

Chapter 5

Project Cost Management

Study Program : Informatics Engineering



Monika Hidayanti, S.Si., M.T.
Department of Mathematics
FMIPA Universitas Padjadjaran



5.1 The Importance of Project Cost Management

- IT projects have a poor track record in meeting budget goals (A 2011 study published in the Harvard Business Review examined IT change initiatives in almost 1,500 projects and reported an average **cost overrun** of 27 percent).
- **Cost overrun** is the additional percentage or dollar amount by which actual costs exceed estimates.
- The projects ranged from enterprise resource planning to management information and customer relationship management systems. Most projects incurred high expenses, with an average cost of \$167 million; the largest project cost \$33 billion.



- The most important finding in the study, one in six of all projects studied contained a “black swan”: a high-impact event that is rare and unpredictable, but not improbable in retrospect. These IT black swan projects had an average cost overrun of 200 percent and a schedule overrun of almost 70 percent.



Example

- The United Kingdom's National Health Service (NHS) IT modernization program was called “the greatest IT disaster in history” by one London columnist. This 10-year program, which started in 2002, was created to provide an electronic patient records system, appointment booking, and a prescription drug system in England and Wales.
- Britain's Labour government estimates that the program will eventually cost more than \$55 billion, a \$26 billion overrun. The program has been plagued by technical problems due to incompatible systems, resistance from physicians who say they were not adequately consulted about system features, and arguments among contractors about who's responsible for what.



- A government audit in June 2006 found that the program, one of the largest civilian IT projects undertaken worldwide, was progressing despite high-profile problems. In an effort to reduce cost overruns, the NHS program would no longer pay for products until delivery, shifting some financial responsibility to prime contractors, including BT Group, Accenture, and Fujitsu Services. On September 22, 2011, government officials in the United Kingdom announced that they were scrapping the National Programme for Health IT. Health Secretary Andrew Lansley said that the program “let down the NHS and wasted taxpayers’ money.”



What Is Cost?

- A popular cost accounting textbook states, “Accountants usually define cost as a resource sacrificed or foregone to achieve a specific objective.”
- Webster’s dictionary defines cost as “something given up in exchange.” Costs are often measured in monetary amounts, such as dollars, that must be paid to acquire goods and services.



- Many IT professionals, however, often react to cost overrun information with a smirk. They know that many of the original cost estimates for IT projects are low or based on unclear project requirements, so naturally there will be cost overruns. Not emphasizing the importance of realistic project cost estimates from the outset is only one part of the problem.
- In addition, many IT professionals think that preparing cost estimates is a job for accountants. On the contrary, preparing good cost estimates is a demanding, important skill that many professionals need to acquire, including project managers.



- Another perceived reason for cost overruns is that many IT projects involve new technology or business processes. Any new technology or business process is untested and has inherent risks. Thus, costs grow and failures are to be expected, right? Wrong. Using good project cost management can change this false perception.

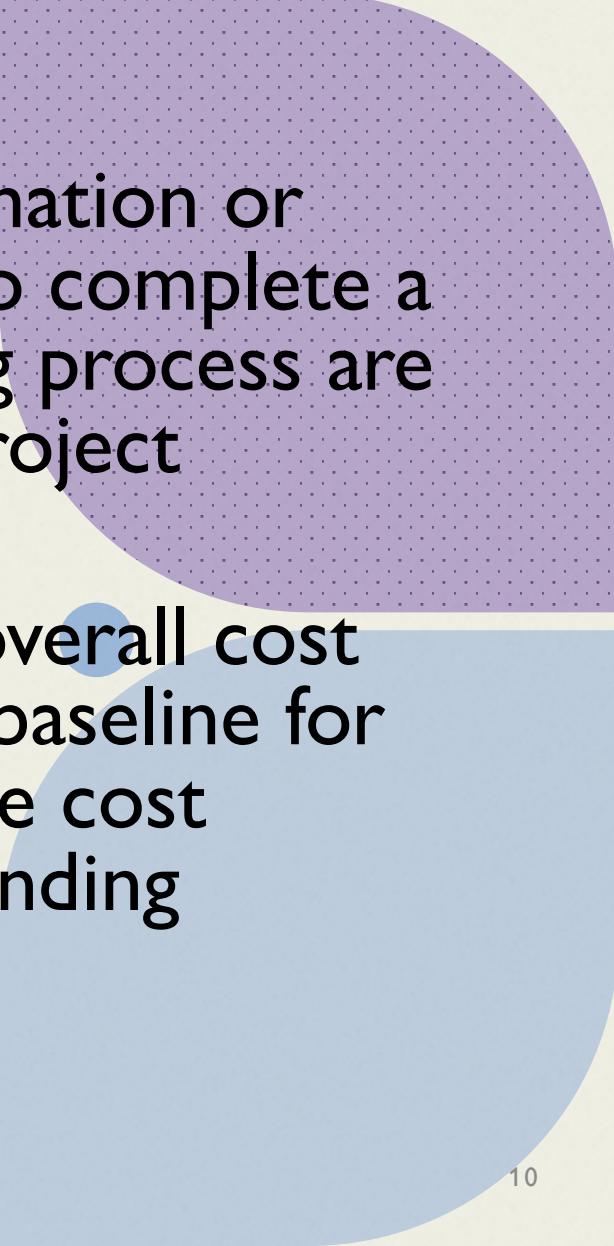


What Is Project Cost Management?

It is the project manager's job to satisfy project stakeholders while continuously striving to reduce and control costs. There are four processes for project cost management:

- 1) Planning cost management involves determining the policies, procedures, and documentation that will be used for planning, executing, and controlling project cost. The main output of this process is a cost management plan.



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- 2) Estimating costs involves developing an approximation or estimate of the costs of the resources needed to complete a project. The main outputs of the cost estimating process are activity cost estimates, basis of estimates, and project documents updates.
 - 3) Determining the budget involves allocating the overall cost estimate to individual work items to establish a baseline for measuring performance. The main outputs of the cost budgeting process are a cost baseline, project funding requirements, and project documents updates.



4) Controlling costs involves controlling changes to the project budget. The main outputs of the cost control process are work performance information, cost forecasts, change requests, and project management plan updates, and project documents updates.



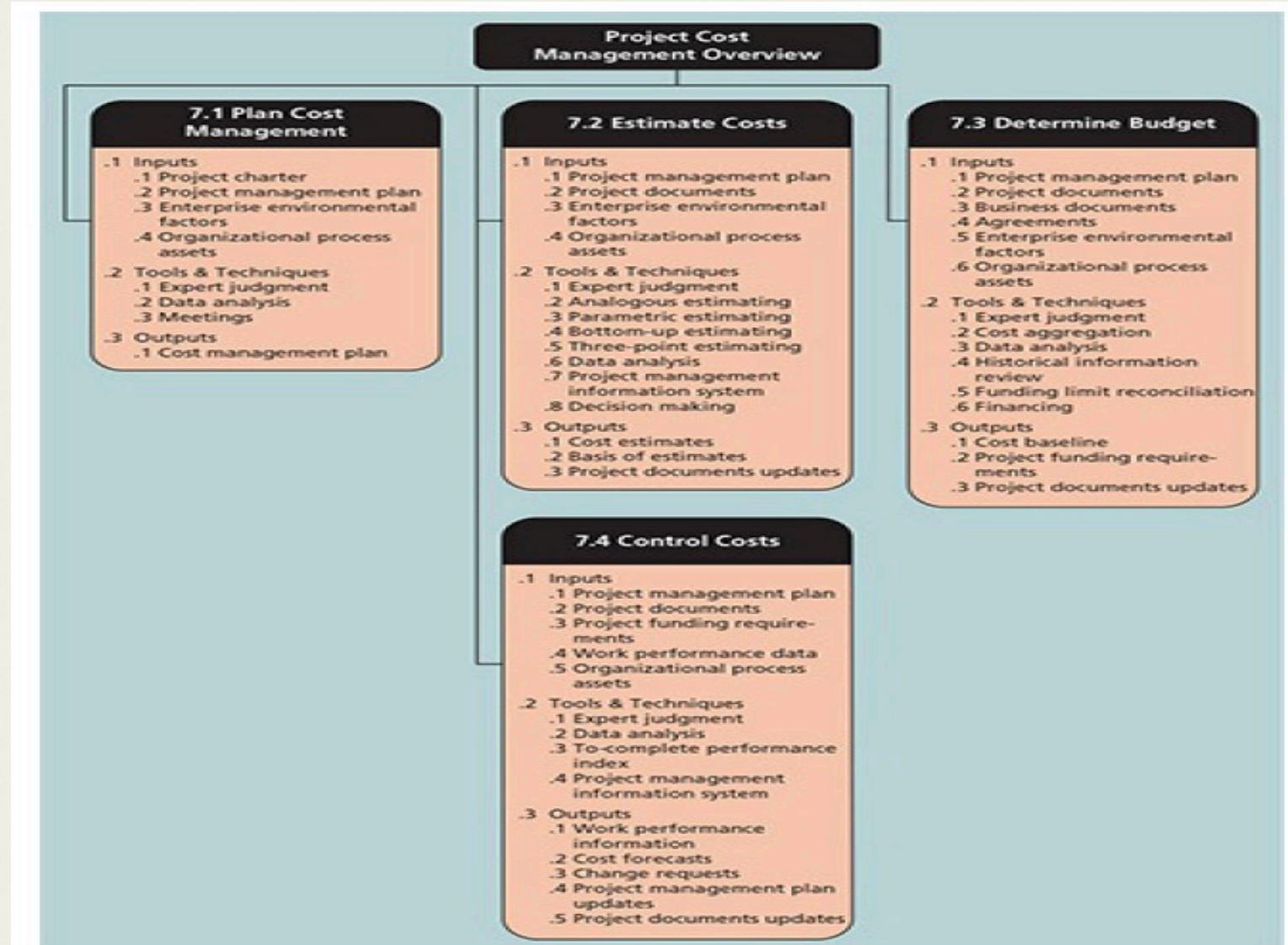


Figure 5. 1 Project cost management overview



5.2 Basic Principles of Cost Management

This section describes general topics such as profits, life cycle costing, cash flow analysis, tangible and intangible costs and benefits, direct costs, sunk costs, learning curve theory, and reserves.

- **Profits** are revenues minus expenditures. To increase profits, a company can increase revenues, decrease expenses, or try to do both.
- **Profit margin** is the ratio of profits to revenues. If revenues of \$100 generate \$2 in profits, there is a 2 percent profit margin. If the company loses \$2 for every \$100 in revenue, there is a -2 percent profit margin.



- **Life cycle costing** provides a big-picture view of the cost of a project throughout its life cycle. This helps you develop an accurate projection of a project's financial costs and benefits. Life cycle costing considers the total cost of ownership, or development plus support costs, for a project.

For example, a company might complete a project to develop and implement a new customer service system in 1 or 2 years, but the new system could be in place for 10 years. Project managers, with assistance from financial experts in their organizations, should create estimates of the costs and benefits of the project for its entire life cycle (10 years in the preceding example).



Media Snapshot

- A primary goal of many projects is to achieve some type of financial benefits, measured using life cycle costing. Project success criteria often include reaching a certain return on investment (ROI) over the life cycle. You cannot measure ROI for projects if you do not have a benefits measurement process in place.



Because organizations depend on reliable IT, huge costs are associated with downtime.

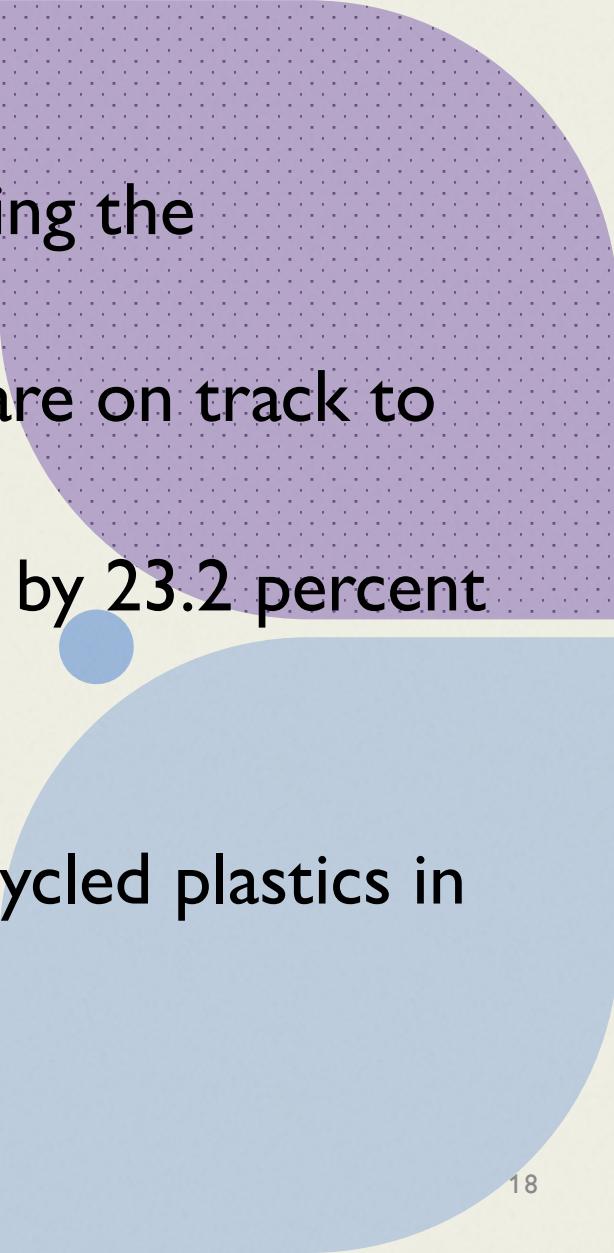
- When Facebook was down for 20 minutes on September 3, 2014, they lost a little more than \$22,453 for every minute or more than \$500,000.*
- On August 19, 2013, Amazon.com went down for about 30 minutes, costing them \$66,240 per minute or nearly \$2 million.
- For Fortune 1000 companies, the average cost of an infrastructure failure is \$100,000 per hour; the average cost of a critical application failure is \$500,000 to \$1 million per hour, or \$8,300 to \$16,600 per minute.
- In 2014, the average annual cost of unplanned application downtime in Fortune 1000 companies was \$1.25 billion to \$2.5 billion.



What went Right?

- An important cost-cutting strategy has been inspired by the global emphasis on improving the environment. Investing in green IT and other initiatives has helped both the environment and companies' bottom lines. Michael Dell, CEO of Dell, said he aimed to make his company "carbon neutral" in 2008. "The computer giant is looking to zero-out its carbon emissions through a number of initiatives, such as offering small businesses and consumers curb side recycling of their old computers, stuffing small recycling bags with free postage into new printer-ink cartridge boxes, and operating a 'Plant a Tree for Me' program."* Dell did reach his goal; as of March 2012, Dell had helped its customers save almost \$7 billion in energy costs.





Dell continues to practice corporate responsibility by helping the environment. In 2014, it reported the following progress:

- Recovered 230.9 million pounds of used electronics and are on track to reach goal of 2 billion pounds by 2020
- Reduced the average energy intensity of our product line by 23.2 percent compared to FY12
- Decreased operational emissions by 10 percent
- Used more than 10 million pounds of post-consumer recycled plastics in our products*



- **Cash flow analysis** is a method for determining the estimated annual costs and benefits for a project and the resulting annual cash flow. Project managers must conduct cash flow analysis to determine net present value.

Tangible and intangible costs and benefits are categories for determining how well an organisation can define the estimated costs and benefits for a project.

- **Tangible costs** or benefits are easy to measure in dollars. For example, suppose that the Surveyor Pro project described in the chapter's opening case included a preliminary feasibility study.



- In contrast, **intangible costs** or benefits are difficult to measure in dollars. Suppose that Juan and a few other people spent their own personal time using government-owned computers, books, and other resources to research areas related to the study. Although their hours and the government-owned materials would not be billed to the project, they could be considered intangible costs. Intangible benefits for projects often include items like goodwill, prestige, and general statements of improved productivity that an organization cannot easily translate into dollar amounts. Because intangible costs and benefits are difficult to quantify, they are often harder to justify.



- **Direct costs** can be directly related to creating the products and services of the project. You can attribute direct costs to a particular project.

For example, direct costs include the salaries of people working full time on the project and the cost of hardware and software purchased specifically for the project. Project managers should focus on direct costs because they can be controlled.

- **Indirect costs** are not directly related to the products or services of the project, but are indirectly related to performing work on the project.

For example, indirect costs would include the cost of electricity, paper towels, and other necessities in a large building that houses 1,000 employees who work on many projects. Indirect costs are allocated to projects, and project managers have very little control over them.



- **Sunk cost** is money that has been spent in the past. Consider it gone, like a sunken ship that can never be raised. When deciding what projects to invest in or continue, you should not include sunk costs.
- **Learning curve theory** states that when many items are produced repetitively, the unit cost of those items decreases in a regular pattern as more units are produced.



- **Reserves** are dollar amounts included in a cost estimate to mitigate cost risk by allowing for future situations that are difficult to predict.
- **Contingency reserves** allow for future situations that may be partially planned for (sometimes called known unknowns) and are included in the project cost baseline. For example, if an organisation knows it has a 20 percent rate of turnover for IT personnel, it should include contingency reserves to pay for recruiting and training costs of IT personnel.
- **Management reserves** allow for future situations that are unpredictable (sometimes called unknown unknowns). For example, if a project manager gets sick for two weeks or an important supplier goes out of business, management reserve could be set aside to cover the resulting costs.



5.3 Planning Cost Management

The first step in project cost management is planning how the costs will be managed throughout the life of the project. In general, a cost management plan includes the following information:

- Level of accuracy: Activity cost estimates normally have rounding guidelines, such as rounding to the nearest \$100. There may also be guidelines for the amount of contingency funds to include, such as 10 or 20 percent.
- Units of measure: Each unit used in cost measurements, such as labour hours or days, should be defined.



- Organizational procedures links: Many organizations refer to the work breakdown structure (WBS) component used for project cost accounting as the control account (CA). Each control account is often assigned a unique code that is used in the organization's accounting system. Project teams must understand and use these codes properly.
- Control thresholds: Similar to schedule variance, costs often have a specified amount of variation allowed before action needs to be taken, such as 10 percent of the baseline cost.



- Rules of performance measurement: If the project uses EVM, as described later in this chapter, the cost management plan would define measurement rules, such as how often actual costs will be tracked and to what level of detail.
- Reporting formats: This section would describe the format and frequency of cost reports required for the project.
- Process descriptions: The cost management plan would also describe how to perform all of the cost management processes.



5.4 Estimating Costs

Project managers must take cost estimates seriously if they want to complete projects within budget constraints.

Types of Cost Estimates

- A rough order of magnitude (ROM) estimate provides an estimate of what a project will cost.
- A budgetary estimate is used to allocate money into an organization's budget.
- A definitive estimate provides an accurate estimate of project costs.



Type of Estimate	When Done	Why Done	Typical Range
Rough order of magnitude (ROM)	Very early in the project life cycle, often 3–5 years before project completion	Provides estimate of cost for selection decisions	-50% to +100%
Budgetary	Early, 1–2 years out	Puts dollars in the budget plans	-10% to +25%
Definitive	Later in the project, less than 1 year out	Provides details for purchases, estimates actual costs	-5% to +10%

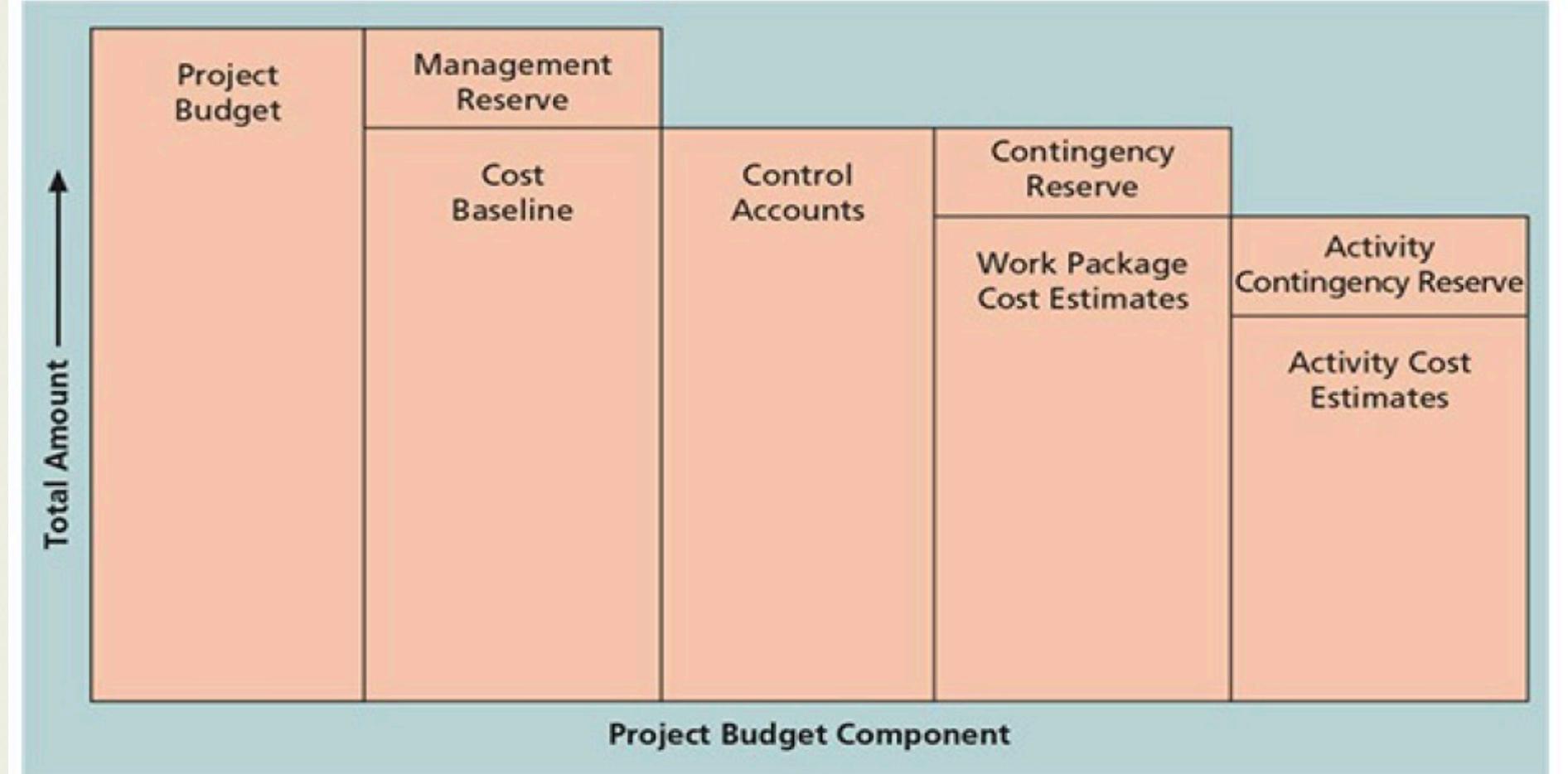
- Type of Estimating Cost



5.4 Determining the Budget

- Determining the budget involves allocating the project cost estimate to individual material resources or work items over time. These material resources or work items are based on the activities in the WBS for the project.





5.6 Controlling Costs

- Controlling project costs includes monitoring cost performance, ensuring that only appropriate project changes are included in a revised cost baseline, and informing project stakeholders of authorized changes to the project that will affect costs



Several tools and techniques assist in project cost control

- Earned value management (EVM) is a project performance measurement technique that integrates scope, time, and cost data. Given a cost performance baseline, project managers and their teams can determine how well the project is meeting scope, time, and cost goals by entering actual information and then comparing it to the baseline.



- Cost variance (CV) is the earned value minus the actual cost. If cost variance is a negative number, it means that performing the work cost more than planned. If cost variance is a positive number, performing the work cost less than planned.
- Schedule variance (SV) is the earned value minus the planned value. A negative schedule variance means that it took longer than planned to perform the work, and a positive schedule variance means that the work took less time than planned.



- The cost performance index (CPI) is the ratio of earned value to actual cost; it can be used to estimate the projected cost of completing the project. If the CPI is equal to one, or 100 percent, then the planned and actual costs are equal—the costs are exactly as budgeted. If the CPI is less than one or less than 100 percent, the project is over budget. If the CPI is greater than one or more than 100 percent, the project is under budget.
- The schedule performance index (SPI) is the ratio of earned value to planned value; it can be used to estimate the projected time to complete the project. Similar to the cost performance index, an SPI of one, or 100 percent, means the project is on schedule. If the SPI is greater than one or 100 percent, then the project is ahead of schedule. If the SPI is less than one or 100 percent, the project is behind schedule.



- The cost performance index can be used to calculate the estimate at completion (EAC) —an estimated cost of completing a project based on performance to date. Similarly, the schedule performance index can be used to calculate an estimated time to complete the project. You can also calculate the to-complete performance index (TCPI) , a measure of the cost performance that must be achieved with the remaining resources to meet a specific goal

