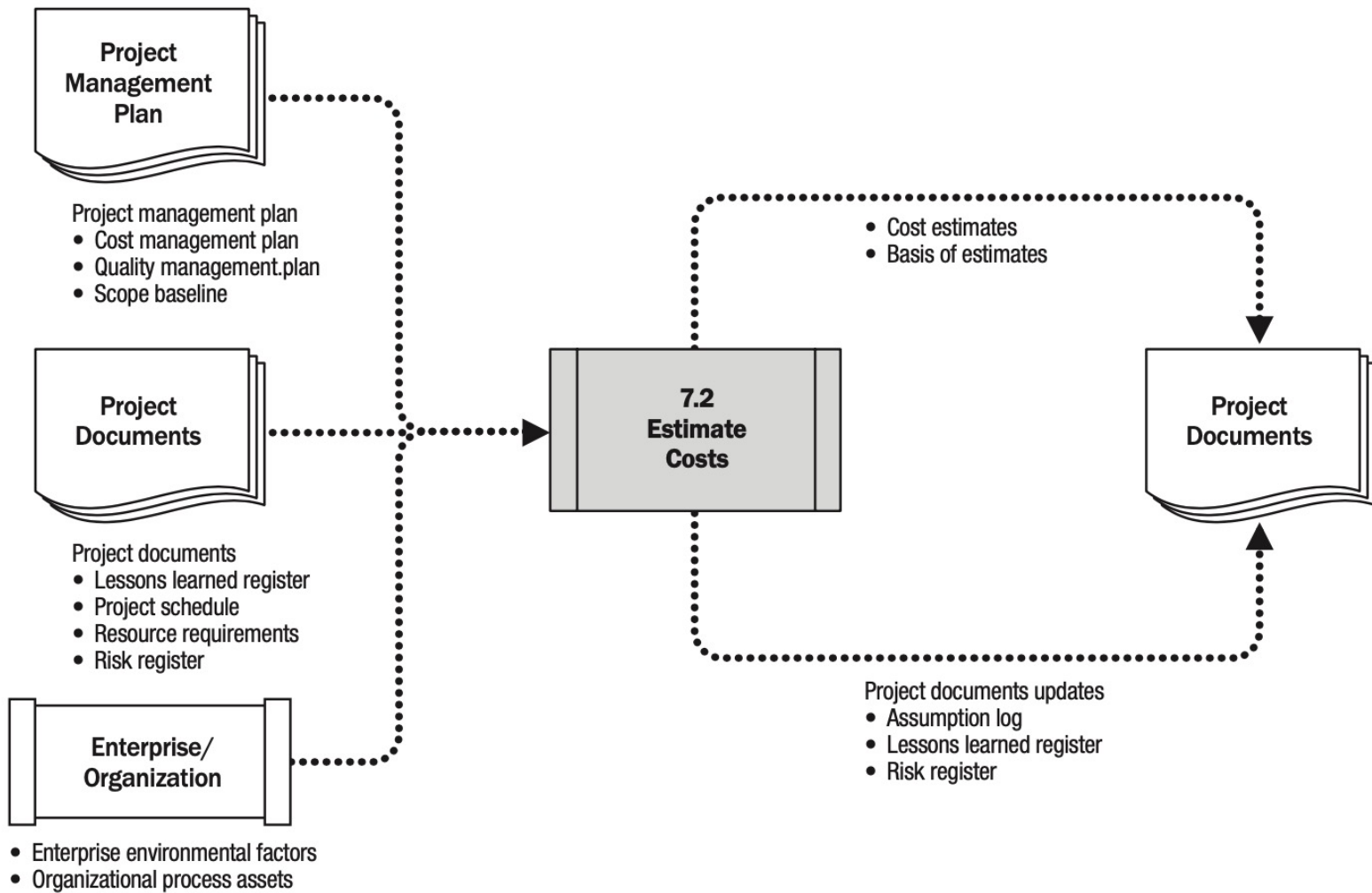
- .1 Cost management plan

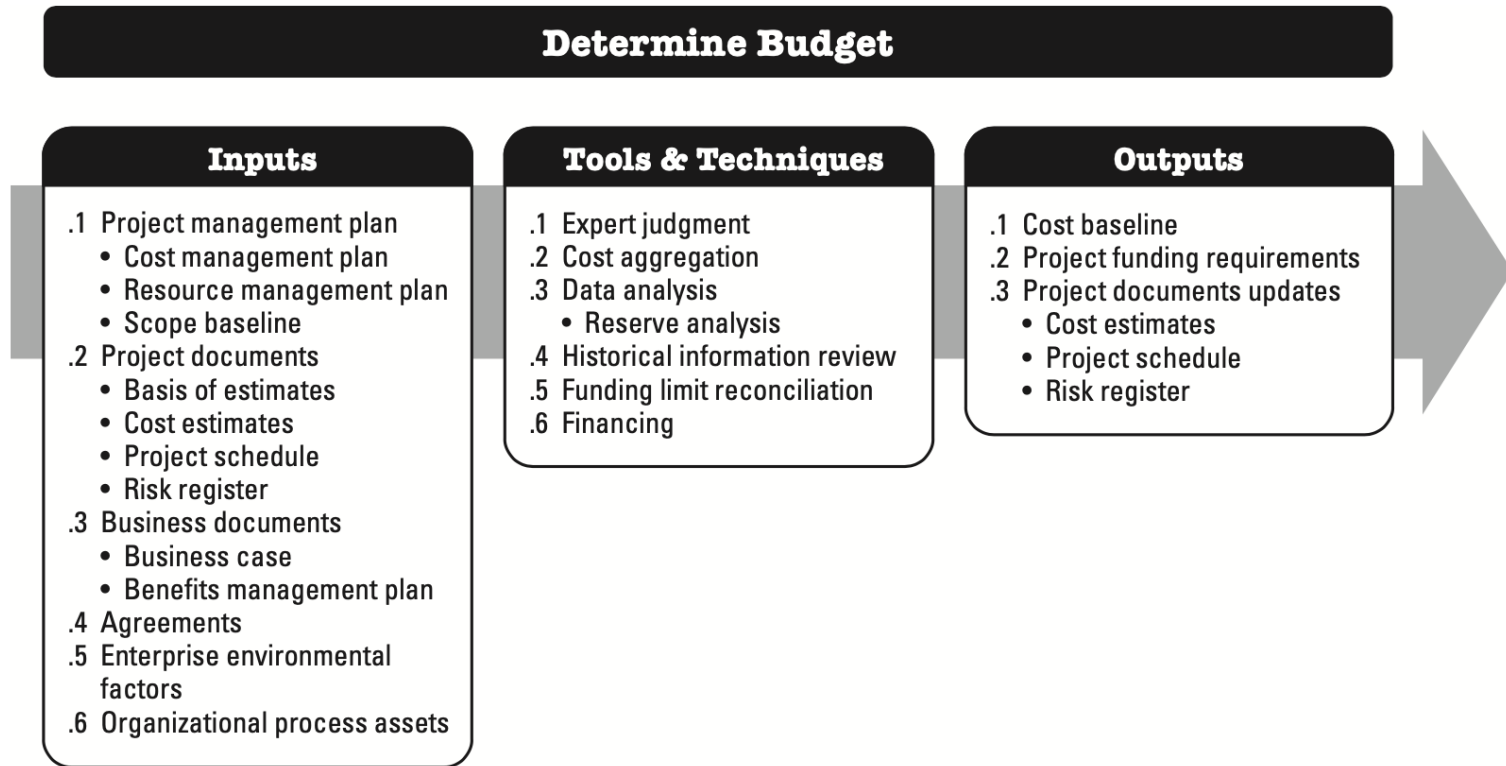


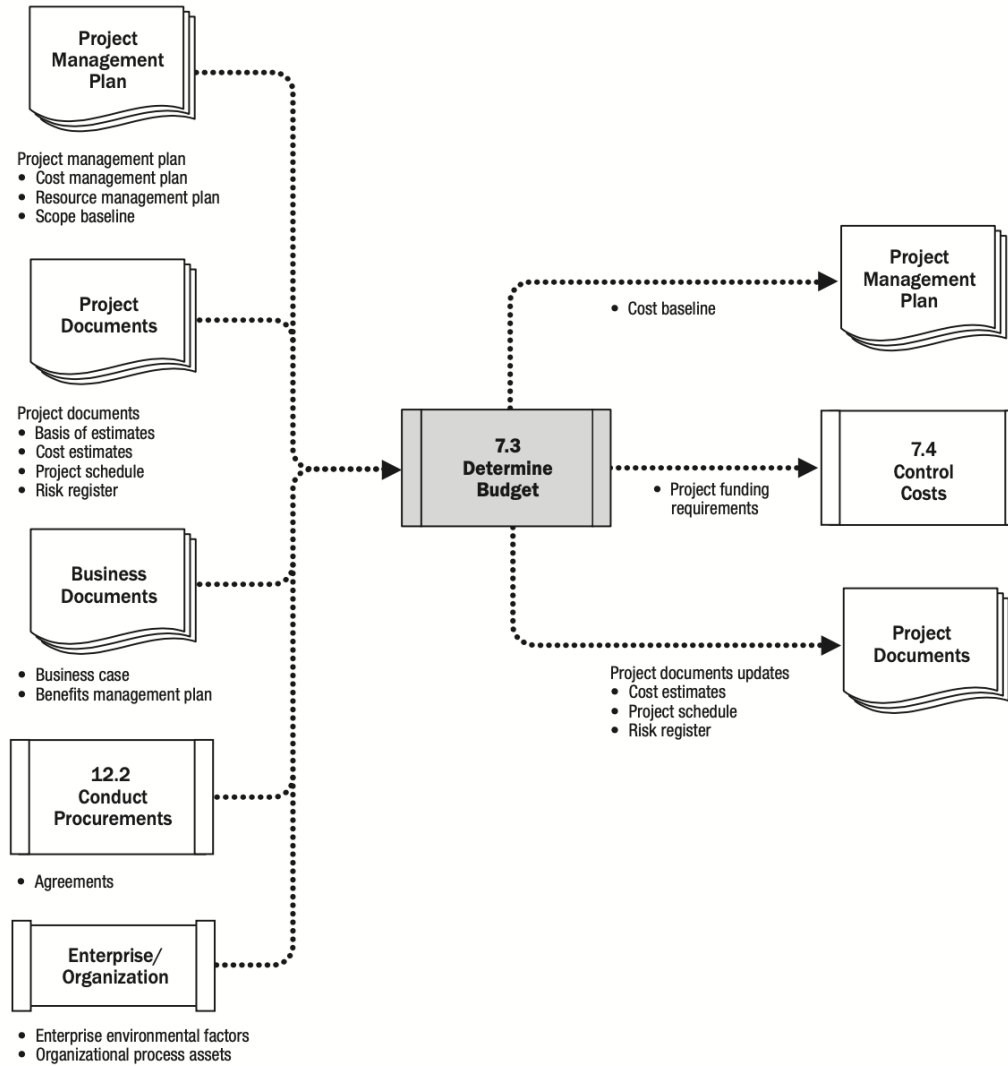


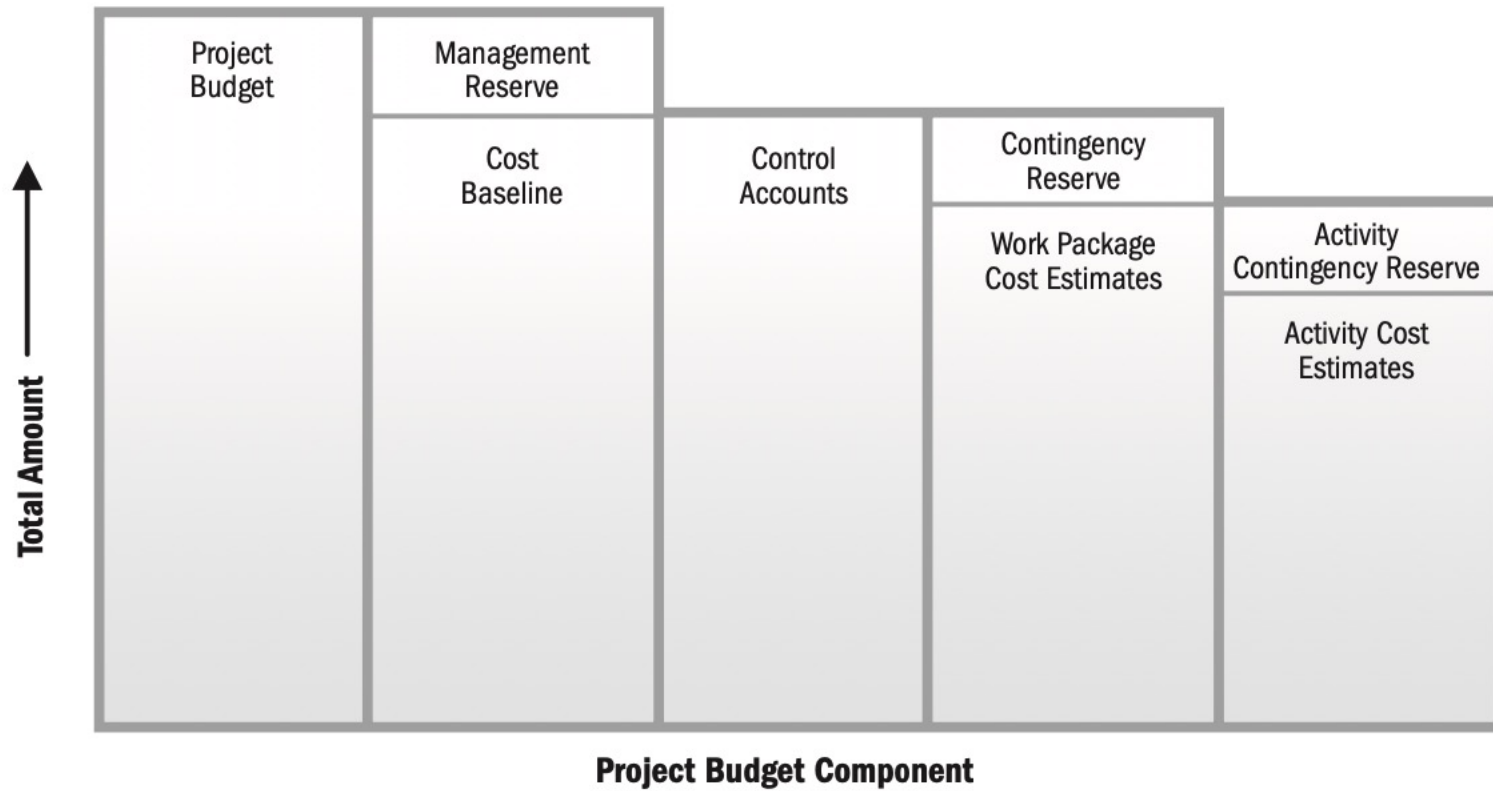


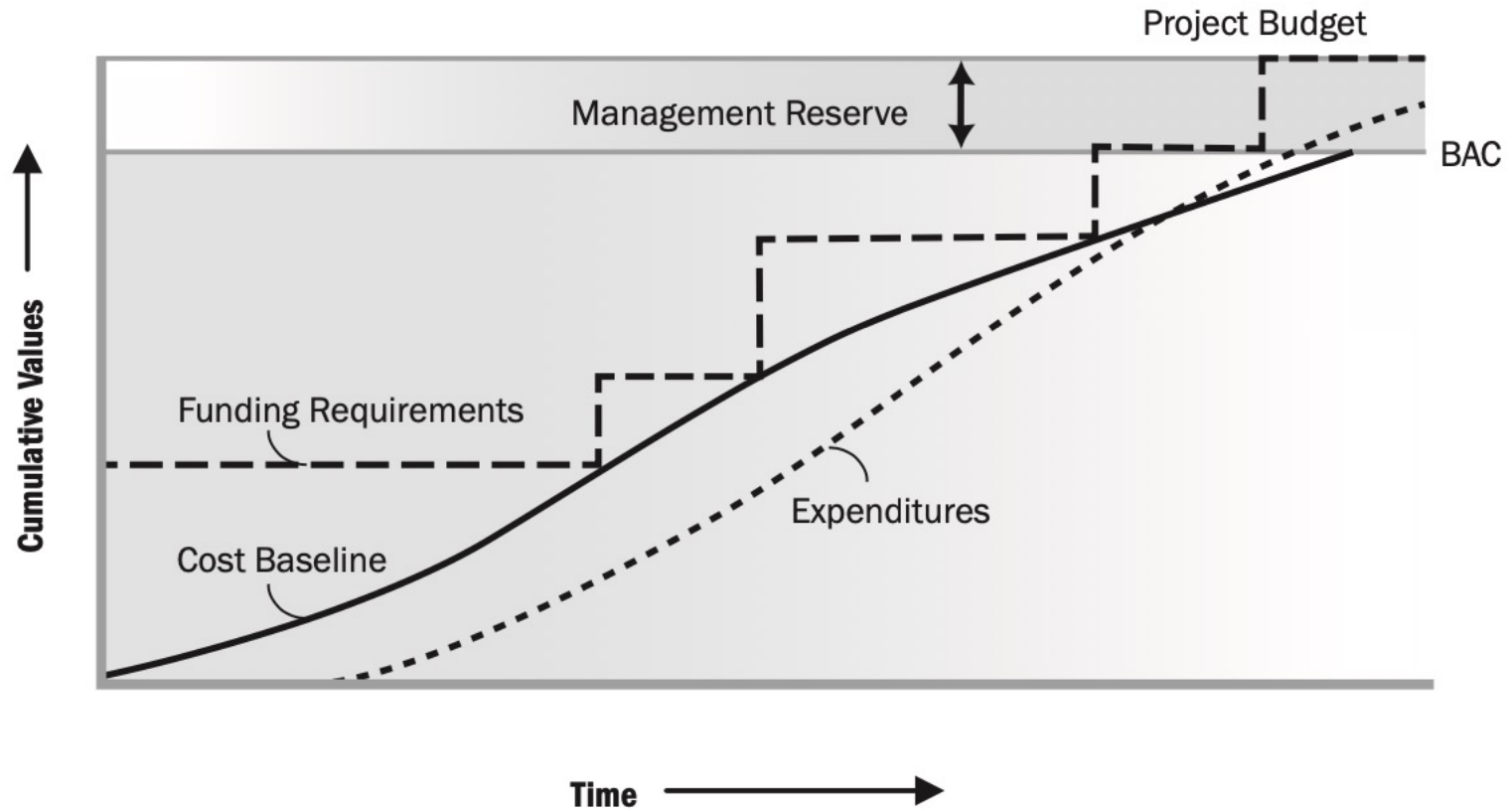


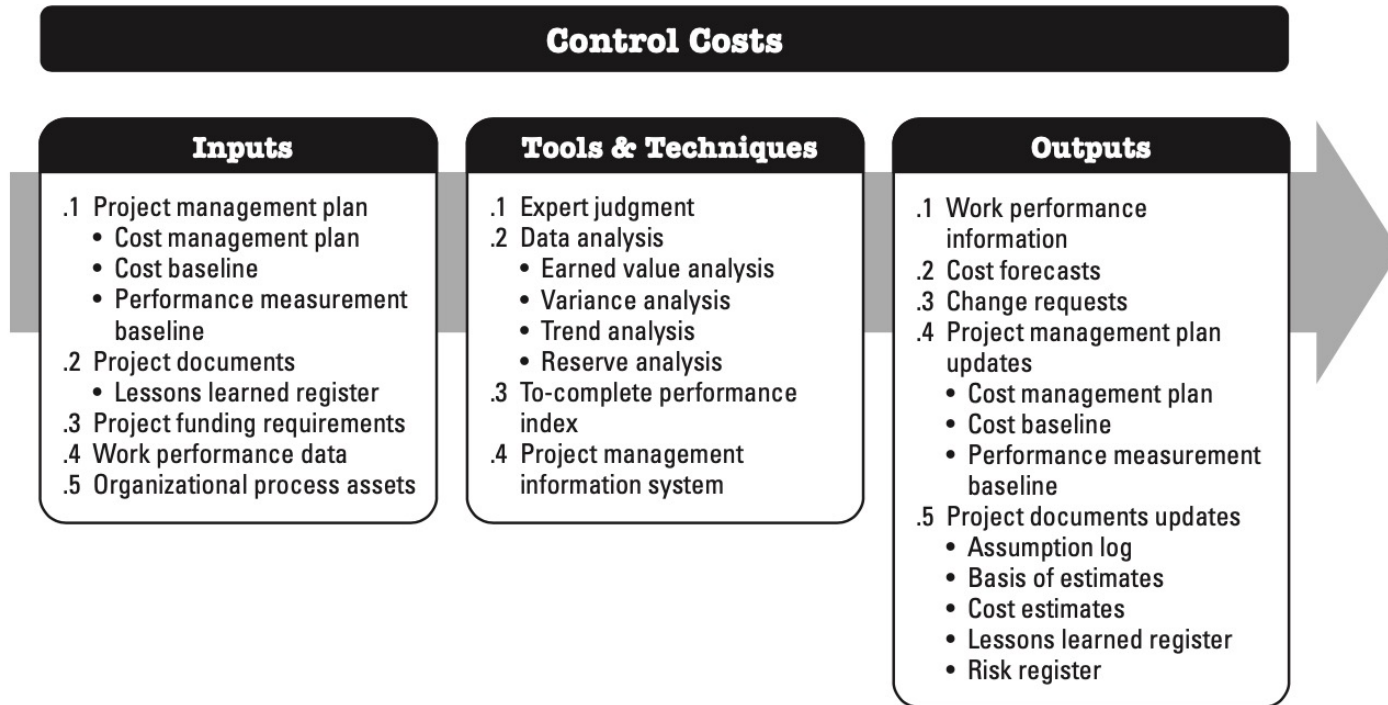




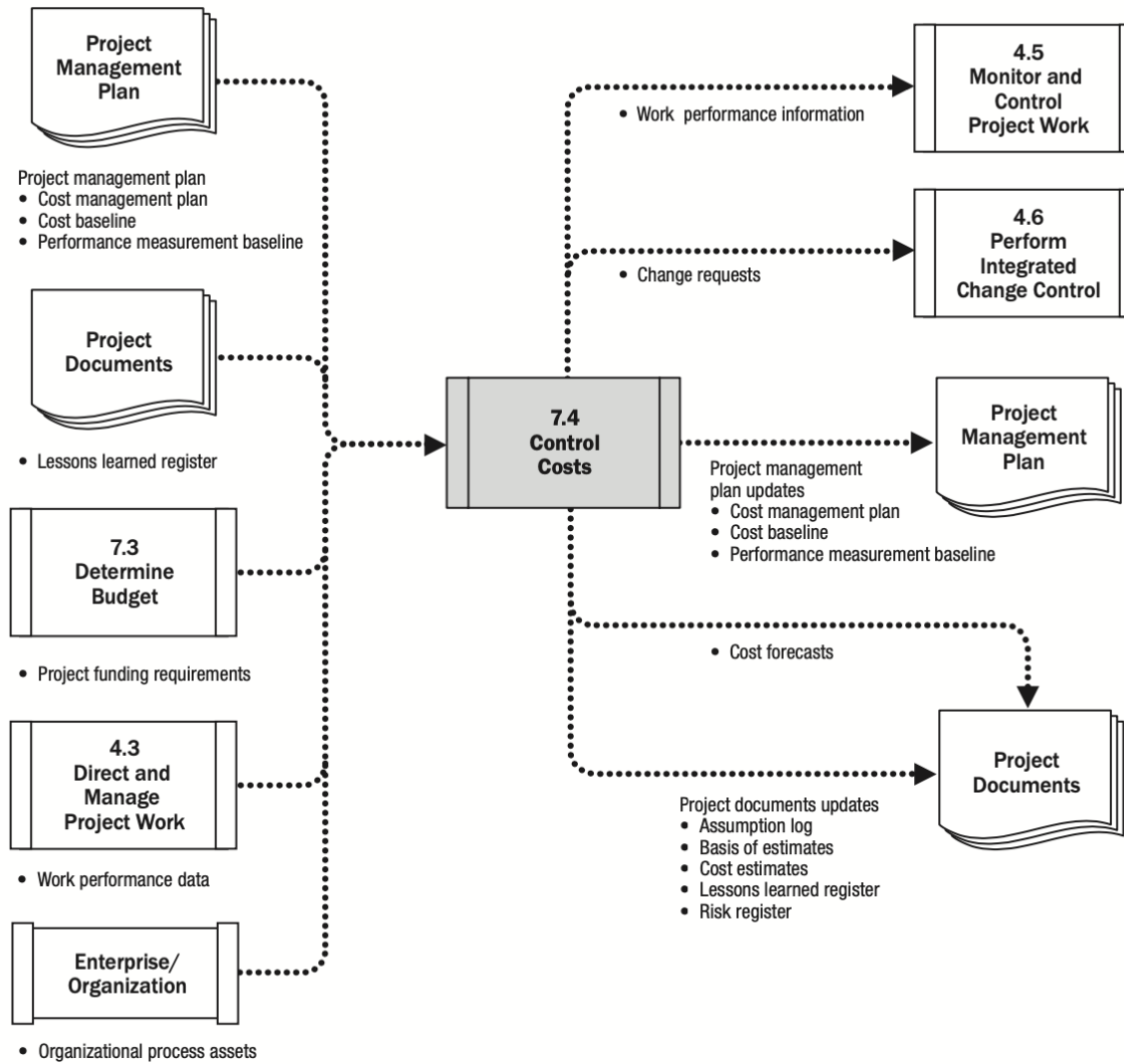








## Cost Management





Earned Value Analysis					
Abbreviation	Name	Lexicon Definition	How Used	Equation	Interpretation of Result
PV	Planned Value	The authorized budget assigned to scheduled work.	The value of the work planned to be completed to a point in time, usually the data date, or project completion.		
EV	Earned Value	The measure of work performed expressed in terms of the budget authorized for that work.	The planned value of all the work completed (earned) to a point in time, usually the data date, without reference to actual costs.	$EV = \text{sum of the planned value of completed work}$	
AC	Actual Cost	The realized cost incurred for the work performed on an activity during a specific time period.	The actual cost of all the work completed to a point in time, usually the data date.		
BAC	Budget at Completion	The sum of all budgets established for the work to be performed.	The value of total planned work, the project cost baseline.		



CV	Cost Variance	The amount of budget deficit or surplus at a given point in time, expressed as the difference between the earned value and the actual cost.	The difference between the value of work completed to a point in time, usually the data date, and the actual costs to the same point in time.	$CV = EV - AC$	Positive = Under planned cost Neutral = On planned cost Negative = Over planned cost
SV	Schedule Variance	The amount by which the project is ahead or behind the planned delivery date, at a given point in time, expressed as the difference between the earned value and the planned value.	The difference between the work completed to a point in time, usually the data date, and the work planned to be completed to the same point in time.	$SV = EV - PV$	Positive = Ahead of Schedule Neutral = On schedule Negative = Behind Schedule
VAC	Variance at Completion	A projection of the amount of budget deficit or surplus, expressed as the difference between the budget at completion and the estimate at completion.	The estimated difference in cost at the completion of the project.	$VAC = BAC - EAC$	Positive = Under planned cost Neutral = On planned cost Negative = Over planned cost



CPI	Cost Performance Index	A measure of the cost efficiency of budgeted resources expressed as the ratio of earned value to actual cost.	A CPI of 1.0 means the project is exactly on budget, that the work actually done so far is exactly the same as the cost so far. Other values show the percentage of how much costs are over or under the budgeted amount for work accomplished.	$CPI = EV/AC$	Greater than 1.0 = Under planned cost Exactly 1.0 = On planned cost Less than 1.0 = Over planned cost
SPI	Schedule Performance Index	A measure of schedule efficiency expressed as the ratio of earned value to planned value.	An SPI of 1.0 means that the project is exactly on schedule, that the work actually done so far is exactly the same as the work planned to be done so far. Other values show the percentage of how much costs are over or under the budgeted amount for work planned.	$SPI = EV/PV$	Greater than 1.0 = Ahead of schedule Exactly 1.0 = On schedule Less than 1.0 = Behind schedule



EAC	Estimate At Completion	The expected total cost of completing all work expressed as the sum of the actual cost to date and the estimate to complete.	<p>If the CPI is expected to be the same for the remainder of the project, EAC can be calculated using:</p> <p>If future work will be accomplished at the planned rate, use:</p> <p>If the initial plan is no longer valid, use:</p> <p>If both the CPI and SPI influence the remaining work, use:</p>	$EAC = BAC / CPI$  $EAC = AC + BAC - EV$  $EAC = AC + \text{Bottom-up ETC}$  $EAC = AC + [(BAC - EV) / (CPI \times SPI)]$	
ETC	Estimate to Complete	The expected cost to finish all the remaining project work.	<p>Assuming work is proceeding on plan, the cost of completing the remaining authorized work can be calculated using:</p> <p>Reestimate the remaining work from the bottom up.</p>	$ETC = EAC - AC$  $ETC = \text{Reestimate}$	
TCPI	To Complete Performance Index	A measure of the cost performance that must be achieved with the remaining resources in order to meet a specified management goal, expressed as the ratio of the cost to finish the outstanding work to the budget available.	<p>The efficiency that must be maintained in order to complete on plan.</p> <p>The efficiency that must be maintained in order to complete the current EAC.</p>	$TCPI = (BAC - EV) / (BAC - AC)$  $TCPI = (BAC - EV) / (EAC - AC)$	<p>Greater than 1.0 = Harder to complete Exactly 1.0 = Same to complete Less than 1.0 = Easier to complete</p> <p>Greater than 1.0 = Harder to complete Exactly 1.0 = Same to complete Less than 1.0 = Easier to complete</p>



Knowledge Areas	Project Management Process Groups				
	Initiating Process Group	Planning Process Group	Executing Process Group	Monitoring and Controlling Process Group	Closing Process Group
<b>7. Project Cost Management</b>		7.1 Plan Cost Management 7.2 Estimate Costs 7.3 Determine Budget		7.4 Control Costs	



# Tailoring Considerations

- **Knowledge management**
- Does the organization have a formal knowledge management and financial databases repository that a project manager is required to use and is readily accessible?



# Tailoring Considerations

- **Estimating and budgeting**
- Does the organization have existing formal or informal cost estimating and budgeting-related policies, procedures, and guidelines?



# Tailoring Considerations

- **Earned value management**
- Does the organization use earned value management in managing projects?





# Tailoring Considerations

- **Use of agile approach**
- Does the organization use agile methodologies in managing projects?
- How does this impact cost estimating?



# Tailoring Considerations

- **Governance**
- Does the organization have formal or informal audit and governance policies, procedures, and guidelines?



## References

- A guide to the project management body of knowledge (PMBOK guide), Sixth Edition, 2017 / Project Management Institute.



# Cost Management

---

CS413 - Software Engineering Project Management

---

Department of Computer Engineering, Bilkent University

Dr. Mustafa Değerli



**Bilkent University**