

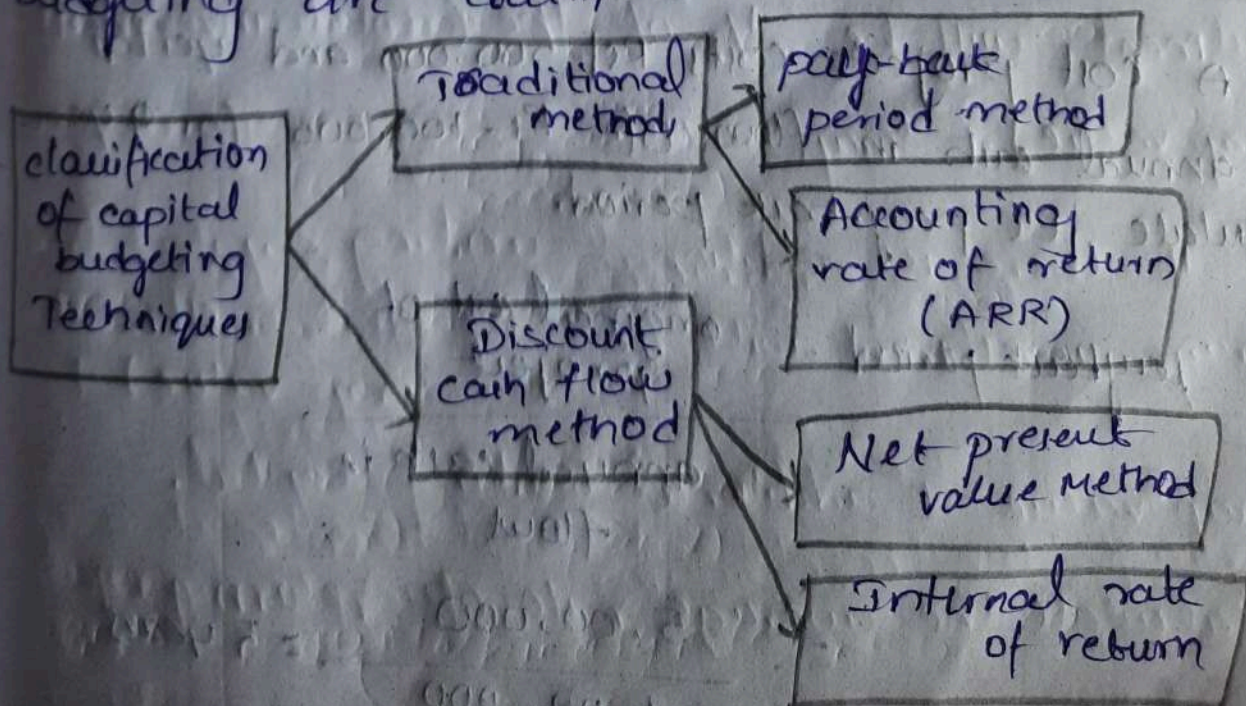
5. Capital Budgeting

- Trad
2. Traditional method :- $\begin{cases} \text{pay back method} \\ \text{ARR} \end{cases}$
3. Discounted cash flow method :- $\begin{cases} \text{net present value} \\ \text{IRR} \end{cases}$
(Internal rate of return)

Def :- Capital is represented by asset, management of asset, means management of capital. Capital budgeting is therefore capital expenditure decision concerning acquisition, extension, expansion & development of fixed assets. Capital budget in this way refers to acquisition and development of fixed asset in operations.

Capital budget method & Techniques :-

The popular techniques of capital budgeting are classified as under:



1. pay-back period / pay out period Method:-

It is one of the traditional methods of evaluation of investment proposals. Under this method, it is a simple and easy. Here, pay back (or) pay out period is no. of years required to recover the original investment.

* Calculation of pay-back period:-

If annual cash flow is constant / even the following formula will be applied:-

$$\text{payback period} = \frac{\text{original cost of the project}}{\text{annual cash in flow}}$$

NOTE:- Annual cash in flow, it is the annual earning or profit before depreciation and after taxes.

problems:-

1) A cost project costs Rs. 500,000 and yields an annual cash in flow of Rs. 100,000 for 9 years. Calculate its pay-back period.

Sol:-
$$\text{payback period} = \frac{\text{original cost of project}}{\text{annual cash in flow}}$$

$$= \frac{5,00,000}{1,00,000} = 5 \text{ years}$$

Model: if annual cash flow is not constant/uneven, under this method payback period calculate by adding up the cash in flow until the total is equal to the initial investment (outlay) in the project.

2) Determine a pay Back period for a project which requires a cash outlay of ₹1- 24000 and generates cash in flow of ₹1- 4000, 8000, 8000, 10000, in the first, second, 3rd, 4th years respectively

Year	Annual cash in flow	Accumulated Annual cash in flow (AAFI)
1	4000	4000
2	8000	12000
3	8000	20000
4	10000	26000

$$\text{pay Back period} = \text{Lower year} + \frac{\text{original cost of the project} - \text{AAFI of 3 years}}{\text{AAFI of 4 years} - \text{AAFI of 3 years}}$$

$$\therefore \text{pay Back period} = 3 + \left(\frac{24000 - 20000}{20000 - 12000} \right)$$

$$= 3 + \left(\frac{4000}{8000} \right)$$

$$= 3 + 0.4$$

$$= 3.4 \text{ year.}$$

* Average rate of return:- Accounting rate of return):- The ratio of annual profit after taxes to the average investment is known as average rate of return. Average investment is supposed to be equal to half of the original investment.

$$ARR = \frac{\text{Average annual profit after taxes}}{\text{Average investment / original investment}} \quad (or)$$

$$ARR = \frac{\text{Average earnings}}{\text{Average investment}} \times 100$$

* Special features of ARR Method:-

1. Average investment is supposed to be half of the total investment (capital outlay) if there is no scrap value. In case of scrap value, the average investment will be $\frac{1}{2}$ of the (total investment - Scrap value) + Scrap value.

* If there is additional working capital the average investment will be $= \frac{1}{2} (\text{total investment} - \text{scrap value}) + \text{scrap value} + \text{additional working capital}$,

1) calculate the average rate of return project

A and B from the following details.

	project A	project B
Investment	20,000	48,000
Expected life (no salvage value)	6 years	8 years

project net income (after depreciation and taxes)

years	project A	project B
1	4000	6000
2	3000	6000
3	3000	4000
4	2000	2000
5	—	2000
Total:-	12000	20000

sol:-

particular.	project A	project B
Average investment $\frac{\text{total investment}}{2}$	$= \frac{20000}{2}$ $= 15000$	$= \frac{48000}{2}$ $= 24000$
Averages earning $= \frac{\text{total earning}}{\text{no. of years}}$	$= \frac{12000}{6}$ $= 2000$	$= \frac{20000}{8}$ $= 2500$

ARR	$\frac{2000}{15000} \times 100$	$\frac{2500}{24000} \times 100$
$\left[\frac{AE \times 100}{AI} \right]$	$= 13.33\%$	$= 10.41\%$

⇒ The average rate of return of project A is higher and hence project A may be preferred.

2) project A requires an investment of ₹500,000 and has a scrap value of ₹20,000 after 5 years. It is expected to yield profits after depreciation and taxes during the 5 years amounting ₹1,40,000, 60,000, 70,000, 50,000, 20,000. Calculate the average rate of return.

Sol:- Average rate of return = $\frac{\text{Average earning}}{\text{Average investment}} \times 100$
(ARR)

where total earning for 5 years = 40,000 + 60,000 + 70,000 + 50,000 + 20,000

$= 2,40,000$

Average earnings = $\frac{2,40,000}{5}$

$= 48,000/-$

Average investment = $\frac{1}{2} (\text{total investment} - \text{scrap value}) + \text{Scrap value}$

$= \frac{1}{2} (500,000 - 20,000) + 20,000$

$$\frac{2500}{24000} \times 100$$

$$= 10.41\%$$

um of project
A may be

of ₹ 5,00,000
after 5 years
depreciation
amounting ₹ 1-40.
ate the average

average earning
average investment

40,000

9,000

01-

ment - scrap
Scrap value

0000] + 20000

$$= 2,60,000/-$$

$$ARR = \frac{48000}{260,000} \times 100$$

$$= 18.46\%$$

* Net present value method (NPV):

The net present (NPV) takes into consideration the time value of money. Taking into consideration the scrap value, if the present value of cash in flows exceeds the initial cost of the project, the project is accepted otherwise rejected.

* If there are 2 project proposals giving net value the project with the higher net present value is

$$NPV = (\text{present value of cash inflow} - \text{investment})$$

$$\text{present value} = \frac{C.F.}{(1+r)^t}$$

where C.F = cash in flow

r = discounting rate

n = year

$$NPV = \frac{C.F_1}{(1+r)^1} + \frac{C.F_2}{(1+r)^2} + \dots + \frac{C.F_n}{(1+r)^n} - \text{Investment}$$

For calculating present value, we can use discounting principle or table values. Table values are given for present value of one rupee received in different years.

Q. calculate net present value of two projects & suggest which of two project should be accepted assuming a discount rate of 10%.

Sol:-	project A	project B
initial investment	20000	50000
estimated life	5 years	5 years
Scrap values	2000	4000

Sol:-	years	project A cash in flow	project B cash in flows.
	1	10000	40000
	2	15000	30000
	3	8000	10000
	4	6000	5000
	5	4000	4000

Sol:- calculation of Discount factor:-

we are using the formula $\frac{1}{(1+r)^n}$

where $r = 10\%$ (given)

$$= \frac{10}{100} = 0.1$$

For 1st year $= \frac{1}{(1+0.1)^1} = 0.909$ (present value of Rs @ of for 1st year)

For 2nd year $= \frac{1}{(1+0.1)^2} = 0.826$

For 3rd year $= \frac{1}{(1+0.1)^3} = 0.751$

For 4th year $= \frac{1}{(1+0.1)^4} = 0.683$

For 5th year $= \frac{1}{(1+0.1)^5} = 0.620$

Calculate of NPV for project 'A' :-

years	cash inflow	present value of Rs-1 @ 10%	present value of cash in flow
1	10000	0.909	9090
2	15000	0.826	12390
3	8000	0.751	6008
4	6000	0.683	4098
5	4000	0.620	2480
5	2000	0.620	1240
Total			35312

present value of cash inflows = 35,312

present value of initial investment = 30,000

$$NPV = 35,312 - 30000$$

$$= 5312$$

calculation of NPV for project B:

years	present value 10%	cash in flow	present value cash in flow.
1	0.909	40000	36360
2	0.826	30000	24780
3	0.731	10000	7310
4	0.683	5000	3415
5	0.621	4000	2484
5	0.621	4000	2484
			<hr/> 77033

For 1st year =

present value of cash in flow = 77033

present value of initial investment = 50000

$$NPV = 77033 - 50000$$

$$= 27033$$

* 4. Internal Rate of Return Method (IRR)

1. Internal rate of the return for an investment proposal is that discount rate which equates the present value of future cash flows with the present value of cash outflows of an investment when compared with the IRR with a required rate of return. Internal rate of Return is more than required rate of returns, the project is accepted else Reject.

1) A firm has an investment opportunity involving Rs. 50000. The cost of capital is 10%. From the details given below find out the internal rate of return and see whether the project is acceptable.

	(Rs)
Cash flow year 1 :	5000
Cash flow year 2 :	10000
Cash flow year 3 :	15000
Cash flow year 4 :	25000
Cash flow year 5 :	30000

Discount factor

Years	10%	15%	20%	25%
1	0.909	0.870	0.833	0.800
2	0.829	0.576	0.694	0.640
3	0.751	0.658	0.579	0.512
4	0.683	0.572	0.482	0.410
5	0.621	0.497	0.402	0.328

So:- As the discount Rate are from 10% to 25%. The internal rate return may be in b/w 10% and 25%. As it is trial and error method we can start with any rate let us try with 15% and 20%

Calculation of IRR:-

Years	cash in flow	present value factors @ 15%	Discount cash in flow.
1	5000	0.870	4350
2	10000	0.756	7560
3	15000	0.658	9870
4	25000	0.572	14300
5	30000	0.497	14910
Total:-			50990

present value factors @ 20%	Discount cash in flow.
0.833	4165
0.694	6940
0.579	8685
0.482	12050
0.402	12060
Total:-	43900

The present value of cash in flow at 15% is Rs. 50,990 which is more than initial investment Rs. 50,000 and at 20%, 43,900 which is less than the required one. Hence, the actual IRR lies in between 15% and 20% and can be computed by way of interpolation as follows:

$$\text{IRR} = L + \frac{P_1 - Q}{P_1 - P_2} \times D$$

where L = lower Discount rate 15%

P_1 = present value of earnings at lower rate Rs. 50,990

P_2 = present value of earnings at higher rate Rs. 43,900

Q = actual investment Rs. 50,000

D = Difference in rate of return
20% - 15% = 5%

$$15 + \frac{50990 - 50000}{50990 - 43900} \times 5\%$$

$$15 + \frac{990}{7090} \times 5$$

$$= 15.7\%$$

As the internal rate of Return 15% is above the cost capital is 10%, so the project is acceptable.

* Ratio Analysis:-

What is ratio?

A ratio is simply a number expressed in terms of another. It refers to the numerical relationship b/w two variables which are comparable. It is an expression derived by dividing one variable by the other.

It is a statistical measure that provides an insight into relationship b/w two variables. Ratio can be expressed in terms of percentages and quotients also.

Types of Ratios:-

Based on their nature, the ratio can broadly be classified into 4 categories.

1. Liquidity ratio
2. Activity ratio
3. Capital structure ratio
4. Profitability ratio

Liquidity Ratio:-

- ⇒ current ratio
- ⇒ quick ratio (or) liquidity ratio (or) Acid test ratio

$$\text{current ratio} = \frac{\text{current assets}}{\text{current liabilities}}$$

Here current assets includes the following.

1. cash in hand
2. cash at Bank
3. Bills Receivables
4. stock
5. prepaid expenses
6. Debtors
7. Marketable Securities.

1. * Current liabilities:-

The current liabilities are as follows

- (1) creditors
- (2) bills payable
- (3) Bank overdraft
- (4) outstanding expenses
- (5) income Received in advance.

2. Quick ratio:- or Liquidity ratio.

$$\text{Quick ratio} = \frac{\text{Liquid Assets / quick assets}}{\text{current liabilities}}$$

where quick assets = current assets - [stock + prepaid expenses]

3. From the following balancing sheet of xyz company. calculate.

- 1) Current ratio
- 2) Liquidity ratio

Balancing sheet xyz company Ltd at on 31-12-2001

Balance sheet	
Liabilities	Assets
preference share capital 1000	land & building 225
equity share capital 150	plant & machinery 250
general reserve 250	Furniture & fixtures 100
Debentures 400	stock 250
creditors 200	debt 1250
bill payable 50	cash at Bank 250
outstanding expenses 50	cash in hand 125
profit & loss A/c 100	prepaid expenses 50
Bank loan long run 200	Marketable security 125
	1500
1500	

From the above bal sheet identify the current liabilities.

The current assets include stock 250 +
 Current a/c + 250 + CI + 125 +

= 925/-

The current liability includes
creditors + bank over + outstanding + over-
drops

$$\Rightarrow 200 + 50 + 50 = 300$$

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

$$= \frac{925}{300}$$

$$= 3.1$$

$$\textcircled{2} \text{ Liquidity ratio} = \frac{\text{Liquid Assets}}{\text{Current liabilities}}$$

$$= 925 - [\text{stock} + \text{prepaid expenses}]$$

$$= 925 - [300]$$

$$= 625$$

$$\text{Liquidity ratio} = \frac{625}{300}$$

$$= 2.1$$

2. The following are an extract of the b/s of a company during the last year. compute current ratio and quick ratio.

land and Builds 50000

land and machinery 1,00,000

furniture and fixtures 25000

closing stock 25000

Sundry debtors 12500

wages prepaid 2500

Sundry Creditors 8000

rent outstanding 2000

(i) From the above, ratio the current assets includes closing stock + sundry debtors + wages prepaid

$$= 25000 + 12500 + 2500$$
$$= 40000$$

→ current liabilities includes sundry creditors + rent outstanding

$$= 8000 + 2000$$
$$= 10000$$

Therefore current ratio = $\frac{\text{Current Assets}}{\text{Current liabilities}}$

$$= \frac{40000}{10000}$$

$$= 4$$

(ii) Quick ratio

Quick ratio = $\frac{\text{Quick Assets}}{\text{Current liabilities}}$

$$\text{Quick Assets} = \text{Current Assets} - (\text{stock} + \text{prepaid expenses})$$
$$= 40,000 - (25000 + 2500)$$
$$= 12500$$

$$\text{Quick ratio} = \frac{12500}{10000} = 1.25\%$$

* Final accounts:-

The process of preparing final A/c's are sole proprietors of are two stages

1. Trading and profit & loss account.
2. Balance sheet

1. Trading Account:-

Trading Accounts			
Dr			Cr
particular	Ri	particular	Ri
TO opening stock	xxx	By sales (-) sales return	xxx
TO purchases	xxx	By closing stock	xxx
TO purchase return		By gross loss	xxx
TO wages	xxx	By gross	
TO cartage in words	xxx	(transfer to P/L A/c)	
TO purchased			
TO fuel and power	xxx		
TO direct expenses	xxx		
TO gross profit	xxx		
(Transfer to profit/loss)	xxxx		xxxx

profit and losses account for the
year ending - - - -

particulars	Rs	particulars	Rs
		TO gross profit	xxx
TO salaries	xxx	By discount received	xxx
TO rent (office)	xxx	By commission received	xxx
Insurance	xxx	By profit on sales of fixed assets	xxx
TO carriage outwards	xxx	By net loss	xxx
TO telephone charges	xxx		
TO cost of samples	xxx		
TO advertising expenses	xxx		
TO heating & lighting	xxx		
TO discount allowed	xxx		
TO Bad debts	xxx		
TO depreciation	xxx		
	xxxx		

Balancing sheet on

Liabilities	Rs	Assets	Rs
		Fixed assets	
capital (+) net profit	xxx	plant & machinery	
(Bank over draft) x		(-)	xxx
long term	xxx	depreciation	
current liabilities		land and building	xxx
creditors	xxx	(-) depreciation	
bill payable	xxx	furniture	
Bank over draft	xxx	current assets / cash in hand	xxx
outstanding liabilities	xxx	cash at Bank	xxx
		debtors	xxx
		stock	xxx
		prepaid expense	xxx
		marketable security	xxx