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Digital Area for Networking
Teachers and Educators

Co-funded by
the European Union

Profitability index, Payback period & Average return (ROI)

Outline

- Profitability index
- Payback period & flaws
- Average rate of return (vs ROI)
- Excercises

Profitability index

- Measures the NPV per unit of investment – in other words, it is a measure of how efficiently each project creates one unit of NPV.
- Projects that generate low NPV could still be a part of an optimal set of decisions if they don´t use up much of the budget.

$$\boldsymbol{Profitability\ index} = \frac{\boldsymbol{NPV}}{\boldsymbol{Investment}}$$

PI – decision making?

- Larger than 0 or 1 ?

  Depends on calculation, NPV of all flows, or just flows after the initial investment?

0	1	2	3	4	5	6	**NPV @7%**
- 35 000 €	250 €	3 000 €	14 000 €	13 500 €	14 700 €	14 100 €	**9 457,54 €**

PI 1	**PI 2**
0,270	1,270

PI – limitations?

- Not working perfectly when projects are lumpy

  NPV and capital budgeting constraints has to take place

0	1	2	3	4	5	**NPV @7%**	**PI**
- 1 000 €	- €	- €	- €	- €	2 000 €	**425,97 €**	**0,43**
- 400 €	100 €	150 €	175 €	180 €	200 €	**247,24 €**	**0,62**

Payback period

- **Length of time it takes to recover the original investment in a project.**
- **Shorter the better? Discount or not?**

How long is „accurate hurdle“? How long is too long? Does shorter period mean higher wealth? – vastly myopic

0	1	2	3	4	5	NPV @7%	PI	**PP**
- 1 000 €	- €	- €	- €	- €	2 000 €	425,97 €	0,43	**5**
- 400 €	100 €	150 €	175 €	180 €	200 €	247,24 €	0,62	**2,86**

Payback period - calculation

$$PP = LY + \frac{BA}{CIFR}$$

LY: Number of Years immediately preceding year of Final Recovery

BA: Balance amount to be recovered (Initial investment – flows accumulated to the year preceeding the year of Final Recovery)

CIFR: Flows accumulated to the year of final Recovery – flows accumulated to the year preceeding the year of Final Recovery

or:

v

$$\textbf{\textit{Payback period}} = lower\ year + \frac{(Initial\ outlay - lower\ cumulative\ cash\ inflow)}{(higher\ cumulativecash\ inflow - lower\ cumulative\ cash\ inflow)}$$

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Average rate of return – calculation

- Average Annual Net Earnings After Taxes / Initial investment * 100%

or

- Average annual net earnings after taxes / Average investment over the life of the project * 100%
- Be aware of not confusing it with ROI!

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