

Capital Budgeting Analysis: NPV, IRR, and Payback Period

Project Overview:

This project analyzes two capital investment opportunities by calculating key financial metrics: **Net Present Value (NPV)**, **Internal Rate of Return (IRR)**, and the **Payback Period**. It was created in Excel, showcasing practical financial evaluation techniques used in corporate decision-making.

The analysis includes:

- **Cash inflows** and **cash outflows** for two investment projects.
- Cumulative cash flow calculations over 5 years.
- Use of a **discount rate** (8%) to evaluate the time value of money.
- Automatic computation of financial metrics:
 - **NPV** to assess profitability,
 - **IRR** to determine the expected return rate, and
 - **Payback Period** to measure how quickly the initial investment is recovered.

Key Learnings:

This project allowed me to:

1. **Understand Capital Budgeting Techniques:**
I learned how to assess investments using NPV, IRR, and Payback Period, fundamental tools in financial analysis.
2. **Time Value of Money:**
The project emphasized the importance of discounting future cash flows to their present value.
3. **Comparative Project Evaluation:**
By comparing two projects with different cash flow profiles, I analyzed how NPV, IRR, and payback period impact investment decisions.
4. **Excel Financial Modeling:**
I strengthened my Excel skills by:
 - Calculating cumulative and net cash flows.
 - Automating financial metric computations using Excel formulas.
 - Presenting data visually and clearly.

Key Concepts:

- **Net Present Value (NPV):** Measures the profitability of a project by discounting future cash flows at a specified rate. Positive NPV indicates a profitable investment.
- **Internal Rate of Return (IRR):** The discount rate at which the NPV equals zero. A higher IRR signifies a better return on investment.

- **Payback Period:** The time taken to recover the initial investment, useful for assessing liquidity risk.
- **Cumulative Cash Flow:** A running total of net cash flows, illustrating when the break-even point is achieved.

Critical Details:

- **Project 1:**
 - Higher initial investment (\$1.5 million) but generates higher annual cash flows.
 - **NPV** = \$108,206 | **IRR** = 10.38% | **Payback Period** = 3.91 years.
- **Project 2:**
 - Lower investment (\$250,000) with smaller but steady cash inflows.
 - **NPV** = \$23,834 | **IRR** = 11.34% | **Payback Period** = 3.76 years.

Decision Insight: While Project 1 has a higher NPV (greater total value), Project 2 has a slightly faster payback and higher IRR (better return percentage).

Tools Used:

- **Microsoft Excel** for data entry, formula automation, and financial calculations.

Conclusion:

This analysis demonstrates a structured approach to investment evaluation, combining quantitative metrics to support decision-making. By publishing this project, I aim to provide a resource for understanding capital budgeting concepts, Excel financial modeling, and real-world project evaluation.