CSE4708: Software Project Management

Unit II : Project Evaluation & Estimation

Topic: Cost Benefit Analysis Techniques

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Economic Assessment

Cost Benefit Analysis Techniques

Cost Benefit Analysis Techniques

- Net profit
- Payback period
- Return on investment
- Net present value
- Internal rate of return

Net profit

Year	Cash-flow
0	-100,000
1	10,000
2	10,000
3	10,000
4	20,000
5	100,000
Net profit	50,000

‘Year 0’ represents all the costs before system is operation

Net profit value of all the cash-flows for the lifetime of the application

Pay back period

This is the time it takes to start generating a surplus of income over outgoings.

Year	Cash-flow	Accumulated
0	-100,000	-100,000
1	10,000	-90,000
2	10,000	-80,000
3	10,000	-70,000
4	20,000	-50,000
5	100,000	50,000

Return on investment (ROI)

$$ROI = \frac{\text{Average annual profit}}{\text{Total investment}} \times 100$$

In the previous example

- average annual profit
  = 50,000/5
  = 10,000
- ROI = 10,000/100,000 X 100
  = 10%

NET PRESENT VALUE - Discount factor

Discount factor = $1/(1+r)^t$

r is the interest rate (e.g. 10% is 0.10)

t is the number of years

In the case of 10% rate and one year

- Discount factor = 1/(1+0.10) = 0.9091

In the case of 10% rate and two years

- Discount factor = 1/(1.10 x 1.10) =0.8294

Applying discount factors

Year	Cash-flow	Discount factor	Discounted cash flow
0	-100,000	1.0000	-100,000
1	10,000	0.9091	9,091
2	10,000	0.8264	8,264
3	10,000	0.7513	7,513
4	20,000	0.6830	13,660
5	100,000	0.6209	62,090
		NPV	618

Time Value of the Profit

- In cost-benefit analysis, one can calculate the expenditure and the expected profit.
- Understand that profit earned after several years will not have the same value as today, consider inflation while analyzing the cost.
- Inflation erodes the value of money.

Time Value of the Profit

Calculating the Current Worth

- Assume that you invest 100,000 USD in a project. You expect to earn a 10,000 USD profit after one year.
- Considering a yearly inflation of 5%, what will the current value be?

Time Value of the Profit

- The formula to find the Current Value is
  - FV = CV x (1+r/100)^n
  - Here, FV = Future Value, CV = Current Value, r = Inflation, n = time
  - Given values,
  - FV = 10,000 USD
  - r = 5 , n =1
  - Putting these values in the formula,
  - 10,000 = CV X (1+0.05)^1
  - CV = 10,000/1.05
  - CV = 9,523.80
  - Therefore, the current value of your profit is 9,523.80 USD.

Internal rate of return

- Internal rate of return (IRR) is the discount rate that would produce an NPV of 0 for the project
- Can be used to compare different investment opportunities