Implementation of Cost benefit analysis

Example:

The table below gives the estimated cash flow for three different projects:

- Calculate Net Profit for each project. Based on your answer select which project you would choose to develop.
- Using shortest payback method, identify which project you would select for development. Justify your answer referring to the projects payback period and possible profits in payback year.
- Calculate ROI of each project given in the table and select the project based on your ROI calculation.
- Calculate NPV using 10% discount rate.

Year	Project-1	Project-2	Project-3
0	-195000	-160000	-295000
1	15000	15000	30000
2	30000	15000	35000
3	55000	20000	50000
4	50000	35000	120000
5	55000	55000	110000
6	50000	90000	115000

SOLUTION :

Payback period = time taken to pay back the total investment

ROI = (Average Annual Profit / Total Investment) * 100 where

Average Annual Profit = Net Profit ÷ Project duration

For Project 1 :

NET PROFIT = Rs 60000

Payback period = time taken to pay back the total investment of Rs 195000

= 5 - (10/55) = **4.82 years**

Average Annual Profit = Net Profit ÷ Project duration = 60000÷ 6 = 10000

So, ROI = (average annual profit / total investment) * 100

= (10000/195000) * 100 = **5.13 %**

For Project 2 :

NET PROFIT = Rs 70000

Payback period = time taken to pay back the total investment of Rs 160000

= 6 - (70/90) = **5.22 years**

Average Annual Profit = Net Profit ÷ Project duration = 70000÷ 6 = 11666.67

ROI = (average annual profit / total investment) * 100

= (11666.67 / 160000) * 100 = **7.29 %**

For Project 3 :

NET PROFIT = Rs 165000

Payback period = time taken to pay back the total investment of Rs 295000

= 5 - (50000/110000) = **4.55 years**

Average Annual Profit = Net Profit ÷ Project duration = 165000÷ 6 = 27500

ROI = (average annual profit / total investment) * 100

= (27500) / 295000) * 100 = **9.32 %**

COMPUTATION OF NPV FOR EACH PROJECT

YEAR	Project 1	Project 2	Project 3	D.F	PV	PV	PV
0	-195000	-160000	-295000	1	-195000	-160000	-295000
1	15000	15000	30000	0.9091	13636.5	13636.5	27273
2	30000	15000	35000	0.8264	24792	12396	28924
3	55000	20000	50000	0.7513	41321.5	15026	37565
4	50000	35000	120000	0.683	34150	23905	81960
5	55000	55000	110000	0.6209	34149.6	34149.5	68299
6	50000	90000	115000	0.5644	28220	50796	64906
NET PROFIT	**60000**	**70000**	**165000**		**-18730.5**	**-10091**	**13927**
ROI	**5.13**	**7.29**	**9.32**	**NPV computed**	**-18730.5**	**-10091**	**13927**
PBP	**4.82**	**5.22**	**4.55**				

- In case of Net Profit, **Project 3 should be selected as it has the maximum Net Profit of Rs. 165000**
- In case of Payback, **Project 3 should be selected as it has the minimum Payback Period value of 4.55 years**
- In case of ROI, **Project 3 should be selected as it has the maximum ROI value of 9.32 %**
- In case of Net present value, **Project 3 should be selected as it has the maximum NPV of 13927.** Project1 and project 2 are not feasible as they have negative NPV.

EXAMPLE 2

A company projecting revenue of 64 lacs in first year and the revenue is going to increase by 25% every year for the next 3 years in succession, after which revenue decreases by 20 lacs in the fifth year and thus will be closed after 5 years. The fixed initial investment for the project is 120 lacs and working capital requirement is 60 lacs. Compute these for the project :

a) Payback Period b) ROI c) NPV assuming 12.5% discount rate

SOLUTION:

Payback period = time taken to pay back the total investment of 180 Lac

= 3 - (10.33/70.23) = **2.853 years = 2 years 10 months 7 days**

Average Annual Profit = Net Profit ÷ Project duration = 294 lacs / 5 = 58.8 Lacs

ROI = (average annual profit /total investment) x 100

= (58.8/180) x 100 = **32.67%**

Computation of NPV :

Year	**Cash flow**	**Discount factor @12.5%**	**Discounted cash flow**	**Cumulative Profit/revenue**
0	-180 L	1.0000	-180 L	-180 L
1	64 L	0.8889	56.89 L	-123.11
2	80 L	0.7901	63.21 L	- 59.9 L
3	100 L	0.7023	70.23 L	10.33 L
4	125 L	0.6243	78.04 L	88.37 L
5	105 L	0.5549	58.26 L	146.63 L
Net Profit :	**RS 294Lacs**	**NPV :**	**RS. 14,663,000**	

EXAMPLE 3

Project A with cashflows of -100000, 10000, 10000, 10000, 20000, 100000 and Project B with cashflows of -120000, 30000, 30000, 30000, 30000, 75000 for year 0, 1, 2, 3, 4 and 5 respectively are to be chosen. Which of these projects will be chosen on the basis of :
a) Payback Period b)ROI c) NPV assuming 10% discount rate

Project A computation of Payback, ROI and NPV for 10 % discount rate :

Year	Cashflows	D.F.	PV	ROI	Payback Period
0	-100K	1	-100K	ROI = Average annual profit / Investment =(10000/100000)*100% = 10% So, **ROI = 10%**	Payback = 5- (50/100) = **4 ½ years**
1	10K	0.9091	9.091K		
2	10K	0.8264	8.264K		
3	10K	0.7513	7.513K		
4	20K	0.6830	13.660K		
5	100K	0.6209	62.09K		
Net Profit	50,000	**NPV =**	**Rs 618**		

Project B computation of Payback, ROI and NPV for 10 % discount rate :

Year	Cashflows	D.F.	PV	ROI	Payback Period
0	-120K	1	-120K	ROI = Average annual profit / Investment =(15000/120000)*100% = 12.5% So, **ROI = 12.5%**	Payback = **4 years**
1	30K	0.9091	27.273K		
2	30K	0.8264	24.792K		
3	30K	0.7513	22.539K		
4	30K	0.6830	20.490K		
5	75K	0.6209	46.5675K		
Net Profit	75,000	**NPV= Rs**	**23661.50**		