

Date  
27/7/25

Unit-II

# Capital Budgeting / Investment Decisions.

1. Explain the Capital budgeting and its features?

## A). Introduction:-

\* budget is made for a long term capital investments of Capital Expenditure. The process of preparing capital budget is known as Capital budgeting. It is the process of making investment decisions in fixed assets.

## Concept of Capital Budgeting:

The term Capital Budgeting refers to investment on long term activities, in anticipation of expected return over a period of time exceeding one year. It is also known as investment decision making or Capital expenditure decision or analysis of capital expenditure.

## Definitions:-

1. " Capital Budgeting is a long term planning for making and financing to proposed capital outlay".

- Brigham

2. " capital Budgeting generally refers to, acquiring inputs for achieving long run returns".

- Solomon Ezra

3. " capital Budgeting consists in planning development of available capital for the purpose of maximizing the long term profitability of the concern"

- Lynch

## features of Capital Budgeting:

The following are the features of Capital budgeting

\* Capital Budgeting decisions involves the exchange of current funds for the Benefits to be achieved in future.

\* The feature benefits are expected to be realized over a period of years.

\* The funds are invested in non-flexible and long term

activities.

- \* They have a long term and significant effect on the profitability of the concern.
- \* They involve generally huge funds
- \* The decisions taken through the capital budgeting process are irreversible decisions in nature.

2. Explain the need, significance or importance of Capital Budgeting?

A) Capital Budgeting means planning for Capital Assets.

The following are the points relates to the importance of Capital Budgeting.

1. Large Investments:-

Generally Capital budgeting decisions involve large investment of funds. But the funds available with the firm are always limited and the demand for funds exceeds the resources. Hence it is very important for a firm to plan and control its capital expenditure.

2. Long-term commitment of funds:-

Long-term commitment of funds increases the financial risk involved in the investment decision. Greater the risk involved, Greater is the need for careful planning of capital expenditure that is capital budgeting.

3. Irreversible in nature:-

The capital expenditure decisions are of irreversible nature. Once the decision for acquiring a permanent asset is taken, It becomes very difficult to dispose of those assets without incurring heavy losses.

4. Long term effect on profitability:-

Capital budgeting decisions have a long term and significant effect on the profitability of a concern, not only the present earnings of the firm.

but also the future growth and profitability of the firm depends upon the investment decision taken today.

capital budgeting is almost important to avoid over investment or under investment in fixed assets.

### 5. Difficulties of Investment Decisions :-

The long term investment decisions are difficult to be taken because

1. Decision extends to a series of 20 years, beyond the current accounting period.
2. Uncertainties of future.
3. Higher degree of risk.

### 6. National Importance :-

Investment decisions though taken by individual concern is of National importance because it determines employment, economic activities and economic growth.

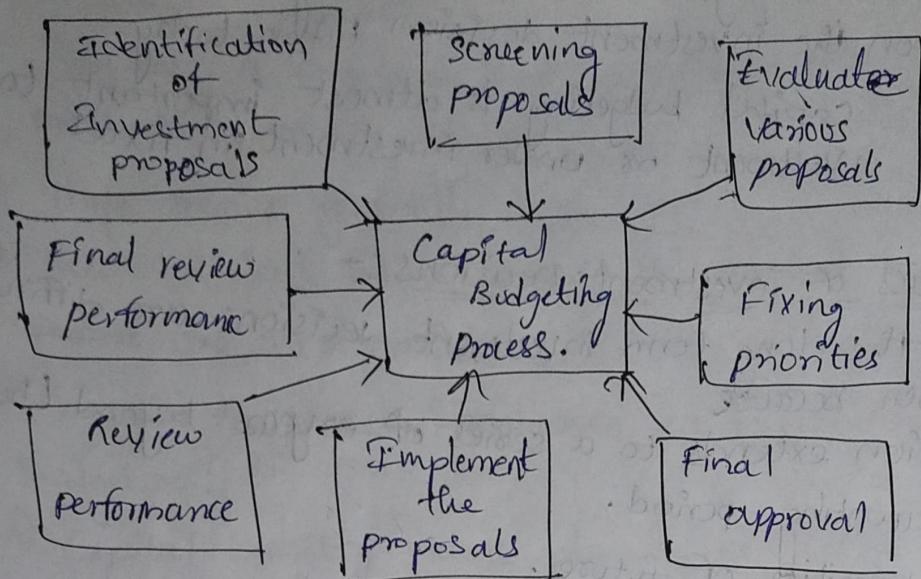
### Conclusion :-

Finally it is said that without using Capital Budgeting techniques a firm may involve itself in a losing project. Proper timing of purchase, replacement, expansion and alteration of asset is essential.

### Q. Write about the capital Budgeting process?

A) Capital Budgeting is a complex process, As it involves decisions relating to the investment of current funds for the benefits to be achieved in future and the future is always uncertain.

The following procedure is adopted in the process of capital budgeting



### 1. Identification of investment proposals :-

The capital budgeting process begins with the identification of investment proposals. The proposal or the idea about potential investment opportunities from the top management of the organisation.

### 2. Screening the proposals :-

The Expenditure planning committee screens the various proposals received from different departments. The committee views those proposals from various angles in accordance with the corporate strategies.

### 3. Evaluation of various proposals :-

The next step in the capital budgeting process is to evaluate the profitability of various proposals. There are followed many methods to be used such as profitability index, payback period method, internal rate of return method, net present value method etc.. All these methods of evaluating profitability of Capital investment proposals.

### 4. Fixing priorities :-

After Evaluating various proposals, unprofitable or uneconomic proposals may be rejected in the straight way. Hence, it is very essential to rank the various proposals and to establish priorities after considering urgency, Risk and profitability involved there in.

## 5. Final Approval :-

Proposals meeting the evaluation and finally approved to be included in the capital expenditure budget. It is lays down the amount of estimated expenditure to be incurred on fixed assets during the budget period.

## 6. Implementing proposals :-

Preparation of a capital expenditure budgeting and incorporation of a particular proposal in the budget with the implementation of the project.

While implementing the project, it is better to assign responsibilities. For completing the project within the given time and cost limit, so as to avoid unnecessary delays and cost over runs.

## 7. Review Performance :-

The last stage in the process of capital budgeting is the evaluation of the performance of the project. The Evaluation is made through post completion audit by way of comparison of actual expenditure on the project with the budgeted and also by comparing actual return from the investment with the anticipated return.

## 8. Final Review Performance :-

The unfavourable variances, if any should be looked into and the causes of the same to be identified so that corrective action may be taken in future.

## 4. Discuss about the factors influencing Capital budgeting decisions?

a) There are many factors, financial as well as non-financial, which influence the capital expenditure decisions. The following which are highly influencing Capital budgeting

Expenditure decisions.

1) Urgency :- A project may be selected immediately due to emergency or urgency. The reason is that such immediate selection saves the life of the company i.e., survival of a company is the primary importance than other factor.

→ Example of urgency are = Breakdown of some plant and machinery (P/m), fire accident etc...

2. Availability of funds :-

All the projects are not requiring the same level of investments. Some projects require huge amount and having high profitability. If the company does not have adequate funds, such projects may be given up.

3. Minimum rate of return on investment :-

Every management expects a minimum rate of return on capital investment. It refers to the point below which a project would not be accepted.

4. Future Earnings :-

The future earnings may be uniform or fluctuating. Even, though the company expects guaranteed future earnings in total which affects the choice of a project.

5. Legal Functions :-

The management should consider the legal factors while selecting a project. In the case of leather and chemical industries there are number of provisions created to protect environment pollution.

Now, the management gives much importance to legal provisions rather than cost and profit.

6. Degree of Risk and uncertainty :-

Every proposal involves certain risk and

uncertainty due to economic condition, competition demand and supply conditions, consumer preferences etc. The degree of risk and uncertainty affects the profitability of the project.

Hence the degree of risk and uncertainty of the project is taken into consideration for selection.

#### 7. Research and development Projects:-

It is highly required for technology based industries. The research and development project gives more benefits in the long run.

#### 8. Obt obsolescence :-

The replacement of existing fixed assets is compulsory, since there can be obsolescence of plant and machinery.

#### 9. Intangible factors:-

Goodwill of the company, industries relations, safety and welfare of employees are considered while selecting a project instead of considering project alone. These factors also responsible for selection of any project.

#### 5. Explain the kinds of capital decisions?

a) The overall objective of Capital budgeting is to maximize the profitability of a firm or the return on investment. This objective can be achieved either by increasing the revenues or by reducing costs.

Under consideration of the investment proposals, Capital budgeting decisions may be classified into 3..

\* Accept - Reject Decisions.

2. Mutually Exclusive project decisions

3. Capital rationing decisions.

4. Accept - Reject Decisions:-

It relates to independent proposals, which

Do not compete with one another, such decisions are generally taken on the basis of minimum return on investment.

All those proposals, which yield a rate of return higher than the minimum required rate of return are accepted and the others are rejected

## 2. Mutually Exclusive Project Decisions :-

Such decisions relate to proposals, which compete with one another in such a way that acceptance of one automatically excludes the acceptance of the other. Thus, one of the proposals is selected at the cost of the other.

Ex:- A company may have the option of buying a new machine or a second-hand machine, selecting a machine out of more than one brands available in the market. In such a case the company may select one best alternative out of the various options by adopting the suitable technique of capital budgeting. Once one alternative is selected, the others are automatically rejected.

## 3. Capital Rationing Decisions :-

A firm may have several profitable investment proposals but only limited to investment. In such a case, those various investment proposals compete for limited funds and the firm has to ration them. The firm selects the combination of proposals that will return the greatest profitability by ranking them in descending order of their profitability.

6. Explain the capital budgeting Methods, one failing techniques? (or) " while discounted cash flow methods are more superior than the

traditional methods" - Explain.

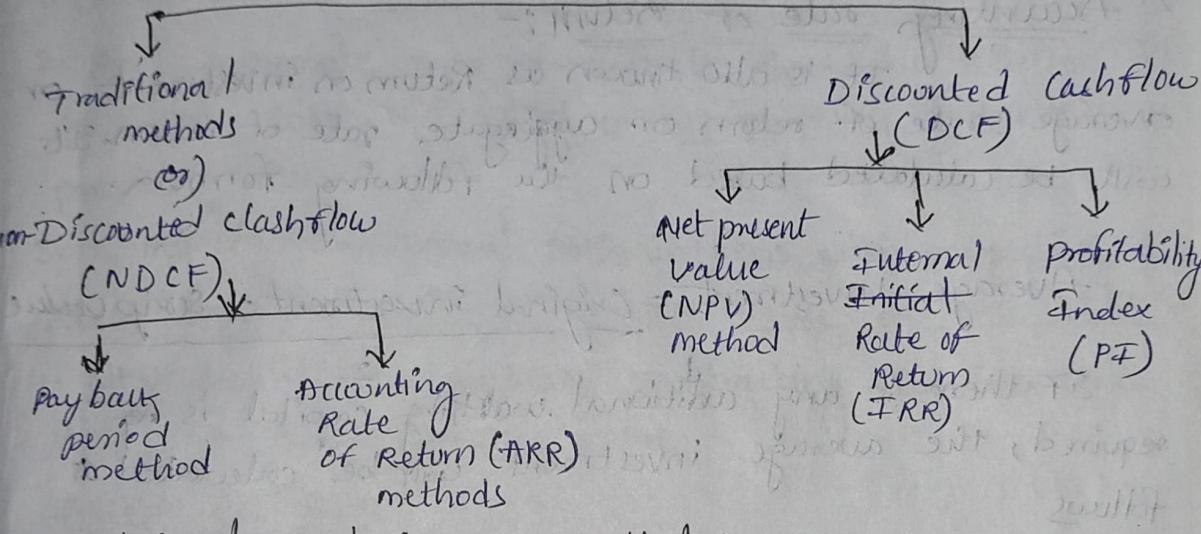
a) "Capital budgeting Evaluation techniques" or "investment appraisal techniques".

Capital budgeting methods broadly classified into 2 categories, which are mentioned below

### Techniques of Capital Budgeting :-

Capital Budgeting Techniques (or) methods

Investment Appraisal methods



### Traditional Techniques or methods :-

Under traditional techniques, which future cash inflow are not discounted to arrive at their future worth. Traditional techniques are divided into 2 types. They are

1. Payback period method.

2. Accounting rate of return method.

#### 1. Payback Period method :-

Payback period is the no. of years required to recover the original investment of a project. It is one of the popular traditional method for evaluating the investment proposals.

In simple words, payback period refers to the period of time for which the projects cash outflows can

be recovered from the project. Cash inflows <sup>or</sup> investment.

Formula :-

$$\text{Payback period} = \frac{\text{Investment}}{\text{Annual cash inflows}}$$

Acceptance Rule :-

Accept the project, if the calculated payback is less than the normal payback, otherwise the project should be rejected.

2. Accounting rate of Return :-

It is also known as Return on Investment or average rate of return or aggregate rate of return. It will be calculated based on the following formula.

$$\text{Average Investment} = \frac{\text{Original investment} + \text{Scrap value}}{2}$$

If there is any additional working capital required, the average investment will be calculated as follows

$$\text{Average Investment} = \frac{\text{Original Investment} + \text{Scrap value} + \text{Additional working capital}}{2}$$

The Average rate of return is calculated as follows

$$ARR = \frac{\text{Average income after taxes}}{\text{Average investment}} \times 100$$

Acceptance Rule :-

Accept the project, If the calculated ARR is greater than normal rate of return, otherwise the project should be rejected

Discounted cashflow methods :-

1. Net present value method :-

It is also known as net gain method. This

is one of the popular method considering time value of money.  
The first discounted cash flow technique is net present value.

Net present value may be defined as the summarization of the present value of the cash flows in each year minus the summarization of the present value of the net cash outflows in each year.

In order to calculate NPV the following steps should be consider.

1. Determination of annual cash inflows
2. An appropriate rate of interest should be selected it is called cost of capital or discounting factor or present value.
3. Multiplying the annual cash inflows with respective discounting factor is get present value of cash inflows.
4. NPV should be calculated subtracting the investment from the total present value

Acceptance Rule :-

Accept the project, if the NPV is positive or equal to zero. A project should be rejected, if the NPV is negative.

2. Internal rate of Return :-

The second discounted cash flow for appraising Capital investment decisions is the IRR method. This technique is also known as yield on investment. IRR may be define as the total present value are equal to investment at a particular rate of return. The value of IRR can be calculated by trial & error method.

Acceptance rule :-

If the calculated IRR is more than the cost of capital the project is accepted, otherwise the project should be rejected.

3. Profitability Index (PI) :-

Profitability index is also known as benefit cost ratio. It is based on NPV method, and similar to NPV method. The following formula to calculate the profitability index.

$$PI = \frac{\text{Present value of cash inflows}}{\text{present value of cash outflows (or) Investment}}$$

Acceptance rule :-

If the PI is greater than or equal to one the project is accepted. If the PI is less than one then that project is rejected.

Problems

1. A project cost ₹ 100,000 and yields annual cash inflows of ₹ 20,000 for 8 years. Calculate the payback period.

A) Payback period =  $\frac{\text{Investment}}{\text{Annual cash flow}} = \frac{100,000}{20,000} = 5 \text{ years.}$

2. The company wants to reduce its labour cost by installing a new machine. Two types of machines are available in the market, machine X and machine Y. Machine X would cost ₹ 18,000 whereas machine Y cost ₹ 15,000. Both the machines can reduce annual labour cost by ₹ 3,000. You are required to calculate the machine X and Y the payback period and recommended the best machine.

A) Machine X =  $\frac{18,000}{3,000} = 6 \text{ years}$

Machine Y =  $\frac{15,000}{3,000} = 5 \text{ years}$

recommendations:-

According to payback period method machine Y is more desirable than machine X because it has a shorter payback period than machine X.

3. A project cost rupees 500000 and each yields annually a profit of ₹ 80,000 after depreciation, at 12% per annum. But before tax of 30%. Calculate the payback period of a project.

a) calculation of payback period :-

Profit before tax

Tax 50%

Profit after tax :

(+) Depreciation

$$(500,000 \times \frac{12}{100})$$

Annual cash flow

80,000

40,000

40,000

60,000

100,000

$$PBP = \frac{\text{Investment}}{\text{Annual cash flow}}$$

$$= \frac{500,000}{100,000}$$

= 5 years.

A. There are two projects X and Y. Each project requires an investment of ₹ 20,000. You are required to rank these projects according to payback method from the following information.

Net profit before depreciation & after tax.

Year	Project X (Rs)	Project Y (Rs)
1	1000	2000
2	2000	4000
3	4000	6000
4	5000	8000
5	8000	-

A) Project X is invested of Rupees 20,000.  
Payback period = 5 years.

$$\text{Annual cash inflow} = 1000 + 2000 + 4000 + 5000 + 8000 = 20,000$$

## Project y :-

PBP = 4 years.

$$\text{Annual cash inflow} = 2000 + 4000 + 6000 + 8000 = 20,000$$

Hence the project y should be preferred at the <sup>1<sup>st</sup></sup> rank.

5. A project cost ₹ 250000 and yields annually a profit of ₹ 50000 after depreciation at 12% p.a but before tax at 50%. Calculate the payback period.

A) profit before tax

(E) Tax @ 50%

(f) Depreciation @ 12

Annual cash inflow -

50,000
25,000
25,000
30,000
55,000

$$\begin{aligned} \text{PBP} &= \frac{250000}{55000} \\ &= 4.5 \text{ yrs} \end{aligned}$$

## Advantages of Payback period method :-

1. It is simple to understand and easy to calculate
2. It requires lesser time and labour cost as compared to the other methods.
3. It reduces the loss through obsolescence and it is more suitable to the developing countries like India.

## Disadvantages of Payback period method :-

1. It doesn't take into account the cash inflows earned after the payback period. Hence the profitability of the projects can't be assessed correctly.
2. This method ignores the time value of money.
3. It doesn't take into consideration the cost of capital.
4. It may be difficult to determine the minimum acceptable payback period.

## Accounting Rate of Return method:-

1. From the following information, you are required to calculate ARR. An investment costing rupees 20,00000, It is expected to produce the following profits.

year	1	2	3	4
profit	1,60,000	3,20,000	3,60,000	1,20,000

$$A) \text{ARR} = \frac{\text{Average Income}}{\text{Average Investment}} \times 100 \Rightarrow \frac{2,40,000}{1,00,000} \times 100 = 24\%$$

$$\text{Average income} = \frac{1,60,000 + 3,20,000 + 3,60,000 + 1,20,000}{4}$$

$$= \frac{9,60,000}{4} = 2,40,000.$$

$$\text{Average Investment} = \frac{20,00,000}{2} = 10,00,000.$$

2. A, B and C are the three projects. The projects are expected to each require ₹ 2,00,000 have an estimated life of 5 years, 4 years and 3 years respectively. The company required rate of return is 10%. The Anticipate cash flows after tax (CFAT) for three projects are as follows.

year	Project		
	A	B	C
1	50,000	80,000	100,000
2	50,000	80,000	100,000
3	50,000	80,000	100,000
4	50,000	30,000	-
5	1,90,000	-	-

rank in each project applying the method of average rate of return.

$$\text{Average Rate of Return} = \frac{\text{Average Income}}{\text{Average Investment}} \times 100.$$

Project A :-

$$\text{Average income} = 50,000 + 50,000 + 50,000 + 50,000 + 1,90,000 \\ = \frac{3,90,000}{5} = 78,000.$$

$$\text{Average investment} = \frac{500,000}{2} = 1,00,000$$

$$\text{Project A ARR} = \frac{78,000}{1,00,000} \times 100 = 78\%$$

Project B :-

$$\text{Average income} = \frac{8,70,000}{4} = 67,500$$

$$\text{Average investment} = 1,00,000$$

$$\text{Project B ARR} = \frac{67,500}{1,00,000} \times 100 = 67.5\%$$

Project C :-

$$\text{Average income} = \frac{10,000}{3} = 70,000$$

$$\text{Average investment} = 1,00,000$$

$$\text{Project C ARR} = \frac{70,000}{1,00,000} \times 100 = 70\%$$

Ranking the projects are preferred - project A is the first, project C is second and project B is third.

Advantages of ARR method :-

1. It is very simple to understand and easy to calculate.
2. It takes into consideration, the total earnings from the project during its entire economic life.
3. This approach gives weight to the profitability of the project.

Disadvantages of ARR method :-

1. This method also ignores the time value of money.

- It doesn't take into account the cash-flows, which are more important than the accounting profits.
- Under this method, longer the term of the project, greater is the risk involved.
- This method doesn't determine the fair rate of return on investment.

### Net present value method :-

The initial investment of ₹ 50,000, Estimated life of 5 years, Discount rate 10%. The profits before depreciation after tax. The profits (CFAT) are as follows.

Years	CFAT	Present value @ 10%
1	14,000	0.909
2	16,000	0.826
3	18,000	0.751
4	20,000	0.683
5	25,000	0.621

Calculate the net present value.

### Calculation of net present value, method :-

Year	CFAT	Present value @ 10%	Present value
1	14,000	0.909	12,726
2	16,000	0.826	13,216
3	18,000	0.751	13,518
4	20,000	0.683	13,660
5	25,000	0.621	15,525
		Total present value	68,645

$$NPV = \text{Total present value} - \text{Present value of initial Investment}$$

$$= 68,645 - 50,000 \Rightarrow 18,645$$

② From the following information of Rushi Private Limited. Suggest which of the machine to be purchased. Expected earnings after tax are given below. Each machine required investment of ₹1,00,000.

Years	Machine A Cash flows	Machine B Cash flows
0	400,000	400,000
1	40,000	1,20,000
2	1,20,000	1,160,000
3	160,000	2,00,000
4	2,40,000	1,20,000
5	1,60,000	88,000

cost of capital is 10%. Calculate the net present value and profitability index.

a) calculation of total present values

Year	Machine A Cash flow	PV @ 10%	Present value	Machine B Cash flow	PV @ 10%	Present value
1	40,000	0.909	36,360	1,20,000	0.909	1,09,080
2	1,20,000	0.826	99,120	1,160,000	0.826	1,32,160
3	1,60,000	0.751	1,20,160	2,00,000	0.751	1,50,200
4	2,40,000	0.683	1,63,920	1,20,000	0.683	81,960
5	1,60,000	0.621	99,360	88,000	0.621	54,680
		TPV	5,18,920		TPV	5,23,080

$$NPV = \text{Present value of cash inflow} - \text{Present value of cash outflow}$$

$$\text{Machine A } NPV = 5,18,920 - 4,00,000 = 1,18,920.$$

$$\text{Machine B } NPV = 5,23,080 - 4,00,000 = 1,23,080$$

$$PI = \frac{\text{Present Value of cash inflows}}{\text{present value of cash outflows}}$$

$$MA(PI) = \frac{5,18,920}{4,00,000} = 1.2973$$

$$\text{Machine B (PI)} = \frac{5,23,080}{4,00,000} = 1.3077$$

③ From the following information, calculate the NPV of the two projects and suggest which of the two projects should be accepted, a discount rate of 10%.

particulars	project - X	project - Y
Investment	20,000	20,000
Estimated life	5 years	5 years
Scrap value	1000	2000

The profit before depreciation and after tax (CFAD) as follows.

year	project X	project Y
1	5000	20,000
2	10,000	10,000
3	10,000	5,000
4	3000	3000
5	2000	2,000

A) Calculation of NPV

Year

$$2020-1 - \frac{2023}{2024} = 14.00$$

$$2020-1 - \frac{2020}{2024} = 19.00$$

Year	Project X	DF@ 10%	Present Value	Project Y	DF@ 10%	Present Value
1	5000	0.909	4,545	20,000	0.909	18,180
2	10,000	0.826	8,260	10,000	0.826	8,260
3	10,000	0.751	7,510	5000	0.751	3,755
4	3000	0.683	2,049	3000	0.683	2,049
5	2000	0.621	1,242	2000	0.621	1,242
5 (sum) v)	1000	0.621	621	2000	0.621	1,242
			24,227			34,728

NPV = Present value of cash flow - present value of outflow

$$\text{Project X} = 24,227 - 20,000 = 4,227$$

$$\text{Project Y} = 34,728 - 30,000 = 4,728.$$

Acceptance rule:-

Net present value of project 'Y' is higher than the of project 'X' and hence the project 'Y' is to be selected.

- ④ A company is apprising ten two projects A & B, The cash flows for project A is ₹ 5000 & for project B is ₹ 4,750. Both projects have an initial Capital investment of ₹ 4,750 each. Calculate the PI for both projects and determine whether or not to invest in the projects.

~~⑤  $\text{PI} = \frac{\text{Present value of cash inflows}}{\text{Present value of cash outflows}}$~~

$$\text{Project A PI} = \frac{5000}{4750} = 1.0526$$

$$\text{Project B PI} = \frac{4750}{4750} = 1.0211$$

Both projects have a profitability index (PI) > 1. ~~so we can accept both projects, most preferable to accept the project with the largest PI that is Project A.~~

## Advantages of NPK method :-

- It recognises the time value of money.
- This method is suitable to uniform cash outflows and uneven cash inflows at different periods of time.
- This method is useful for best decision criteria for mutually exclusive projects.
- It takes into consideration the objective of maximum profitability.

## Disadvantages :-

- As compared to the traditional methods, the net present value method is more difficult to calculate and operate.
- It is not easy to determine an appropriate discount factor.
- It doesn't give solutions, when the comparable projects are involved in different amounts of investment.

## Advantages of PI method :-

- PI method of evaluating a proposal has following advantages.
- 1. Time value of money is taken into consideration.
- 2. It is the cash flows generated during the entire life of the project are taken for analysis purpose.
- 3. It consider the exact rate of return relating to the project.
- 4. It is the objective of maximization of the shareholders wealth.

## Disadvantages :-

- 1. To determine discount rate not easy under this method.
- 2. To calculate profitability index is difficult in respect of two projects, which have different economic life.

## Capital Rationing :-

Capital Rationing is a limiting factor, it occurs at any time due to lack of funds or insufficient capital to implement by investment proposals. The following steps should be considered.

1. Application of any one of the discounted cash flow methods.
2. Arranging the projects in descending order of profitability.
3. Selecting the project based on the availability of capital.

## Acceptance Rules:-

Discounting cash flow methods under 3.

$$NPV \geq 0$$

$$IRR \geq K \text{ (cost of capital)}$$

$$PI \geq 1$$

Short:-

## Risk Analysis in Capital Budgeting:-

All the techniques of Capital Budgeting require the estimation of future cash inflows and outflows. The future cash flows are estimated, based on the following factors

1. Expected economic life of the project.
2. Capacity of the project.
3. Selling price of the project.
4. Production cost.
5. Depreciation rate.
6. Rate of taxation.
7. Future Demand of the project etc...

It is the most difficult task while making an investment decision. The following methods are suggested for accounting for risk in Capital Budgeting.

1. Accounting for Risk in Capital Ex.
2. Sensitivity technique.
3. Probability technique.

- 3. standard deviation method.
- 4. Co-efficient of various method.
- 5. Decision tree Analysis. etc...

~~Henry  
05/02/25~~