

Managerial Finance: Payback Period Calculation

Given:

Initial investment: \$992,943

Year (t)	Cash Flows
1	\$492,503
2	\$390,721
3	\$351,532
4	\$444,281

Objective:

Calculate the payback period of the project.

Step-by-Step Solution:

1. Introduction:

The payback period is the time it takes for the initial investment to be recovered from the net cash inflows generated by the project. It is a simple and quick method to evaluate the profitability of an investment.

2. Cumulative Cash Flows Calculation:

Calculate the cumulative cash flows at the end of each year until the initial investment is recovered.

Year (t)	Cash Flows	Cumulative Cash Flow
1	\$492,503	\$492,503
2	\$390,721	\$492,503 + \$390,721 = \$883,224
3	\$351,532	\$883,224 + \$351,532 = \$1,234,756
4	\$444,281	\$1,234,756 + \$444,281 = \$1,679,037

Each cumulative cash flow is obtained by adding the cash flows of the current year to the cumulative cash flow of the previous year.

3. Payback Calculation:

Identify the year in which the cumulative cash flow exceeds the initial investment.

- At the end of Year 2, the cumulative cash flow is \$883,224, which is less than the initial investment (\$992,943).
- At the end of Year 3, the cumulative cash flow is \$1,234,756, which is greater than the initial investment (\$992,943).

So, the payback period falls between Year 2 and Year 3.

To find the exact month:

Remaining investment after Year 2:
 $\$992,943 - \$883,224 = \$109,719$

Cash flow in Year 3:
\$351,532

Fraction of Year 3:

Fraction of Year 3 = $\frac{\text{Remaining Investment}}{\text{Cash Flow in Year 3}} = \frac{\$109,719}{\$351,532} \approx 0.31$

The fraction represents the portion of Year 3 required to recover the remaining investment. For accuracy, round off to two decimals.

Final Payback Period:

Payback Period = 2 years + 0.31 year \approx 2.31 years

The project recovers the initial investment in approximately 2.31 years, accounting for the part of the third year needed to cover the remaining investment.

Supporting Statement:

The payback period is a straightforward metric to estimate when the initial investment will be recovered, which is critical for evaluating the risk and liquidity of the investment.

Final Solution:

The payback period for this project is approximately 2.31 years.

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