

Assessing monetary benefits of an information system
 At \$10,000 the first year a increasing benefits of \$10,000 a year for the next 5 years. One-time development costs of \$30,000 & recurring cost of \$20,000 per year over the duration of system's life.
 The discount rate for the company is 11%. Using a 5 year time horizon, calculate the net present value of these cash benefits. Also calculate the overall value on investment within present's horizon period. At what point does breakeven occur?

2) Given: Monthly benefits (V) = 70,000 (1st year)
 Increasing benefits per year after 1st year = 20,000
 One-time cost = 30,000
 Recurring cost = 40,000
 Discount Rate (r) = 11% $r = 0.11$

No. of years	0	1	2	3	4	5
Cost (C)	30000	0	0	0	0	0
Benefit (V)	0	70000	90000	110000	130000	150000

Net present value (NPV) of benefits $PV = \frac{V}{(1+r)^t}$

For 1st year, $PV_1 = \frac{70,000}{(1+0.11)^1} = 63064$

2nd year, $PV_2 = \frac{90,000}{(1+0.11)^2} = 74330$

3rd year, $PV_3 = \frac{110,000}{(1+0.11)^3} = 81808$

4th year, $PV_4 = \frac{130,000}{(1+0.11)^4} = 88210$

5th year, $PV_5 = \frac{150,000}{(1+0.11)^5} = 93813$

So Net present value of benefits (NPV)
 $= 63064 + 74330 + 81808 + 88210 + 93813$
 $NPV_{benefits} = 324956$

NPV of costs

For year 0, $PV_0 = \frac{30,000}{(1+0.11)^0} = 30,000$

For year 1, $PV_1 = \frac{40,000}{(1+0.11)^1} = 36037$

For year 2, $PV_2 = \frac{40,000}{(1+0.11)^2} = 32465$

For year 3, $PV_3 = \frac{40,000}{(1+0.11)^3} = 29248$

For year 4, $PV_4 = \frac{40,000}{(1+0.11)^4} = 26150$

For year 5, $PV_5 = \frac{40,000}{(1+0.11)^5} = 23273$

So Net present value of cost = $30,000 + 36037 + 32465 + 29248 + 26150 + 23273$
 $NPV_{costs} = 227813$

Hence, Overall NPV = $NPV_{benefits} - NPV_{costs}$
 $= 324956 - 227813$
 $= 97143$

So Overall NPV = 97143
 $\therefore \text{Overall NPV} = \frac{NPV_{benefits}}{NPV_{costs}} = \frac{324956}{227813} = 1.426$

Notes

Break even ratio: $\frac{\text{Yearly NPV cash flow}}{\text{Overhead NPV cash flow}}$

✓ we know Yearly NPV cash flow
= PV of benefits of 7 years - PV of costs of that year

∴ Yearly NPV cash flow =

$$\text{For Year 0} = 0 - 30000 = -30000$$

$$\text{For Year 1} = 62060 - 26029 = 3593$$

$$\text{For Year 2} = 64320 - 32465 = 3185$$

$$\text{For Year 3} = 65908 - 34348 = 3160$$

$$\text{For Year 4} = 67174 - 36150 = 3064$$

$$\text{For Year 5} = 68280 - 37923 = 3035$$

✓ Also, we know

Overhead NPV cash flow

= Yearly NPV cash flow for 7th year + Overhead NPV cash flow for (7-1)th year

∴ Overhead NPV cash flow

$$\text{For Year 0} = -30000 + 0 = -30000$$

$$\text{For Year 1} = 3593 + (-30000) = -26407$$

$$\text{For Year 2} = 3185 + (-26407) = -23222$$

$$\text{For Year 3} = 3160 + (-23222) = -20062$$

$$\text{For Year 4} = 3064 + (-20062) = -16998$$

$$\text{For Year 5} = 3035 + (-16998) = -13963$$

Hence, the break even ratio is between Year 2 and Year 3

∴ $\frac{\text{Year 2}}{\text{Year 3}} = \frac{3185}{3160} = 1.0079$

And, 2nd year ratio = 1.0079 years (Rounded off)