PAGE No.
DATE / /

* Types of non-numeric models.
1) The sacred cow
2) The Operating Necessity
3) -11- Competitive -11-
4) Product line extension
5) Comparitive Benifit
6) Q-Sort

* Numeric Models
Profit / profitability
Real Options
Scoring
window-of-opportunity analysis
Discovery driven planning

1. profitability

payback Period :
initial fixed investment /
Estimated annual net cash

payback period = 100,000 / 25,000 = 4 years.

Discounted Cash Flow | Net present Value
Determine the NPV by discounting them by rate of return.

$$NPV = A_0 + \sum_{t=1}^{n} \frac{F_t}{(1+k)^t}$$

A_0 — Initial ~~est~~ investment always negative
k = rate of return

$5000 = P_1(1+1)^n$

$5000 = P_1 2^5$

PAGE NO.
DATE / /

$F_t \rightarrow$ net cash Flow in period t

Now p_t is the predicted rate of inflation during period t.

$$NPV = A_0 + \sum_{1}^{n} \frac{F_t}{(1+k+p_t)^t}$$

$$NPV = A_0 + \sum_{1}^{n} \frac{F_t}{(1+k)^t}$$

e.g.

5000 in	year
9000	2
10,000	3
10,000	4
3000	5

$A_0 = \$25000$

$k = 12\% = 0.12$

Soln:

year	F_t	K	PV
1	5000	0.12	4464.28
2	9000	0.12	7174.74
3	10000	0.12	7117.80
4	10000	0.12	6355.18
5	3000	0.12	1702.28

$t=1 \quad \frac{5000}{(1+0.12)^1}$

$NPV_1 = \frac{5000}{(1+0.12)^1} = 4464.28$

$NPV_2 = \frac{9000}{(1.12)^2} = 7174.74$

$NPV_3 = \frac{10000}{(1.12)^3} = 7117.80$

$NPV_4 = \frac{10,000}{(1.12)^4} = 6355.18$

$NPV_5 = \frac{3000}{(1.12)^5} = 1702.28$

PAGE No.
DATE / /

$PV_1 + PV_2 + PV_3 + PV_4 + PV_5 = \underline{26814.28}$

profitability index $PI = \frac{\text{cash inflow}}{\text{cash outflow}}$

$= \frac{26814}{25,000}$

$= 1.07256$

$PI > 1$ ✓

26814
25

-25,000 + 26810
$ 1810

payback period

5000 + 9000 + 10,000 + 10,000 = 25000 ✓

10,000
12
866.

3 years and 2 months.

Q.2. $ 100,000 investment ✓ A_0

net cash inflow $ 25,000 per year for 8 years. F_V

rate of return (k) = 15% = 0.15 ✓

rate of inflation (P_r) = 3% = 0.03

$NPV = -100,000 + \sum_{t=1}^{8} \frac{25,000}{(1+0.15+0.03)^t}$

$NPV = A_0 + \sum_{t=1}^{n} \frac{F_V}{(1+k+P_r)^t}$

	year	Fv	k	Pv	NPVn
t=1	1	25,000	0.15	0.03	~~19531.25~~ 21186.44
t=2	2	— " —	0.15	0.03	~~15258.79~~ 17954.61
t=3	3	— " —	0.15	0.03	~~11920.93~~ 15215.77
t=4	4	— " —	0.15	0.03	~~9313.22~~ 12894.72
t=5	5	— " —	0.15	0.03	~~7275.96~~ 10927.73
t=6	6	— " —	0.15	0.03	~~5684.34~~ 9260.79
t=7	7	— " —	0.15	0.03	~~4440.89~~ 7848.12
t=8	8	— " —	0.15	0.03	~~3469.45~~ 6650.95

PAGE No.
DATE / /

NPV1 + NPV2 + NPV3 ..... + NPV8 = 76894.82

NPV = -100,000 + 76894

NPV1 + NPV2 + NPV3 ..... + NPV8 = 101939.13

NPV = -100,000 + 101939

NPV = $1939 ✓

Net preset value is positive
∴ the project is acceptable

profitability Index : $\frac{101939}{100000}$

= 1.01939

here. PI > 1

payback time

25000 + 25000 + 25000 + 25000 = 100,000

∴ payback time is 4 years.

1,00,000	25,000