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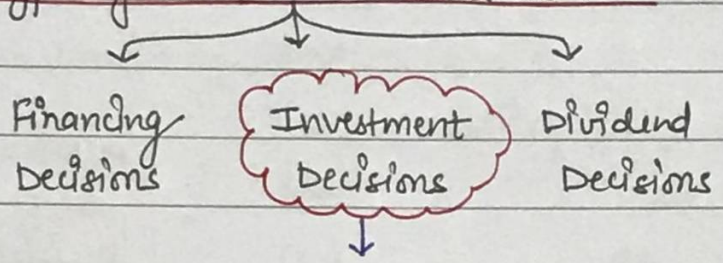
Financial Management

Chapter : Capital Budgeting

3 types of decisions involved in FM -



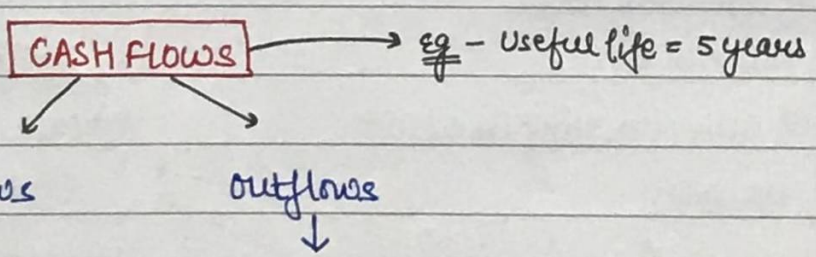
* It is concerned with optimum utilisation of funds, in order to maximise the wealth of shareholders.
* Each rupee of capital raised bears some cost (cost of capital). Thus, funds should be invested in such a manner, that cost of capital can be recovered.
* Capital Budgeting involves -

→ Identification of investment project (assets).

→ Estimating and evaluating post-tax incremental cashflows from each project.

NPV = PV of future cashflow − Initial Investment.

→ selection of project with highest NPV.



- CFAT (T_1 - T_5)
- Salvage value (T_5)
- Working capital recouped/ Recovered (T_5)

- Initial Investment. (T_0)
- Working capital Investment. (T_0)

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1. Calculation of Initial Investment – (T_0)

	Cost of Project / Asset	xxx
(+)	Freight and Insurance	xxx
(+)	Installation / Assembly	xxx
		xxx
(−)	salvage value of old projects	(xx)
(+)	Tax on capital gain	xxx
(−)	Tax on capital loss	(xx)
	Initial Investment	xxx

outflows

Inflows ← (−) salvage value of old projects (xx)
outflows ← (+) Tax on capital gain xxx
Inflows ← (−) Tax on capital loss (xx)

Applicable only in case of Replacement Decision i.e when Asset is replaced.

2. Calculation of working capital – (T_0 & T_5)

working capital → outflow (T_0), Inflow (T_5)

Given ✓

Current Assets – current liabilities = working capital
(to be calculated)

3. Calculation of CFAT – (T_5)

Net operating cashflow after Tax

Income statement Pro.

	Sales
(−)	Variable cost
	Contribution
(−)	Cash operating Fixed cost
	EBIDTA
(−)	Dep^n / Amortisation
	EBIT
(−)	Interest
	EBT
(−)	Tax

Income statement Pro Max.

	Sales
(−)	Variable cost
	Contribution
(−)	Cash operating Fixed cost
	EBIDTA / EBIT / EBT
(−)	Tax
	NOPAT
(+)	Tax Advantage on Dep^n
	CFAT

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PAT
⊖ Preference Dividend
EAESH

Note :- Depreciation to be calculated on
Initial Investment ✓ working capital Investment ✗

4. Calculation of Terminal cashflow / salvage value - (TS)

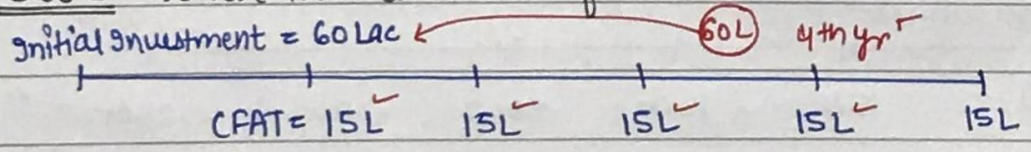
	Scrap Value of the Asset	XXX	→ Inflow
(−)	Tax on capital gain	(XX)	→ outflow
(+)	Tax on Capital loss	XX	→ outflow avoided i.e inflow.
(+)	working capital Recouped / Recovered	XX	
	Amount of salvage Value	XXX	

CAPITAL BUDGETING TECHNIQUES :-

1. Payback Period : (lower the better)

Case 1:- when the CFAT is uniform.

Eg:-



$$\text{Payback period} = \frac{\text{Initial Investment}}{\text{CFAT}}$$

$$= \frac{60,00,000}{15,00,000} = 4 \text{ years}$$

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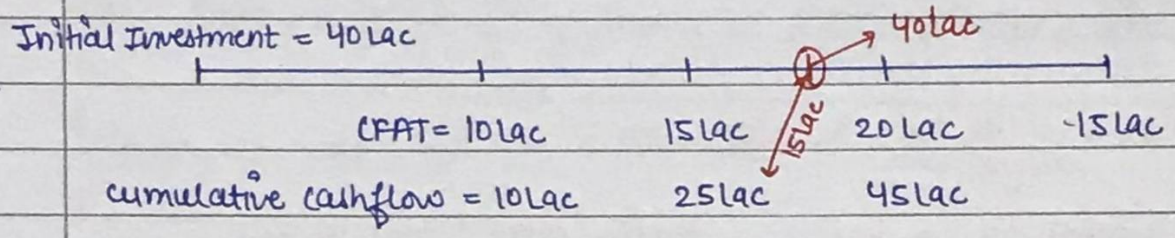
Case 2:- when the CFAT is not uniform.
↳ Apply cumulative cashflow method.

Eg:-



$$\text{Payback period} = 2 \text{ years} + \frac{15,00,000}{20,00,000} \times (3 \text{ years} - 2 \text{ years})$$

$$= 2.75 \text{ years} \longrightarrow 2 \text{ years } 9 \text{ months}$$

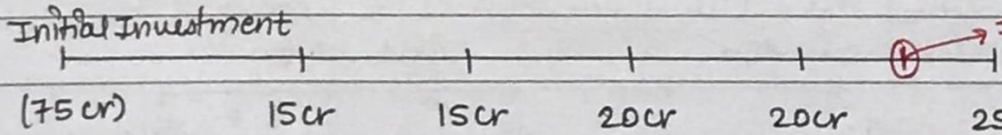
2. **Payback period Reciprocal** : (Higher the better)

$$\text{Payback period reciprocal} = \frac{\text{CFAT}}{\text{Initial Investment}}$$

3. **Post Payback Profitability** : (Higher the better).

$$\text{Post Payback Profitability} = \text{Total cash inflows} - \text{Initial Investment}.$$

Eg:-



cumulative cashflow =	15cr	30cr	50cr	70cr	100cr	30cr

salvage value = 5cr

Post payback profitability = 15 + 15 + 20 + 20 + 25 + 5 − 75 cr = 25 cr

$$\text{Payback period} = 4 \text{ years} + \frac{5 \text{ cr}}{30 \text{ cr}}$$

$$= 4.16 \text{ years} \longrightarrow 4 \text{ years}, 2 \text{ months}.$$

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4. **Post Payback Profitability Index** : (Higher the better).

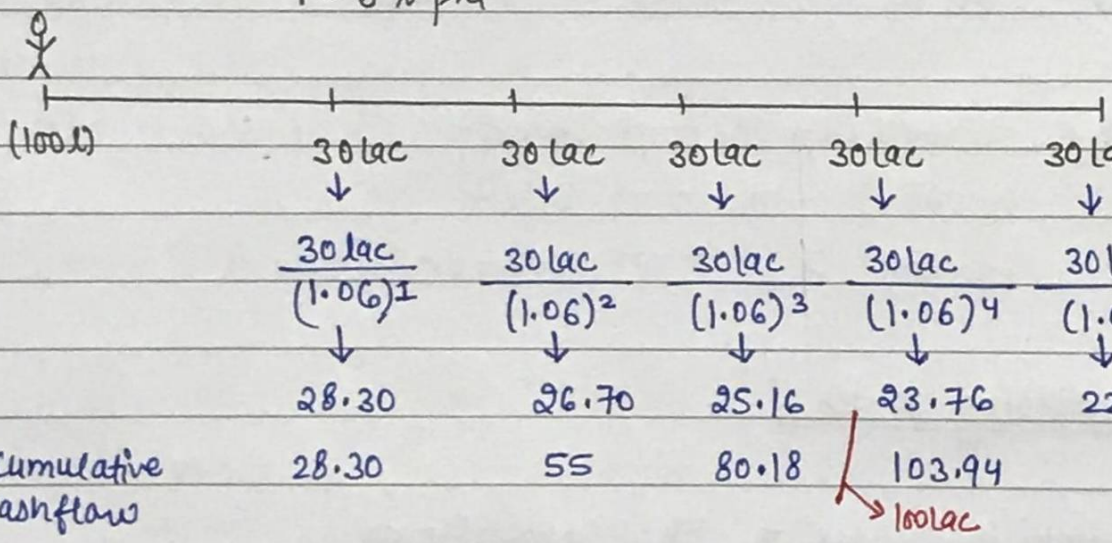
$$\text{Post Payback Profitability Index} = \frac{\text{Post payback profit}}{\text{Initial investment}} \times 100$$

As, in the above example ⇒ PPE Index $= \frac{25\,cr}{75\,cr} \times 100$

$= \boxed{33.33\%}$

5. **Discounted Payback Period** : (Lower the better).

Eg:- $r = 6\%$ p.a



Cumulative cashflow	28.30	55	80.18	103.94

100 lac

Discounted Payback Period → $3\text{ yrs} + \frac{19.82}{23.76} = \underline{3.83\text{ years}}$

Payback Period → $\frac{100}{30} = \underline{3.33\text{ years}}$

Conclusion :- Always payback period is < discounted payback period.

6. **Net Present Value (NPV)** :

↳ Inflow − outflow.

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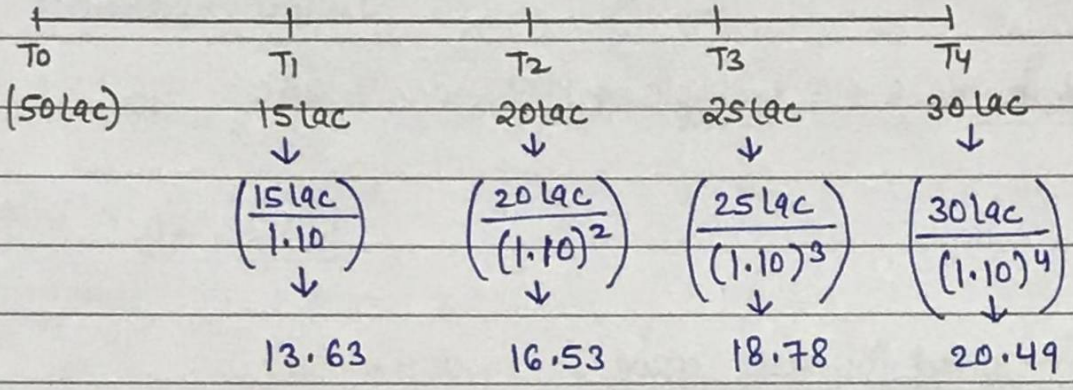
NPV = Present value of cash inflows − Present value of cash outflows.

Eg:-

$K_C = 10\%$



NPV = Present value of cash inflows − Present value of cash outflows.

NPV = 69.43 lac − 50 lac = 19.43 lac.

Note :- If NPV is +ve ⟶ Accept.
If NPV is −ve ⟶ Reject.
If NPV = 0 ⟶ Accept or Reject.

7. Profitability Index :

$$\text{Profitability Index} = \frac{\text{PV of cash inflows}}{\text{PV of cash outflows}}$$

Particulars	NPV	PI
PV of cash inflows > PV of cash outflows	+ve	>1
PV of cash inflows = PV of cash outflows	0	=1
PV of cash inflows < PV of cash outflows	−ve	<1

Eg:-

	PVCIF		PVCOF		NPV		PI
1.	5,00,000	>	4,00,000	+	1,00,000	>1	1.25
2.	4,00,000	=	4,00,000	0	0	=1	1
3.	3,75,000	<	4,00,000	−	(25,000)	<1	0.9375

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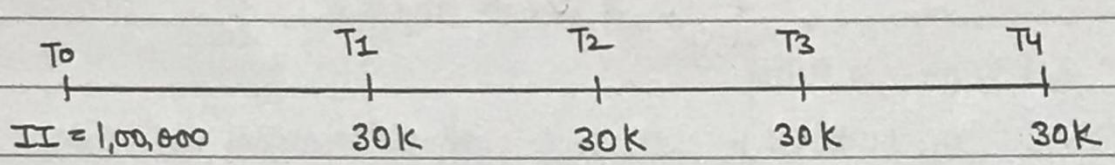
8. **Internal Rate of Return** : using Interpolation Method –

$$IRR = \text{Lower Rate} + \left[\frac{\text{NPV at Lower Rate}}{\text{NPV at Lower Rate} - \text{NPV at Higher Rate}}\right] \times (\text{Higher Rate} - \text{Lower Rate})$$

Eg:-



At Kc = 6% ; NPV = ₹ 3,953

& At Kc = 10% ; NPV = ₹ (4,904)

Now',

$$IRR = 6\% + \left[\frac{3953}{3,953 - (4,904)}\right] \times [10\% - 6\%]$$

IRR = 7.79%

* Kc → Cost → Expectation of Investor

IRR → Return → Actual Return

Very Imp

Particulars	NPV	PI	IRR	Decision
PVCIF > PVCOF	+ve	>1	IRR > Kc	Accept
PVCIF = PVCOF	0	=1	IRR = Kc	Accept | Reject
PVCIF < PVCOF	-ve	<1	IRR < Kc	Reject

* **NPV V/s IRR** –

Eg:- Mutually exclusive projects (accept any one)

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Project	II	IRR	NPV	IRR	NPV
A	2,00,000	12%	30,000	20%	30,000
B	10,00,000	15%	75,000	15%	75,000

1st case :- Invest in Project B

2nd case :- Invest in Project B

Note :- ① Incase of Mutually exclusive projects when both NPV and IRR offer contradectory views (in case ②)

IRR → Project A accepted.

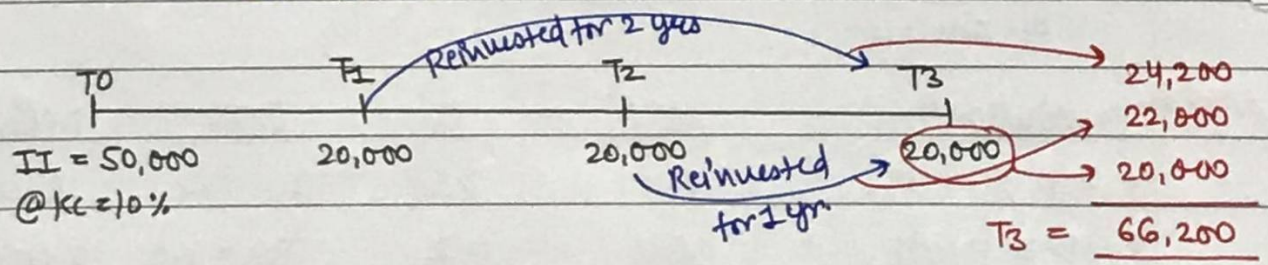
NPV → Project B accepted.

In this case, NPV is considered over IRR for the purpose of making capital Budgeting decision.

9. Modified Internal Rate of Return :

MIRR - Assumption that intermediate cashflows reinvested in the business at Kc.

Eg :-



NPV @ KC = 10% = (263) (-ve)

NPV @ KC = 9% = 1118.5 (+ve)

$$IRR = 9 + \left[\frac{1118}{1118 - (263)}\right] \times (10\% - 9\%)$$

IRR = 9.80%

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10. **Accounting Rate of Return : (ARR)**

Also called as Unadjusted Rate of Return.

- Based on Initial Investment
- Based on Average Investment

$$ARR = \frac{\text{Average PAT}}{\text{Initial Investment}}$$

Default Assumption

$$ARR = \frac{\text{Average PAT}}{\text{Average Investment}}$$

$$\text{Avg Investment} = \frac{\text{Initial Investment} + \text{Scrap value}}{2}$$

Eg:-

Year	CFAT	Dep^n	PAT (CFAT − Dep^n)
1	240	152	88
2	230	152	78
3	190	152	38
4	180	152	28
5	170	152	18
			250

$$\text{Avg PAT} = \frac{250}{5\text{ yrs}} = 50$$

If Initial Investment = 800 lac
If Salvage value = 40 lac

$$ARR = \frac{\text{Avg PAT}}{\text{Initial Investment}}$$

$$ARR = \frac{50}{800}$$

$$ARR = 6.25\%$$

$$ARR = \frac{\text{Avg PAT}}{\text{Avg Investment}}$$

$$ARR = \frac{50}{420} \quad (800 + 40 \text{ lac} = 840/2)$$

$$ARR = 11.90\%$$

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Capital Rationing :-

This concept is applicable when the entity has limited funds and multiple options to invest in.

- **Projects are Divisible** → can be accepted in parts.
  - Rank on the basis of NPV per rupee invested.
- **Projects are Indivisible** → cannot be accepted in parts.
  - Rank various permutations & combinations that gives the maximum NPV.

Note :- If question gives → Profit is

Before Tax and Depreciation	After Depreciation before Tax	After Depreciation and Tax	After Tax before Depreciation
EBIDTA	EBIT	NOPAT	CFAT