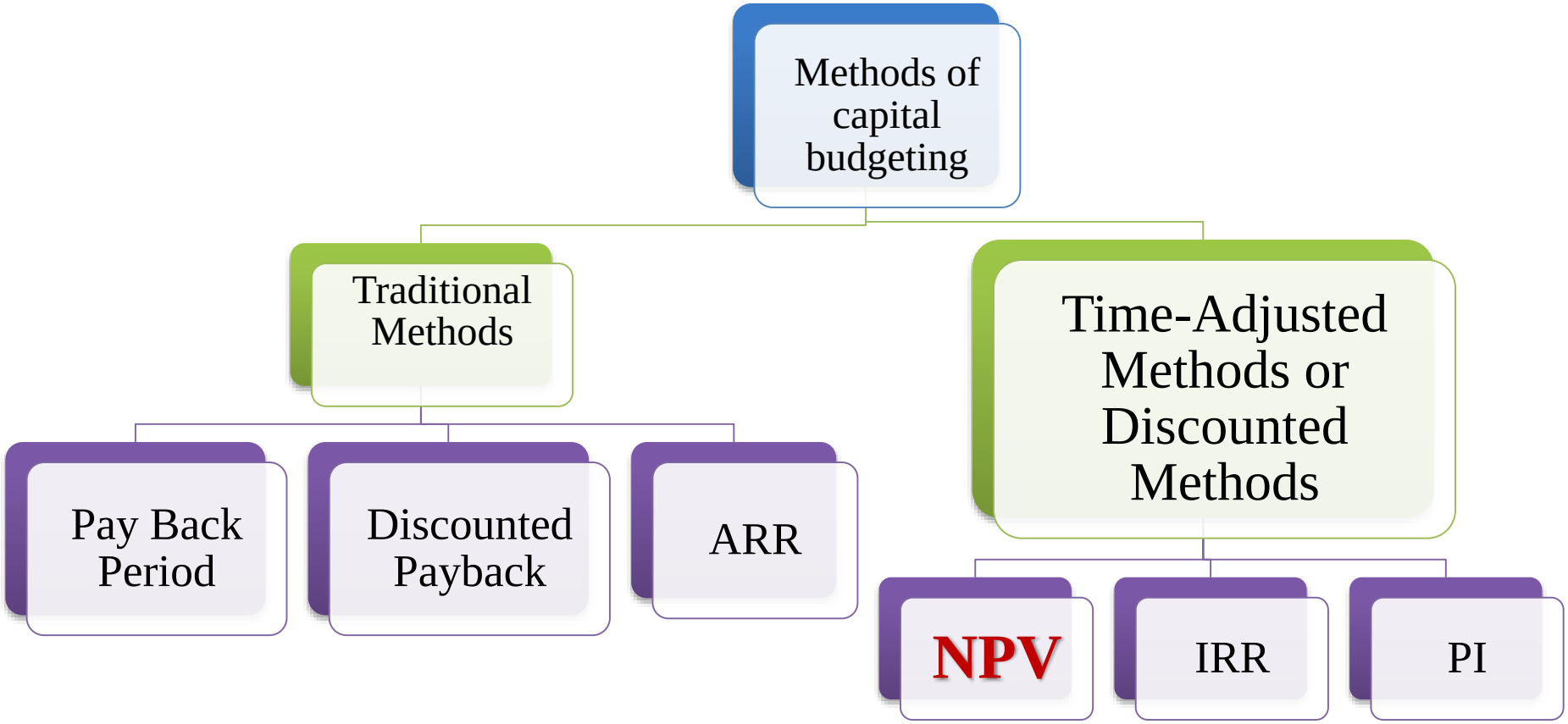
FINANCIAL MANAGEMENT

Net Present Value Method (NPV)

Capital budgeting

Capital budgeting (or investment appraisal) is the process of determining the viability to long-term investments on purchase or replacement of property plant and equipment, new product line or other projects.

Methods of capital budgeting



Discounted Capital Budgeting Methods

- Modern Methods
- Considers Time vale of money

- The main DCF techniques for capital budgeting
  - Net Present Value (NPV),
  - Internal Rate of Return (IRR),
  - Profitability Index (PI)

Net Present Value Method

- Cash flows of the investment project should are forecasted based on realistic assumptions.
- Appropriate discount rate are identified to discount the forecasted cash flows.
- Present value of cash flows is calculated using the opportunity cost of capital as the discount rate.

- Net present value should be found out by subtracting present value of cash outflows from present value of cash inflows.
- NPV = PVinflows – Pvoutflows
- The project should be accepted if NPV is positive (i.e., NPV > 0).

Acceptance Rule

- Accept the project when NPV is positive
  NPV > 0
- Reject the project when NPV is negative
  NPV < 0
- May accept the project when NPV is zero
  NPV = 0

When cash inflows are even:

NPV = C * (PVF) -i

In the above formula,

C is the cash inflow expected to be received each period;

PVF is the Present value factor

i is the initial investment

Calculate the net present value of a project which requires an initial investment of Rs:243,000 and it is expected to generate a cash inflow of Rs:50,000 each month for 12 months. Assume that the salvage value of the project is zero. The target rate of return is 12% per annum.

Solution

We have,

Initial Investment	= Rs: 243,000
Net Cash Inflow per Period	= Rs:50,000
Number of Periods	= 12
Discount Rate per Period	= 12% ÷ 12 = 1%

Solution

Net Present Value

=C * PVF- i

= 50,000 × 11.255 − 243,000

= 562,750 − 243,000

= 319,750

Equipment A has a cost of Rs:75,000 and net cash flow of Rs:20,000 per year, for six years. A substitute equipment B would cost Rs:50,000 and generate net cash flow of Rs:14,000 per year for six years. The required rate of return of both equipment's is 11 %. Calculate NPV.

Which equipment should Be accepted and Why?

Solution

Equipment A

NPV= C *PVF –Initial Invst.

NPV = 20,000 * 4.2305 – 75,000 = 9610

Equipment B

NPV= C *PVF –Initial Invst.

NPV = 14,000 * 4.2305 – 50,000 = 9227

Equipment A is Accepted

When cash flows are uneven

- The formula for the net present value can be written as follows:

$$\text{NPV} = \left[\frac{C_1}{(1+k)} + \frac{C_2}{(1+k)^2} + \frac{C_3}{(1+k)^3} + \cdots + \frac{C_n}{(1+k)^n} \right] - C_0$$

$$\text{NPV} = \sum_{t=1}^{n} \frac{C_t}{(1+k)^t} - C_0$$

Where as

$C_1, C_2 \ldots C_n$ *represents net cash inflow for year 1,2….n*

K *is the opportunity cost of capital*

C_0 *is the initial investment*

n *is the expected life of investment*

Assume that Project *X* costs Rs 2,500 now and is expected to generate year-end cash inflows of Rs 900, Rs 800, Rs 700, Rs 600 and Rs 500 in years 1 through 5. The opportunity cost of the capital may be assumed to be 10 per cent.

Solution

$$NPV = \frac{Rs\ 900}{(1+0.10)^1} + \frac{Rs\ 800}{(1+0.10)^2} + \frac{Rs\ 700}{(1+0.10)^3} + \frac{Rs\ 600}{(1+0.10)^4} + \frac{Rs\ 500}{(1+0.10)^5} - Rs\ 2{,}500$$

$$= [Rs\ 900(PVF_{1,\,0.10}) + Rs\ 800(PVF_{2,\,0.10}) + Rs\ 700(PVF_{3,\,0.10} + Rs\ 600(PVF_{4,\,0.10}) + Rs\ 500(PVF_{5,\,0.10})] - Rs\ 2{,}500$$

$$= [Rs\ 900 \times 0.909 + Rs\ 800 \times 0.826 + Rs\ 700 \times 0.751 + Rs\ 600 \times 0.683 + Rs\ 500 \times 0.620] - Rs\ 2{,}500$$

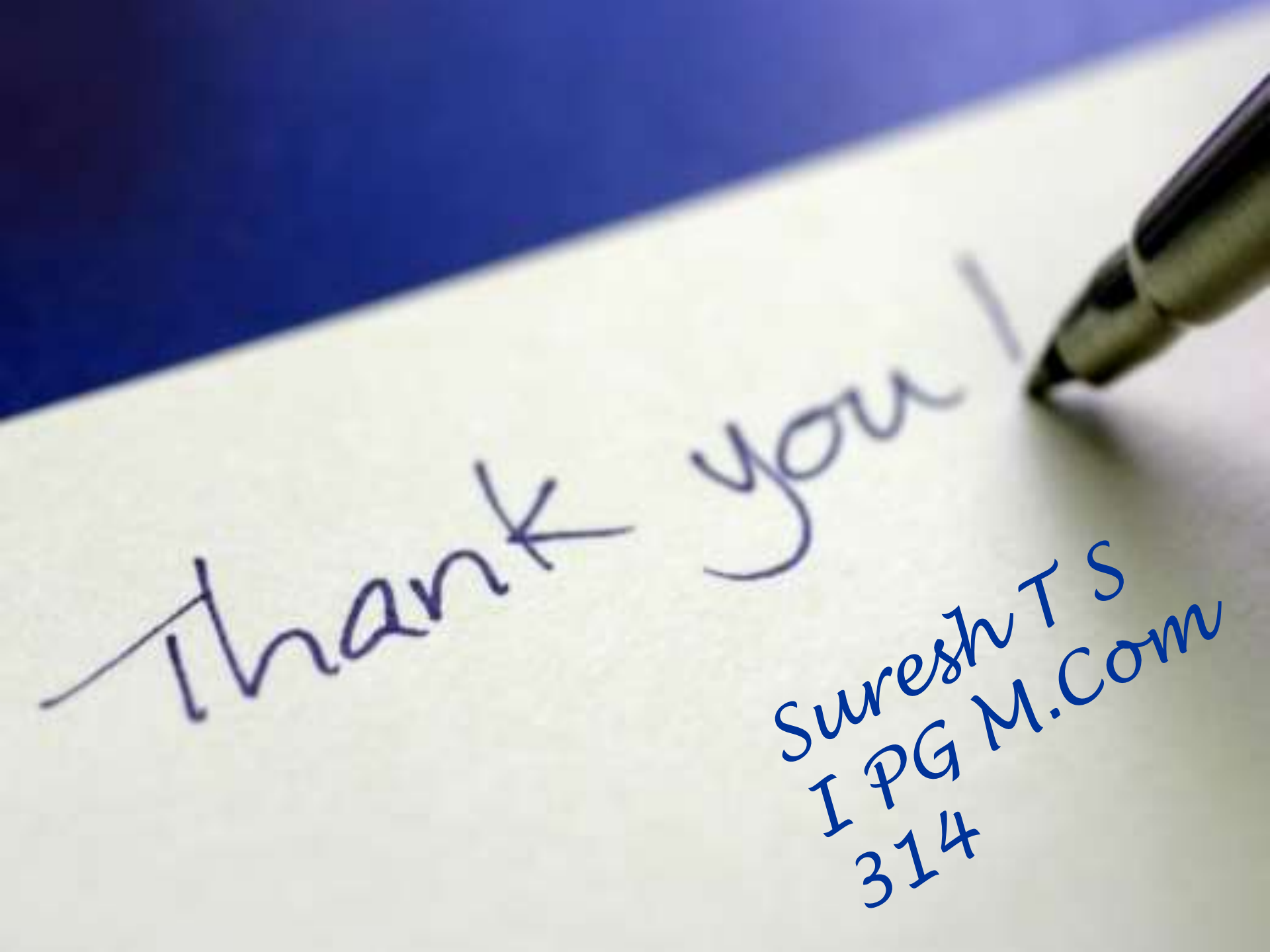
$$= Rs\ 2{,}725 - Rs\ 2{,}500 = +Rs\ 225$$

Merits of the NPV Method

- Time value of money
- Timings and the amounts of cash flows
- Measure of true profitability
- Value-additivity
- Shareholder value

Demerits of the NPV Method

- More difficult to calculate
- Involved cash flow estimation may not be true
- Discount rate difficult to determine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