

Profitability Index

Profitability index (PI), also known as **profit investment ratio (PIR)** and **value investment ratio (VIR)**, is the ratio of payoff to investment of a proposed project. It is a useful tool for ranking projects because it allows you to quantify the amount of value created per unit of investment. Profitability index is an investment appraisal technique calculated by dividing the present value of future cash flows of a project by the initial investment required for the project.

Formula:

Profitability Index

$$= \frac{\text{Present Value of Future Cash Flows}}{\text{Initial Investment Required}}$$

$$= 1 + \frac{\text{Net Present Value}}{\text{Initial Investment Required}}$$

Explanation:

Profitability index is actually a modification of the net present value method. While present value is an absolute measure (i.e. it gives as the total dollar figure for a project), the profitability index is a relative measure (i.e. it gives as the figure as a ratio).

Decision Rule

Rules for selection or rejection of a project:

- If $PI > 1$ then accept the project
- If $PI < 1$ then reject the project

Profitability index is sometimes called benefit-cost ratio too and is useful in capital rationing since it helps in ranking projects based on their per dollar return.

Example 1:

Company C is undertaking a project at a cost of ₦50 million which is expected to generate future net cash flows with a present value of ₦65 million. Calculate the profitability index.

Solution

Profitability Index = PV of Future Net Cash Flows / Initial Investment Required

Profitability Index = ₦65M / ₦50M = 1.3

Net Present Value = PV of Net Future Cash Flows – Initial Investment Required
 Net Present Value = ₦65M - ₦50M = ₦15M.

The information about NPV and initial investment can be used to calculate profitability index as follows:

Profitability Index = 1 + (Net Present Value / Initial Investment Required)
 Profitability Index = 1 + ₦15M/₦50M = 1.3

Example 2:

- Investment = ₦ 40,000
- Life of the Machine = 5 Years

CFAT Year	CFAT
1	18000
2	12000
3	10000
4	9000
5	6000

Calculate Net present value at 10% and PI:

Year	CFAT	PV@10%	PV
1	18000	0.909	16362
2	12000	0.827	9924
3	10000	0.752	7520
4	9000	0.683	6147
5	6000	0.621	3726
	Total present value		43679
	(-) Investment		40000
	NPV		3679

PI = 43679/40000 = 1.091 > 1 ⇒ Accept the project