PROJECT APPRAISAL/TERM LOAN APPRAISAL

🏦 11.4 Capital Budgeting

- Capital budgeting is the process that **companies use to evaluate and select long-term investment projects**, such as purchasing new machinery, expanding operations, or launching new products.
- It involves assessing potential expenditures that require significant capital outlays and **determining their profitability and feasibility over time.**

Time Value of Money - Discounting Technique

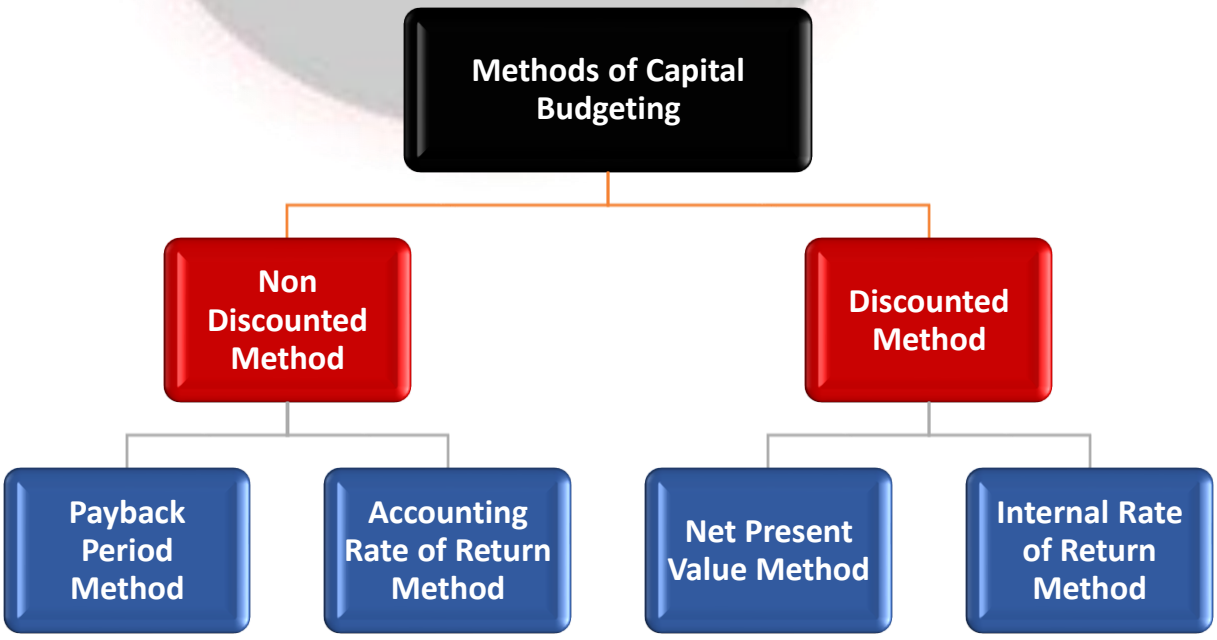
✔ **Money today is worth more than the same amount in the future.**

✔ **A rupee today can be invested to earn interest, making it more valuable than a rupee received later.**

✔ **Capital budgeting techniques must consider the time value of money to make accurate investment decisions.**

📌 Key Concepts: Time Value of Money

📜 Concept	✅ Definition
📅 Future Value (FV)	Value of money at a future date.
💰 Present Value (PV)	Value today of a future cash flow.
📉 Discounting	Converts future money into its present value.
📊 Discount Factor (DF)	A multiplier used to find PV from FV.



📌 11.4.1 Payback Period Method

✔ **Measures the time required to recover the initial investment.**

✔ **Formula:**

📉 **Payback Period = Initial Investment / Annual Cash Inflow**

✔ **Shorter payback period = Better project** ✅

📌 **Example 1:**

A project with an **initial investment of ₹1,000 lakh** has the following cash inflows:

📅 Year	💰 Annual Cash Inflow (₹ lakh)	📊 Cumulative Cash Inflow (₹ lakh)
1	100	100
2	150	250
3	250	500

4	300	800
5	200	**1000**
6	200	**1200**

📌 Example 2: Comparing Two Projects

📅 Year	📊 Project A (Cash Flow ₹ lakh)	📊 Project B (Cash Flow ₹ lakh)
1	200	100
2	300	200
3	500	200
4	**Nil**	300
5	**Nil**	200
6	**Nil**	250
7	**Nil**	200
8	**Nil**	150

✔️ Payback Period:

- **Project A: 3 Years (Shorter Payback Period)** ✅
- **Project B: 5 Years (Longer Payback, but earns beyond payback period)** ✅

📌 **Limitations of Payback Period Method:**

❌ Ignores **cash flows after payback period**.

❌ **Does not consider the time value of money**.

CASE STUDY

Company A is evaluating two potential projects, Project X and Project Y, using the Payback Period Method. The details are as follows:

Project X.

- Initial Investment: $150,000
- Annual Cash Inflow: $30,000

Project Y:

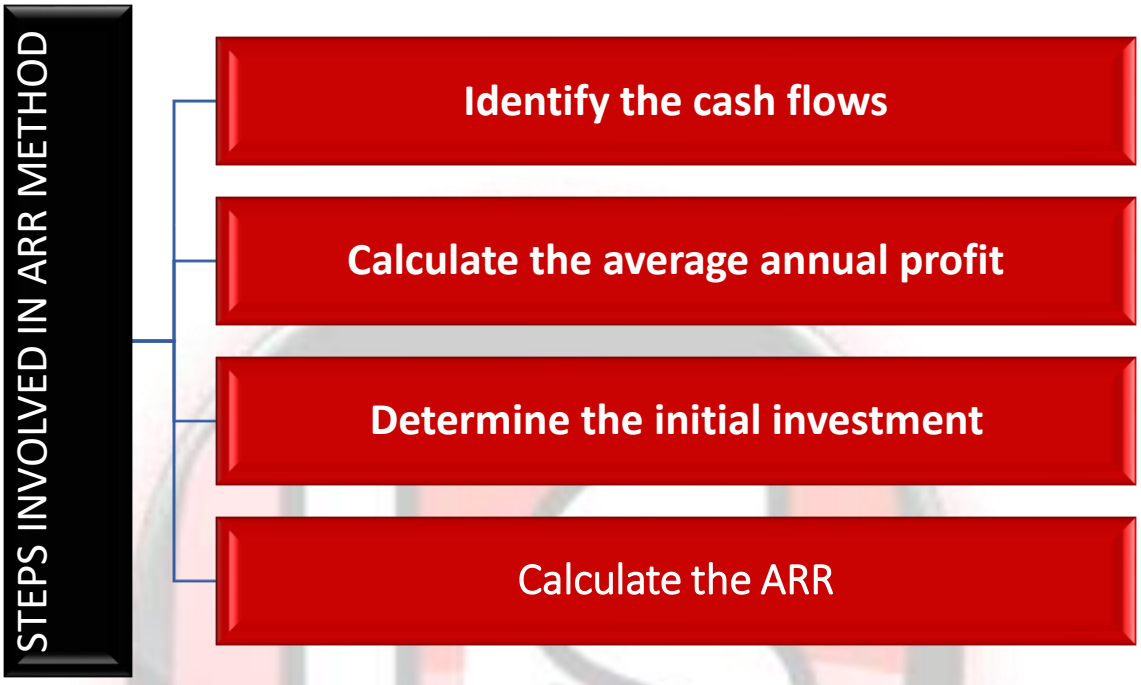
- Initial Investment: $200,000
- Annual Cash Inflow: $50,000

Which project would be selected, and what is the payback period for the chosen project?

ACCOUNTING RATE OF RETURN METHOD (ARR)

- It calculates the **average annual profit** generated by the project as a **percentage of the initial investment**.
- The ARR method provides a simple measure of **profitability by comparing** the **average annual profit to the initial investment**.

- It does **not consider the time value of money** or the project's cash flows beyond the average annual profit.



Investment Decision

Under this method, a project will be accepted **if its Accounting Rate of Return is higher** than the **Minimum rate of return** set by the management.

📌 Example: Comparing Three Projects

📜 Project	📊 Net Operating Profit (₹ lakh)	📈 Original Investment (₹ lakh)	📊 ARR (%)
Project A	300	2,000	**15%**
Project B	300	2,000	**15%**

Project C	300	2,000	**15%**

✔ **ARR is the same for all projects** despite different cash flow distributions.

✔ **ARR does not consider the timing of cash inflows**.

A Company purchases a machine of 100000 having life of 5 years. It is expected that it will generate profit as follows: calculate Average rate of return.

Year	Profit After Tax
1	40000
2	30000
3	50000
4	25000

a) 25.25 %
b) 30.25%
c) 32.25%
d) 36.25%

SOLUTION

$$ARR = \frac{\text{Average profit after tax}}{\text{Initial Investment}}$$

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Net Present Value (NPV) Method

✔ **NPV helps evaluate investment decisions by considering the time value of money**.

✔ **Cash flows are discounted** to their present value using a **predetermined discount rate**.

✔ **NPV Formula:**

📊 **NPV = Σ (Cash Flow at Year t / (1 + Discount Rate)^t) - Initial Investment**

Where:

✔ **Cash Flow at Year t** = Net cash inflow or outflow in year t

✔ **Discount Rate** = Expected return or cost of capital

✔ **t** = Time period (years)

📌 Decision Rule:

✔ **NPV > 0:** Accept the project (Profitable) ✅

✔ **NPV = 0:** Break-even (No loss, no gain) 📊

✔ **NPV < 0:** Reject the project (Loss-making) ❌

A company purchases a machine it will cost 20000 and will produce a cash inflow of 7000 ,7500,8000 for next 3 years. What is the NPV if he discounts rate is 10%?

Solution

No. of years	Cash Inflow(X)	PVIF $1/(1+i)^n$ (Y)			P. V(X*Y)
0	20000	1	-	-	-20000
1	7000	$\frac{1}{(1+0.10)^1}$	$\frac{1}{1.10}$	0.909	6363
2	7500	$\frac{1}{(1+0.10)^2}$	$\frac{1}{1.21}$	0.826	6195
3	8000	$\frac{1}{(1+0.10)^3}$	$\frac{1}{1.33}$	0.751	6008

NPV = Sum of (Present Value of Cash Flow) - Initial Investment

A manufacturing company is considering investing in new machinery. The cost of the machinery is 600,000, and it is expected to generate cash inflows of 200,000 per year for the next 5 years. The company's required rate of return is 12%. Calculate the NPV of the investment and advise the company on whether it should proceed with the purchase.

a) 119696
b) 120569
c) 125364
d) 124536

Solution

$$Present\ value = C\left[\frac{(1+r)^n - 1}{r(1+r)^n}\right]$$

NPV = Sum of (Present Value of Cash Flow) - Initial Investment

📌 Limitations of NPV Method

❌ **NPV cannot compare projects with different investment amounts.**

❌ **Difficult to estimate future cash flows accurately.**

❌ **Discount rate selection impacts NPV calculations.**

Profitability Index (PI) – Adjusted NPV Comparison

✔ **PI solves the limitation of NPV when comparing projects of different sizes.**

✔ **Formula:**

📊 **PI = Present Value of Cash Inflows / Present Value of Cash Outflows**

- **If PI > 1 → The project is profitable (Accept).**
- **If PI < 1 → The project loses value (Reject).**

📌 Example: Comparing Projects X & Y Using PI

📜 Factor	📊 Project X (₹ lakh)	📊 Project Y (₹ lakh)
Present Value of Investment	-5,000	-10,000
Present Value of Cash Inflows	6,000	11,000
Net Present Value (NPV)	1,000	1,000
Profitability Index (PI)	**6,000 ÷ 5,000 = 1.20** ✅	**11,000 ÷ 10,000 = 1.10** ❌

✔ **Project X has a higher PI (1.20 vs. 1.10), so it is the better investment.** ✅

NPV & Profitability Index

📌 Metric	✅ Key Takeaways	🏦 Example

📊 **Net Present Value (NPV)**	Measures absolute profitability of an investment.	**Project A NPV = ₹2,595, so it's viable.**
📈 **Profitability Index (PI)**	Measures relative profitability when comparing projects of different sizes.	**Project X (PI = 1.20) is better than Project Y (PI = 1.10).**
⚠️ **NPV Limitation**	Cannot compare projects with different investment outlays.	**Two projects with equal NPV may have different investment sizes.**
📉 **Impact of Timing on NPV**	**Earlier cash inflows increase NPV.**	**Project A earns more in early years, so it has a higher NPV.**
📊 **Discount Rate Sensitivity**	**Higher discount rates lower NPV.**	**A 15% discount rate reduces future cash values more than 10%.**

🏦 Benefit-Cost Ratio (BCR)

✔ **BCR compares the total benefits of a project against its total costs, both discounted to present value.**

✔ **Higher BCR = Better investment.**

BCR > 1 → The project is **profitable** (benefits exceed costs) → **Accept**

BCR < 1 → The project is **not viable** (costs exceed benefits) → **Reject**

📌 **Formula:**

📊 **BCR = Present Value of Benefits (PVB) / Initial Investment (I)**

📊 **Net Benefit-Cost Ratio (NBCR) = (PVB - Initial Investment) / Initial Investment**

✔ **Decision Rule:**

📊 BCR	✅ Decision
> 1	Accept (Profitable) ✅
= 1	Indifferent 📊
< 1	Reject (Loss-making) ❌

📌 **Example:**

A project with **₹1,00,000 initial investment** yields benefits:

Year	Benefit (₹)	Discount Factor (12%)	Discounted Benefit (₹)
1	25,000	0.893	22,325
2	40,000	0.797	31,880
3	40,000	0.712	28,480
4	50,000	0.636	31,800

SOLUTION

BCR = Present Value of Benefits (PVB) / Initial Investment (

Net Benefit-Cost Ratio (NBCR) = (PVB - Initial Investment) / Initial Investment

Since **BCR > 1**, the project is **profitable**.

11.4.6 Data Needed for NPV & IRR Calculation

To compute NPV & IRR, the following data is required:

Factor	Key Considerations
Life of the Project	Estimated economic lifespan.

📜 Factor	✅ Key Considerations
💰 **Cash Outflows**	Initial investment, capital & working capital costs.
📈 **Cash Inflows**	Expected revenue & cost savings.
🏢 **Residual Value**	Salvage value at project end.
📉 **Net Cash Receipts**	Cash inflows minus outflows.
📊 **Discount Rate (Cut-off Rate)**	Minimum acceptable return or cost of capital.

📌 Life of the Project

✔️ Determined by:

- 🔹 Physical life (wear & tear).
- 🔹 Technological obsolescence.
- 🔹 Market demand changes.

📌 Typical project lifespans:

🏭 Industry	📅 Project Life (Years)
Manufacturing	12-15
IT & Electronics	5-10

Hotel Industry	25+
Infrastructure (Dams, Roads, etc.)	40-50

Cash Outflows & Working Capital Needs

- ✔ **Includes both fixed & operational costs:**
  - **Fixed Costs:** Land, buildings, machinery 🏗️
  - **Working Capital:** Inventory, salaries, utilities 📊

📌 **Implementation Period:**

- ✔ **Year 0 = Construction phase (No revenue).**
- ✔ **Revenue starts post-implementation.**

Cash Inflows & Residual Value

- ✔ **Cash inflows = Revenue + Cost Savings.**
- ✔ **Residual value = Asset value at project end.**

📌 Net Cash Receipts & IRR Calculation

✔ **Net Cash Receipt = Cash Inflows - Cash Outflows.**

INTERNAL RATE OF RETURN METHOD

Internal Rate of Return **represents the discount rate** at which the net present value (NPV) of an investment becomes zero.

- The IRR method **considers the time value of money** by discounting future cash flows to their present value.
- If the **IRR is greater than the cost of capital**, then the project should be undertaken otherwise not.

$$IRR = r_a + \frac{NPV_a}{NPV_a - NPV_b}(r_b - r_a)$$

Explanation

r_a=Lower discount rate

r_b=higher discount rate

NPV_a=NPV at lower discount rate

NPV_b=NPV at higher discount rate

Q:1 A company invests in Infrastructure Project and its Net present value at 10% is 50000 and 12% (-)20000. calculate IRR for this project.

Solution

r_a= 10 % r_b=12 % NPV_a=50000 NPV_b=-25000

$$IRR = r_a + \frac{NPV_a}{NPV_a - NPV_b}(r_b - r_a), = 10 + \frac{50000}{50000-(-20000)}(12 - 10)$$

$$IRR = 10 + \frac{50000}{70000}(2), = 10 + 1.42 = 11.42\ \%$$

RBI Guidelines for Financing Infrastructure Projects

✔ **Infrastructure lending** refers to **credit facilities extended by banks & financial institutions** to finance projects in **government-notified infrastructure sub-sectors**.

✔ **RBI guidelines ensure structured financing & risk management** in these projects.

📌 **Key Components of Infrastructure Financing:**

- **Project Viability Assessment** 📊
- **Risk Management & Due Diligence** ⚠️
- **Special Purpose Vehicles (SPVs) for Private Sector Projects**

- **Consortium Lending & Syndicated Loans**
- **Take-Out Financing for Asset-Liability Management**

Criteria for Financing Infrastructure Projects

Banks & Financial Institutions (FIs) can finance projects that are:

- **Technically Feasible**
- **Financially Viable**
- **Bankable & Low-Risk**

Key RBI Conditions:

Condition	Requirement
Prudential Exposure Norms	Loans must comply with **RBI's exposure limits for infrastructure financing**.
Expertise in Project Appraisal	Banks/FIs must have **specialized teams** for evaluating **technical feasibility & risk assessment**.
Lending to SPVs	Banks can lend to **Special Purpose Vehicles (SPVs) in the private sector** if they are:

- **Legally registered under the Companies Act** 📜
- **Undertaking financially viable infrastructure projects** ✅
- **Not acting as financial intermediaries** 🚫 |

Infrastructure Project Appraisal

✔ **Banks & FIs must conduct a comprehensive due diligence process before financing infrastructure projects.**

📌 **Key Areas of Appraisal:**

📜 **Aspect**	✅ **Evaluation Criteria**
📈 **Viability Assessment**	Ensuring **revenue generation** covers financing costs.
⚠ **Risk Mitigation**	Identifying & managing **project risks** (construction delays, cost overruns, regulatory hurdles).
🏗 **Role of State Guarantees**	State government guarantees **cannot replace thorough credit assessment**.
🏢 **SPV Financing Considerations**	Assessing **contractual obligations & creditworthiness** of project sponsors.

🤝 **Joint Financing & Consortium Lending**	Large projects often require **multiple banks/FIs to share risks**.

📌 **SPV-Financed Projects: Special Considerations**

✔ **SPVs reduce risks by separating project liabilities from parent companies**.

✔ **Risk mitigation through contractual obligations of involved entities**.

📌 Take-Out Financing Arrangements

✔ **Take-out financing helps banks manage long-term infrastructure loans efficiently** by transferring loan exposure to specialized financial institutions like IDFC or SBI.

✔ **This mechanism prevents asset-liability mismatches & liquidity issues.**

📌 **Key Features of Take-Out Financing:**

📜 **Feature**	✅ **Description**

Loan Transfer Agreement	Banks agree to transfer loans after a **pre-determined period**.
Managed by Institutions like IDFC & SBI	IDFC/SBI take over the loan, reducing bank exposure.
Reduces Risk for Banks	Prevents **long-term exposure mismatches** in infrastructure lending.
Model Agreement for Banks	SBI & IDFC provide a reference **agreement template** for take-out financing.