

Introduction to Finance

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MGM237

Lecture 7



Introduction To Finance

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MGM237 Capital Budgeting

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Chapter

07

Capital Budgeting





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Capital Budgeting

- **Introduction to Capital Budgeting.**
- **Objectives of Capital Budgeting.**
- **The Capital Budgeting Process.**
- **Importance of Capital Budgeting Decisions.**
- **Capital Budgeting Methods.**

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Introduction to Capital Budgeting

Definition of Capital Budgeting

- **Capital Budgeting** is the process by which a business evaluates and selects long-term investment projects. It involves analyzing potential expenditures or investments that are significant in amount, such as purchasing new equipment, expanding operations, or launching new products.
- It assesses the **expected cash inflows and outflows** of a project to determine its profitability and feasibility over time.
- The goal is to allocate resources to projects that will maximize the firm's **value** and contribute to its strategic objectives.



Introduction to Capital Budgeting

Importance in Financial Management

- **Strategic Decision-Making:** Capital budgeting decisions shape the future direction of a company by determining which projects will be pursued.
- **Efficient Resource Allocation:** It ensures that limited financial resources are invested in projects with the highest potential returns.
- **Long-Term Impact:** These investments often have implications that extend over several years, affecting the company's growth and sustainability.



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Introduction to Capital Budgeting

- Risk Assessment:** Through rigorous evaluation, capital budgeting helps identify potential risks and uncertainties associated with a project.
- Maximizing Shareholder Wealth:** By selecting value-enhancing projects, companies can increase profitability and, consequently, shareholder value.
- Financial Planning:** It aids in forecasting future financial needs and cash flow management, ensuring the company remains financially stable while undertaking new investments.



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Objectives of Capital Budgeting

Maximizing Shareholder Value

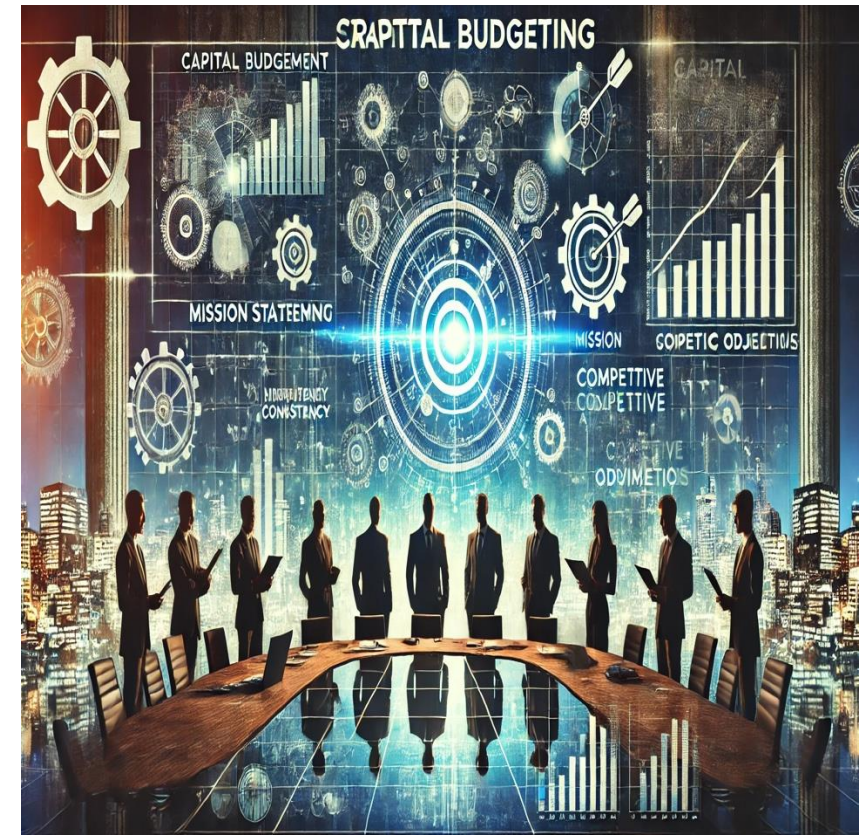
- **Primary Goal:** The foremost objective of capital budgeting is to invest in projects that increase the company's value and, consequently, enhance shareholder wealth.
- **Profit Generation:** By selecting profitable projects, companies can ensure higher returns on investment, leading to increased earnings per share.
- **Sustainable Growth:** Strategic investments contribute to the long-term growth and stability of the company, benefiting shareholders over time.



Objectives of Capital Budgeting

Strategic Alignment with Company Goals

- **Mission Consistency:** Capital budgeting decisions should align with the company's mission and long-term vision.
- **Competitive Advantage:** Investing in projects that support strategic objectives can provide a competitive edge in the market.
- **Resource Optimization:** Ensures that limited financial resources are allocated to projects that best support the company's strategic priorities.

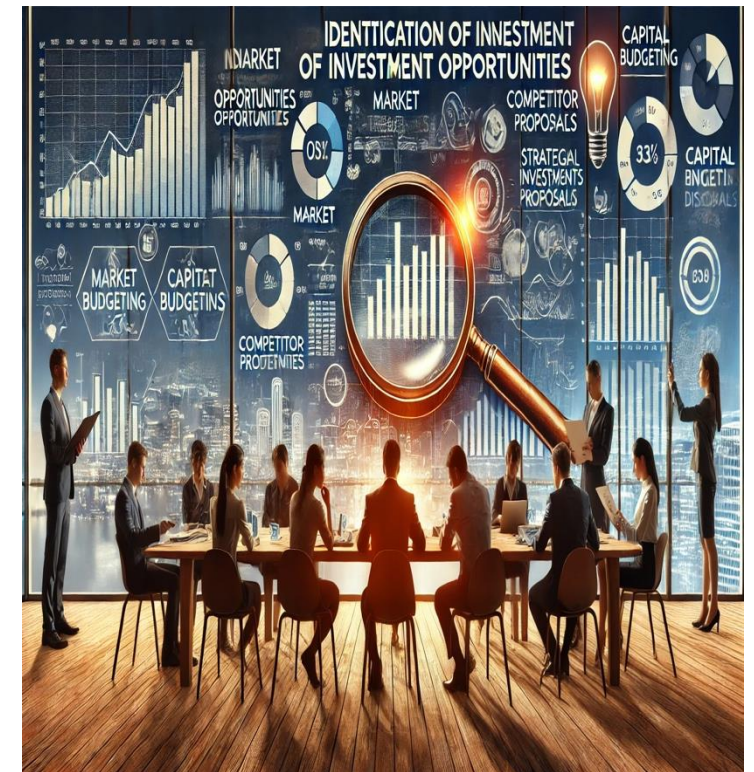


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The Capital Budgeting Process

Identification of Investment Opportunities

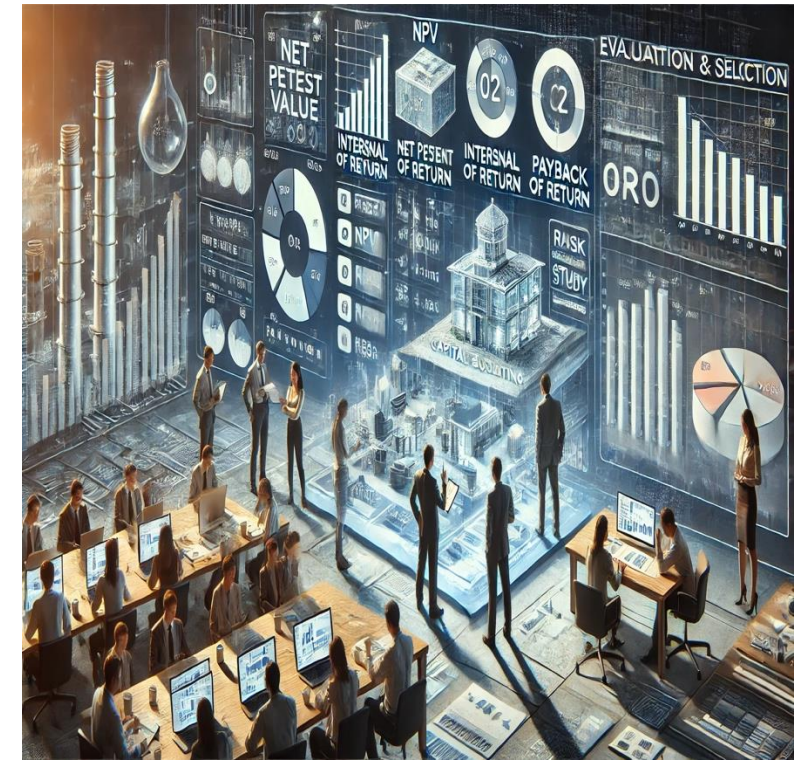
- **Market Research:** Analyzing market trends to spot potential areas for investment.
- **Internal Proposals:** Encouraging departments to propose projects that could improve operations or profitability.
- **Benchmarking:** Looking at competitors and industry leaders to identify successful investment areas.



The Capital Budgeting Process

Evaluation and Selection of Projects

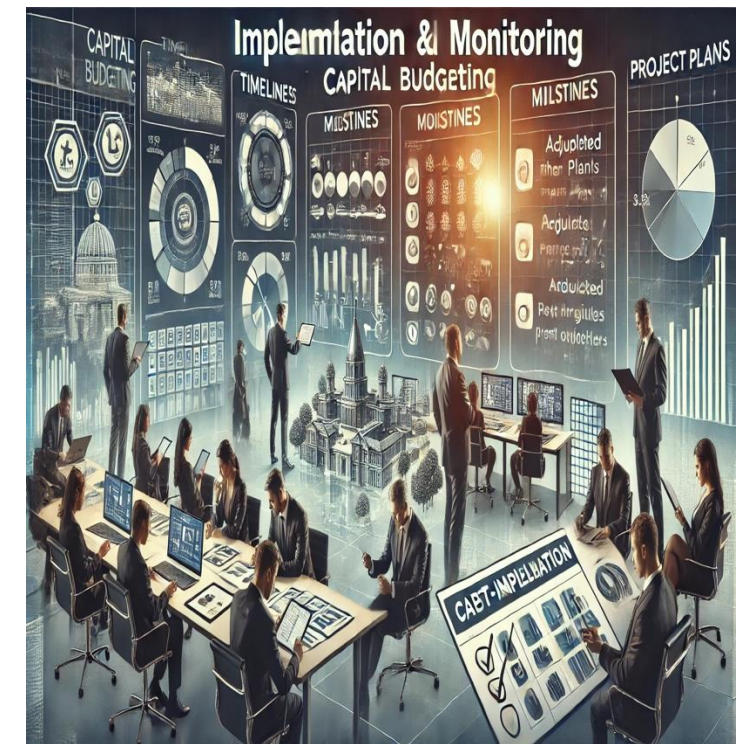
- **Financial Analysis:** Assessing projects using financial metrics like NPV, IRR, and payback period.
- **Risk Assessment:** Evaluating the uncertainties and potential risks associated with each project.
- **Feasibility Studies:** Conducting detailed analyses to determine the practicality and potential success of projects.
- **Ranking and Selection:** Prioritizing projects based on strategic fit, potential returns, and risk levels.



The Capital Budgeting Process

Implementation and Monitoring

- **Project Planning:** Developing detailed implementation plans with timelines and milestones.
- **Resource Allocation:** Assigning budgets, personnel, and other resources necessary for project execution.
- **Performance Tracking:** Monitoring progress against plans and making adjustments as needed.
- **Post-Implementation Review:** Evaluating the outcomes to learn and improve future capital budgeting processes.



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Types of Capital Projects

Project Types

Replacement Projects

Aim to enhance efficiency by upgrading outdated assets and technology.

New Venture Projects

Encourage innovation and diversification by exploring new products and markets.

Expansion Projects

Focus on growing operations and market reach through new facilities and locations.

Regulatory Compliance Projects

Ensure adherence to regulations, enhancing reputation and stakeholder relations.



Types of Capital Projects

Expansion Projects

• **Objective:** To grow the company's operations, production capacity, or market reach.

• **Examples:**

- Building new manufacturing facilities.
- Opening new retail locations.
- Expanding into international markets.

• **Benefits:**

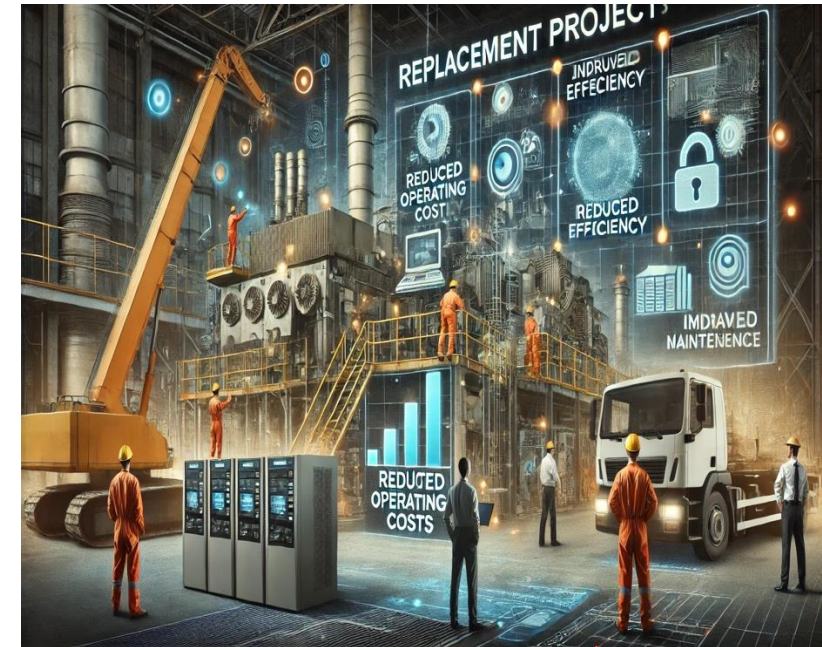
- Increased revenues and market share.
- Economies of scale.



Types of Capital Projects

Replacement Projects

- **Objective:** To replace old or obsolete assets with newer, more efficient ones.
- **Examples:**
 - Upgrading machinery and equipment.
 - Replacing outdated technology systems.
- **Benefits:**
 - Reduced operating costs.
 - Improved efficiency and productivity.
 - Lower maintenance expenses.



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Types of Capital Projects

New Venture Projects

- **Objective:** To diversify or innovate by entering new business areas or developing new products.
- **Examples:**
 - Launching a new product line.
 - Investing in research and development.
 - Entering into joint ventures or partnerships.
- **Benefits:**
 - Access to new markets and customers.
 - Potential for high returns.
 - Staying ahead of industry trends.



Regulatory Compliance Projects

- **Objective:** To comply with laws, regulations, or industry standards.
- **Examples:**
 - Implementing environmental control systems.
 - Upgrading safety equipment to meet new regulations.
 - Ensuring data protection compliance.
- **Benefits:**
 - Avoidance of legal penalties and fines.
 - Enhanced corporate reputation.
 - Improved stakeholder relations.



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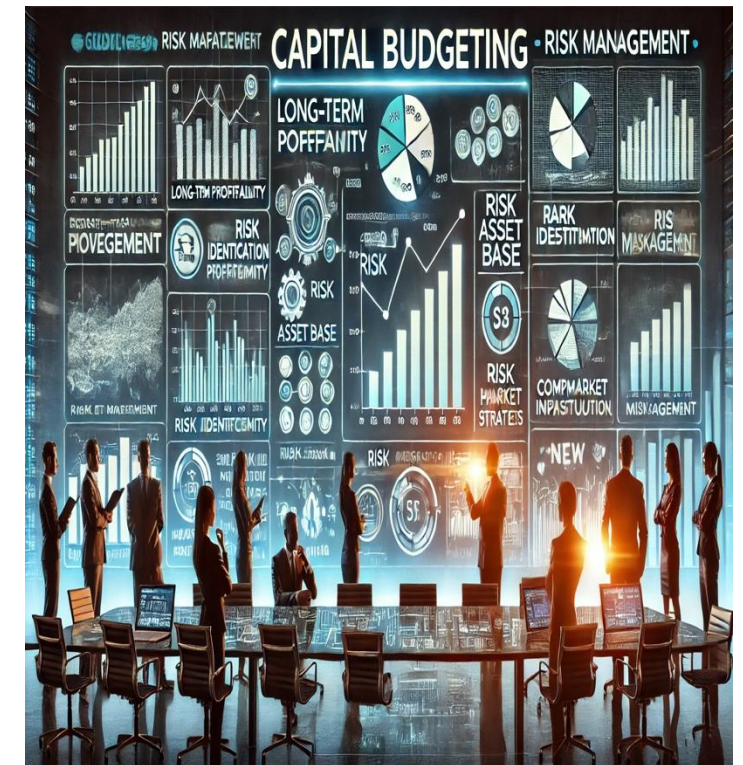
Importance of Capital Budgeting Decisions

Long-Term Profitability Impact

- **Strategic Growth:** Capital budgeting decisions shape the company's future earnings and growth trajectory.
- **Asset Base Enhancement:** Investing in productive assets increases the company's capacity to generate profits.
- **Market Position:** Wise investment decisions can strengthen the company's market position and competitiveness.

Risk Management

- **Identifying Risks:** Early identification of potential risks associated with investments helps in making informed decisions.



Importance of Capital Budgeting Decisions

- **Mitigation Strategies:** Allows the company to develop plans to reduce or manage risks effectively.
- **Avoiding Unprofitable Ventures:** Helps prevent investments in projects with unfavorable risk-return profiles.

Resource Allocation Efficiency

- **Optimal Utilization:** Ensures that the company's limited financial resources are invested in the most beneficial projects.
- **Budgetary Control:** Aids in controlling capital expenditures and avoiding cost overruns.
- **Improved Operational Efficiency:** Investing in efficiency-enhancing projects can reduce operating costs and improve margins.



Capital Budgeting Methods

Overview of Capital Budgeting Methods

Internal Rate of
Return (IRR)



Payback Period

Net Present Value
(NPV)

Pay back period Method

Definition

- **Payback Period:** The amount of time required for a firm to recover its initial investment in a project, calculated from the project's cash inflows.
- It measures how quickly the invested capital is returned.

Calculation

- **For Annuities (Equal Cash Inflows):**

$$\text{Payback Period} = \frac{\text{Initial Investment}}{\text{Annual Cash Inflow}}$$

- **Example:** An initial investment of \$100,000 with annual inflows of \$20,000:

$$\text{Payback Period} = \frac{\$100,000}{\$20,000} = 5 \text{ years}$$

•For Mixed Cash Flows:

- **Cumulative Approach:** Sum the cash inflows each year until the initial investment is recovered.
- **Example:**
 - Year 1: \$30,000
 - Year 2: \$25,000 (Cumulative: \$55,000)
 - Year 3: \$45,000 (Cumulative: \$100,000)
 - Payback Period = 3 years

Considerations**•Time Value of Money:**

- The payback period **does not consider the time value of money**, making it a less sophisticated method compared to NPV and IRR.
- **Discounted Payback Period:** An alternative that discounts cash flows to account for the time value of money.

Pay back period Method

Advantages

- **Simplicity:** Easy to calculate and understand.
- **Liquidity Focus:** Emphasizes quick recovery of investment, important for firms with cash constraints.
- **Risk Reduction:** Shorter payback periods reduce exposure to project risk.

Limitations

- **Ignores Time Value of Money:** Future cash inflows are not discounted.
- **Excludes Post-Payback Cash Flows:** Does not consider cash flows occurring after the payback period, ignoring total project profitability.
- **No Profitability Measure:** Does not indicate whether the project adds value to the firm.

Pay back period Method

Example:

If Bennett's maximum acceptable payback period were 2.75 years, Calculate the pay back period for the following projects:

TABLE 10.1 Capital Expenditure Data for Bennett Company

	Project A	Project B
Initial investment	\$42,000	\$45,000
Year	Operating cash inflows	
1	\$14,000	\$28,000
2	14,000	12,000
3	14,000	10,000
4	14,000	10,000
5	14,000	10,000

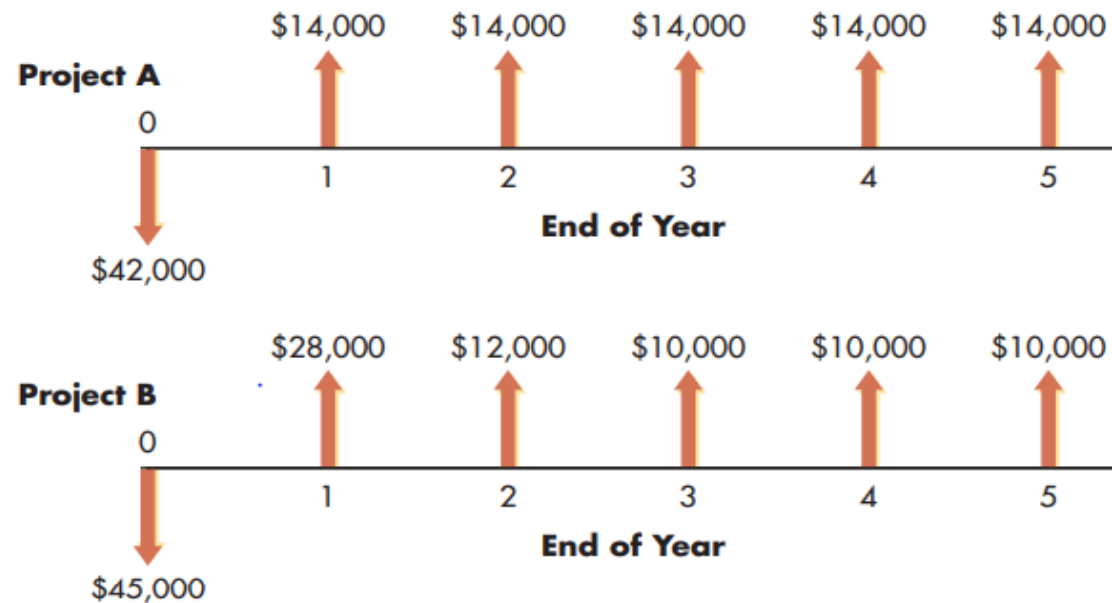
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Pay back period Method

Solution:

FIGURE 10.1

**Bennett Company's
Projects A and B**
Time lines depicting the
conventional cash flows
of projects A and B



Pay back period Method

Solution:

For project A, which is an annuity:

payback period = initial investment / annual cash inflow

payback period = $42000 / 14000 = 3$ Years

Pay back period Method

Solution:

For project B that generate a mixed stream of cash inflows:

- year1: the firm will recover \$28,000 of its \$45,000 initial investment.
- year 2: \$40,000 (\$28,000+12000)
- year 3: \$50,000 Only 50% of the year-3 cash inflow of \$10,000 is needed to complete the payback of the initial \$45,000.
- The payback period for project B is therefore 2.5 years (2 years+ 50% of year 3).

Pay back period Method

Solution:

As Bennett's maximum acceptable payback period were 2.75 years, project A would be rejected, and project B would be accepted. If the maximum acceptable payback period were 2.75 years, both projects would be rejected.

Net Present Value (NPV) Method

Definition

- **Net Present Value (NPV):** The difference between the present value of cash inflows and the present value of cash outflows over a project's life.
- **Time Value of Money:** NPV accounts for the time value of money by discounting future cash flows back to their present value using a specified discount rate (usually the required rate of return or cost of capital).
- **Wealth Maximization:** NPV measures how much value a project adds to the firm, directly aligning with the goal of maximizing shareholder wealth.

Decision Rule

- **Accept the Project:** If $NPV > 0$ (project is expected to add value to the firm).
- **Reject the Project:** If $NPV < 0$ (project is expected to diminish firm value).
- **Indifferent:** If $NPV = 0$ (project breaks even; no net gain or loss).

Net Present Value (NPV) Method

Advantages

- **Considers Time Value of Money:** Provides a realistic assessment by discounting future cash flows.
- **Absolute Measure of Profitability:** Quantifies the expected increase in wealth in monetary terms.
- **Comprehensive Evaluation:** Includes all cash inflows and outflows throughout the project's life.
- **Alignment with Shareholder Wealth:** Directly relates to the firm's objective of maximizing shareholder value.

Net Present Value (NPV) Method

Limitations

- **Complexity:** More complicated than simpler methods like the payback period, requiring detailed cash flow projections and discounting.
- **Estimation Sensitivity:** Results are highly sensitive to the accuracy of cash flow estimates and the chosen discount rate.
- **Capital Rationing:** Does not inherently account for project size; a project with a high NPV but large investment may not be feasible under budget constraints.

Net Present Value (NPV) Method

Example:

The management of Kunkel Company is considering the purchase of a \$40,000 machine that would reduce operating costs by \$7,000 per year. At the end of the machine's eight-year useful life, it will have zero scrap value. The company's required rate of return is 12% on all investment projects.

Required:

(Ignore income taxes.)

1. Determine the net present value of the investment in the machine.
2. What is the difference between the total, undiscounted cash inflows and cash outflows over the entire life of the machine?

Net Present Value (NPV) Method

Solution:

Cash outflow = 40,000

Cash inflow during machine's eight-year useful life= 7,000 per year

$i = 12\%$

Pv of cash inflow= $7,000 \times 4.968 = 34,776$

NPV = PV of Cash inflow - Initial investment= -5,224

The company shouldn't purchase the machine as the NPV of purchasing that machine is negative.

Net Present Value (NPV) Method

Solution:

What is the difference between the total, undiscounted cash inflows and cash outflows over the entire life of the machine?

$$= 56,000 - 40,000 = 16,000$$

Net Present Value (NPV) Method

Example:

Perit Industries has \$100,000 to invest. The company is trying to decide between two alternative uses of the funds. The alternatives are:

	Project A	Project B
Cost of equipment required	\$100,000	
Working capital investment required		\$100,000
Annual cash inflows	\$21,000	\$16,000
Salvage value of equipment in six years	\$8,000	
Life of the project	6 years	6 years

Net Present Value (NPV) Method

Example:

The working capital needed for project B will be released at the end of six years for investment elsewhere. Perit Industries' discount rate is 14%.

Required:

(Ignore income taxes.)

Which investment alternative (if either) would you recommend that the company accept? Show all computations using the net present value format. Prepare separate computations for each project.

Net Present Value (NPV) Method

Solution: Project A:

Item	Years	Amount of cash flow	14% Factor	Present value of cash flow
Cost of equipment required	0	(100,000)	1	(100,000)
Annual cash inflows	1-6	21,000	3.889	81,669
Salvage value of equipment in six years	6	8,000	0.456	3,648
NPV				(14,683)

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Net Present Value (NPV) Method

Solution: Project B:

Item	Years	Amount of cash flow	14% Factor	Present value of cash flow
Working capital investment required	0	(100,000)	1	(100,000)
Annual cash inflows	1-6	16,000	3.889	62,224
working capital released	6	100,000	0.456	45,600
NPV				7,824

The firm should accept project B

The internal rate of Return (IRR) Method

Definition

• **Internal Rate of Return (IRR):** The discount rate that makes the net present value (NPV) of all cash flows from a project equal to zero.

Decision Rule

• **Accept the Project:** If $IRR > \text{Required Rate of Return}$ (also known as the hurdle rate or cost of capital).

• **Reject the Project:** If $IRR < \text{Required Rate of Return}$.

• **Example:**

- **Required Rate of Return:** 8%
- **Project's IRR:** 9.7%
- **Decision:** Accept the project because $9.7\% > 8\%$.

The internal rate of Return (IRR) Method

Advantages

- **Considers Time Value of Money:** Accounts for the timing of cash flows by discounting them.
- **Simple Interpretation:** Provides a clear percentage rate, making it easy to compare with other investment opportunities or the firm's required rate of return.
- **Useful for Ranking:** Helps in ranking multiple projects based on their returns.

Limitations

- **Multiple IRRs:**
 - Projects with non-conventional cash flows (cash flows change direction more than once) can yield multiple IRRs, leading to ambiguity.

The internal rate of Return (IRR) Method

Limitations

- **Reinvestment Assumption:**

- Assumes that interim cash flows are reinvested at the IRR, which may not be practical, especially if the IRR is unusually high.

- **Scale and Timing Ignored:**

- Does not consider the size of the project or the actual dollar value added.
- May favor projects with higher percentage returns but lower total value addition.

- **Conflict with NPV:**

- In mutually exclusive projects, IRR may suggest a different choice than NPV due to differences in cash flow timing and project scale.

The internal rate of Return (IRR) Method

Example:

The Walton Daily News is investigating the purchase of a new auxiliary press that has a projected life of 18 years. It is estimated that the new press will save \$30,000 per year in cash operating costs. If the new press costs \$217,500, what is its internal rate of return? Is the press an acceptable investment if the company's required rate of return is 16%?

The internal rate of Return (IRR) Method

Solution:

$$\text{Factor of the internal rate of return} = \frac{\text{Investment required}}{\text{Net annual cash inflow}}$$

$$= (\$217,500 / \$30,000) = 7.25$$

$$n = 18$$

$$i = ?$$

$$= 12\% \text{ ----- Rejected}$$

Capital Budgeting Methods

Method	Focus	Considers Time Value of Money?	Best For
Payback Period	Time required to recover initial investment	No (unless using discounted payback period)	Assessing liquidity and risk in terms of investment recovery time
Net Present Value (NPV)	Net value added to the firm in today's dollars	Yes	Evaluating profitability and value addition of projects
Internal Rate of Return (IRR)	Expected percentage return of the project	Yes	Comparing project returns to required rates of return



Thank You