

## PMI®—Agile Certified Practitioner (PMI-ACP)®

### Value-based Prioritization—I



After completing this lesson, you will be able to:

- Explain the concept of time value of money
- Take project decisions based on NPV, IRR, ROI, and payback period of a project



All projects require some forecasting, even the most Agile organization will require budgets and forecasts of the expected costs. Forecasting the financial value of a project is the responsibility of the product owner, but it is also a shared responsibility of the project team.



Time value of money suggests that money has different value over time, due to inflation and other factors; money now is worth more than money later on. Determining the time value of money requires knowing the following terminologies:

## Present Value

An amount of money today, or the current value of a future cash flow.

## Future Value

An amount of money at some future time period.

## Period

A length of time (often a year, but can be a month, week, day, hour, etc.).

## Interest Rate

The compensation paid to a lender (or saver) for the use of funds, expressed as a percentage for a period (normally expressed as an annual rate).

The formula to calculate future value is:

$$\mathbf{FV_N = PV(1 + i)^N}$$

The present value can be calculated by turning around the future value formula:

$$\mathbf{PV = \frac{FV}{(1 + i)^N}}$$

PV = Present Value of a sum of money  
FV = Future Value of a sum of money  
N = Number of years  
i = interest rate

Let us see an example for calculating of future value:

Q

If you have \$100 today and you wish to invest it for 3 years for an interest rate of 10%, how much will you have earned at the end of third year?

A

$$FV_3 = 100(1 + 0.10)^3 = 133.10$$

\$100 today is worth \$133.10 in three years with a 10% interest rate compounded annually.

A business case is used to help the organizations to select a project from various projects. A business case is meant to justify a project or features to be included within the product in that project, from the point of view of the business benefits derived. Business cases help in the project selection:

- It reflects the expected benefits and anticipated costs of the project.
- It should include a high level SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis.
- It identifies the key stakeholders.



The participants of business case should be the users, the product owner, the management, and the key stakeholders.

Return on Investment (ROI) is a performance measure used to evaluate the efficiency of an investment or to compare the efficiency of a number of different investments.

- Many organizations have a required rate of return or minimum acceptable rate of return on investment for projects. The formula to calculate ROI is:

$$\text{ROI} = \frac{\text{Projected benefits} - \text{Costs}}{\text{Costs}}$$

**Higher the ROI, the better.**



Net Present Value (NPV) is a method of calculating the expected net monetary gain or loss from a project by discounting all the expected future cash inflows and outflows to the present point in time.

- NPV is a measure of how much money a project can be expected to return (in today's value).
- NPV is used to compare and prioritize projects.

$$\text{NPV} = (\text{Present Values of the Expected Monetary Gains}) \\ - (\text{Present Values of the Costs})$$

**Higher the NPV, the better.**

If the NPV is positive, accept the project.

- A positive NPV means that the project is expected to add value to the firm and will therefore increase the wealth of the owners.
- Since the goal is to increase owners' wealth, NPV is a direct measure of how well the project meets the goal.

# Net Present Value—Example

Let us see an example:

Q

Given below are the details of two projects and their cash flow for a period of five years at an interest rate of 10 percent. Which project would you select?

	A	B	C	D	E	F	G
1							
2							
3	AN. INT RATE-->	10%					
4							
5	PROJECT 1	Year 1	Year 2	Year 3	Year 4	Year 5	Total
6	REVENUES	\$ -	\$2,000	\$3,000	\$4,000	\$5,000	\$14,000
7	COSTS	\$5,000	\$1,000	\$1,000	\$1,000	\$1,000	\$9,000
8	CASH FLOW	\$5,000	\$1,000	\$2,000	\$3,000	\$4,000	\$5,000
9	NPV	\$2,316					
10		ormula = npv (b3,b8:f8					
11							
12	PROJECT 2	Year 1	Year 2	Year 3	Year 4	Year 5	Total
13	REVENUES	\$1,000	\$2,000	\$4,000	\$4,000	\$4,000	\$15,000
14	COSTS	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$10,000
15	CASH FLOW	\$1,000	\$0	\$2,000	\$2,000	\$2,000	\$5,000
16	NPV	\$3,201					
17		rmula = npv (b3,b15:f1					
18							
19	RECOMMEND PROJECT 2 BECAUSE IT HAS THE HIGHER NPV						
20							
21	IF STATEMENT -->	IF(B9>B16, A5,A12)					
22	RESULT -->	PROJECT 2					
23							

The cash flow of both the projects are the same, but NPVs are different.

# Internal Rate of Return

Internal Rate of Return (IRR) shows the interest rate at which the Net Present Value becomes zero.

- The IRR is usually established by a company as the minimum threshold a project must exceed to be considered viable. Usually this threshold is the point at which equity holders would receive a higher return than if they allowed the investment to simply collect interest.
- IRR is used to compare projects; project with a higher IRR is preferred.

$$\text{IRR} = r_a + \frac{\text{NPV}_a}{\text{NPV}_a - \text{NPV}_b} (r_b - r_a)$$

$r_a$  = lower discount rate chosen  
 $r_b$  = higher discount rate chosen  
 $N_a$  = NPV at  $r_a$   
 $N_b$  = NPV at  $r_b$

**Higher the IRR, the better.**

Let us take a look at an example:

**Q** Project A has an investment of \$200,000 and generates an IRR of 27%. Project B has an initial investment of \$100,000 and an IRR of 43%. Which project would you choose?

**A** Project B has a higher IRR and should be selected before Project A.

The payback period is the amount of time it will take to recoup, in the form of net cash inflows, the net amount invested in a project.

- The primary advantage of this method is that the calculations and interpretation are straightforward.
- The second advantage is that the payback period measures the amount and duration of financial risk taken by the organization.
- Many organizations want IT projects to have a fairly short payback period.

**Larger the payback period, riskier the project.**

# NPV, ROI, Payback Period—Example

Summary of a project's financial measures for a period of 5 years is given below:

	A	B	C	D	E	F	G	H
1								
2	DISCOUNT RATE	10%	YEARS					
3		1	2	3	4	5	TOTAL	
4	COSTS	\$5,000	\$1,000	\$1,000	\$1,000	\$1,000	-9,000	
5	DISCOUNT FACTOR	0.91	0.83	0.75	0.68	0.62		
6	DISCOUNT COSTS	-4,545	-826	-751	-683	-621	-7,427	
7								
8	BENEFITS	\$0	\$2,000	\$3,000	\$4,000	\$5,000	\$14,000	
9	DISCOUNT FACTOR	0.91	0.83	0.75	0.68	0.62		
10	DISCOUNTED BENEFITS	0	1,653	2,254	2,732	3,105	9,743	
11								
12	DISCOUNTED BENEFITS + COSTS	-4,545	826	1,503	2,049	2,484	2,316	NPV
13	CUMULATIVE BENEFITS + COSTS	-4,545	-3,719	-2,216	-167	2,316	4,633	
14								
15	ROI	31%						
16								
17								

NPV = (Present Values of the Expected Monetary Gains) - (Present Values of the Costs)

$$ROI = \frac{(\text{Projected Savings (benefits)} - \text{Costs})}{\text{Costs}}$$

$$IRR = r_a + \frac{NPV_a}{NPV_a - NPV_b} (r_b - r_a)$$

Payback in this year





QUIZ  
1

Project A has NPV of 330 and Project B has NPV of 300 and Project C has NPV of 280. Which project would you select?

- a. Project A
- b. Project B
- c. Project A and Project B
- d. Project C



QUIZ  
1

Project A has NPV of 330 and Project B has NPV of 300 and Project C has NPV of 280. Which project would you select?

- a. Project A
- b. Project B
- c. Project A and Project B
- d. Project C



Answer: a.

**Explanation:** Select the Project with a higher NPV. Project A has the highest NPV and it is selected.



## QUIZ 2

If you want to invest \$200 for 5 years at the interest rate of 20%, how much would you HAVE at the end of the second year?

- a. 220
- b. 88
- c. 112
- d. 288



QUIZ  
2

If you want to invest \$200 for 5 years at the interest rate of 20%, how much would you HAVE at the end of the second year?

- a. 220
- b. 88
- c. 112
- d. 288



Answer: d.

**Explanation:** Using the formula for calculation of Future Value,  $200 (1+0.2)^2 = 288$ .



Here is a quick recap of what was covered in this lesson:



- Present value is the amount of money today, or the current value of a future cash flow. Future value is the amount of money at some future time period.
- Thumb rule for decisions: Select the project with higher ROI, IRR, NPV, but lower payback period.



**THANK YOU**