# Cost Management

### Cost, is a resource, sacrificed to achieve a specific objective

### Costs are usually measure in dollars

### Cost estimation is an important output of the project planning

#### The core idea is to know in advance, the expected cost, in varying degree of accuracy, at different phases of the project

### Setting realistic cost expectations is an important task for the project manager

# Purpose of cost management

### Ensure that the project is completed within an approved budget

### Create a cost base line and control it at every milestone

# 3 Steps in cost management

### Project cost management includes the

### processes required to ensure that the

### project is completed within an approved

### budget:

### **Cost estimating**: Developing an estimate of the costs and resources

### **Cost budgeting**: Allocating the overall cost estimate to individual work items to establish a baseline for measuring performance

### **Cost control**: controlling changes to the project budget

# Finance Review

### To understand cost management you need

### to understand basics of finance.

### Profits are revenues minus expenses

### Life cycle costing = cost of a project + the maintenance costs of the products

### Cash flow analysis = estimated annual costs and benefits

### Sunk cost is sunk cost …Its gone

#### Money that has already been spent; It can not be recovered

### Tangible costs can be easily measured

#### Cost of a hardware

### Direct costs are costs that are directly related to the product

#### Salary of a resource

### Indirect costs are not directly related to the product

#### Coffee for the team

### Contingency reserves are for known unknowns

#### Increase in raw material costs

### Management reserves are for the unknowns

#### Cost impact due to earthquake

# Finance Formula

### **FV = Future value of money**

### Annual Compounding, n years

#### FV = PV (1+)n

### Compounding m times per year

#### **FV = PV**

### Continuous Compounding

#### FV = PV ()in

### **PV = Present value of Money**

### Annual Compounding, n years

#### PV = FV (1+)-n

### Compounding m times per year

#### PV = FV

### Continuous Compounding

#### PV = FV ( )-in

# Tools for cost estimation

### Top-Down: Based on the previous project experience

### Bottom-up: Estimate individual work items and sum them to get a total estimate

### Parametric: Use mathematical model to estimate costs

#### Based on project parameters

# Payback Period

### Determines how long it takes for a project to reach a breakeven point



# Constructive cost Model (COCOMO)

### Parameters include source lines of code or function points

#### Function points: Technology-independent assessments of the functions involved in developing a system.

#### Source Lines of Code (SLOC): A human-written line of code

# Earned Value Management

### Integrates scope, time, and cost data

### Given a baseline one can determine how well the project is meeting its goals

# Formulas for EV Analysis

### PV = BCWS

#### PV = Planned Value

#### BCWS = budgeted cost of Work

### EV = BCWP

#### EV = Earned Value

#### EV = budgeted cost of work Planned

### AC = ACWP

#### AC = Actual Cost

#### ACWP = Actual cost of work performed

### EV = BAC x %Complete

#### EV = Earned Value

### CV = EV -AC

#### CV = Cost Variance

#### **-** = over budget

#### **+** = under budget

#### >0 = good

### SV = EV-PV

#### SV = Schedule Variance

#### - = behind schedule

#### **+** = over schedule

#### >0 = good

### CPI = EV/AC BAC/EAC

#### CPI: Cost Performance Index

#### >1 = good \

#### < = cost overrun

### SPI = EV/PV

#### SPI = Schedule Performance Index

#### 1 - on schedule

#### >1= ahead of schedule

### EAC =

#### EAC = Estimate **At** Completion

### ETC = EAC - AC

#### ETA = Estimate **To** Complete

### VAC = BAC – EAC

#### VAC = Variance At Completion

#### BAC = Budget At Completion

### TCPI = (BAC - EV) ÷ (BAC - AC)

#### TCPI: To-complete Cost Performance Index

#### TCPI = 1.0 🡪 the remaining project work must be executed at the same cost performance level as the completed project work.

#### TCPI <1.0🡪 The remaining project work can be executed at a lower cost performance level than the project completed work

#### TCPI > 1.0 🡪The remaining project work must be executed at a better cost performance level than the project completed work.

# Financial analysis of projects

### Net present value (NPV) analysis

#### Method of calculating the expected net monetary gain or loss from a project by discounting all expected future cash inflows and outflows to the present point in time

#### Projects with a positive NPV should be considered

# NPV: Net Present Value



Internal Rate of Return



# Return on investment (ROI)

*ROI* =

## Note that both benefits and costs are discounted