Project Management

#5

Knowledge Sheet

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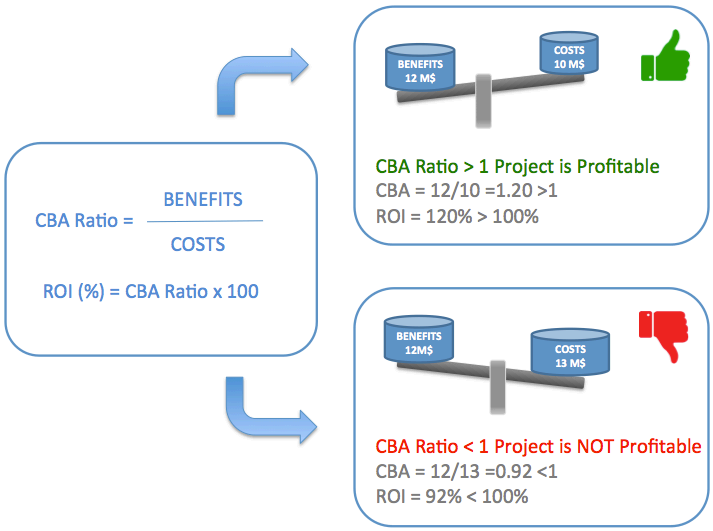
What project managers should know about **Cost Benefit Analysis**?

Cost Benefit Analysis (CBA) tools and techniques contribute to identifying best value projects and alternatives for your organization, as well as documenting and justifying recommendations.

Jules Dupuit (1804-1866), a French civil engineer and self-taught economist is credited with developing the notion of Cost–Benefit Analysis (CBA). Since the 19th century, CBA has grown as a well-established and reliable method to appraise investment project value and use financial criteria for project selection. CBA is used by public organizations to evaluate the social worth of new policies and programs. Private organizations use it as a process to systematically assess the net value and potential benefits of business initiatives.

CBA is recognized as a way to provide an economically sound and reliable framework for the decision making process, however, the modern project manager should understand essential financial aspects, review assumptions, be aware of limitations and ensure the process is inclusive of business context and social welfare. Otherwise the analysis may become inaccurate.

When the potential benefits outweigh potential costs, then projects create added value for the organization and should be undertaken. The CBA ratio is the ratio of the benefits of a project related to its costs, both expressed in monetary terms. When the CBA ratio is superior to 1, the project is a go. And when CBA is below 1, project is a no-go.



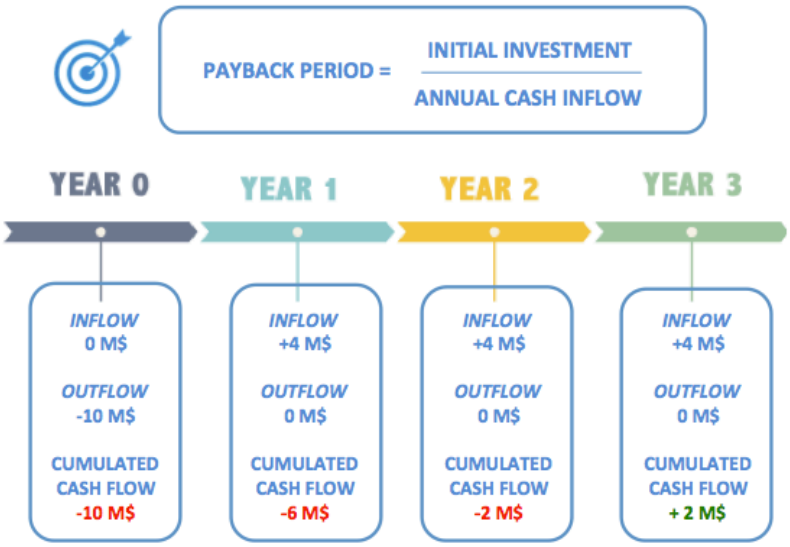
We can also use this formula to evaluate the most beneficial and best option among profitable projects or alternatives. Alternatives with the highest ROI and CBA ratio will create the most value for your organization.

Other important concepts are the Payback Period (PBP) and Net Present Value of a Project. To use the payback period concept, we introduce the financial concept of cash flows. As we switch terminology, we simply translate benefits into money "in" (inflows) and costs as money "out" (outflows). We will also need to organize cash flow (both inflows and outflows) in a timeline so we can visualize what happens year after year.

For example, an initial investment (at year 0) of 10M$ will generate a 3-year annual cash flow of 4 M$, starting year 1. The **Payback Period** formula gives: **PBP = 10/4 = 2.5 years**.

Our diagram shows that:

- Cash Flow = Inflows – Outflows are positive when the project creates value
- The project will start generating positive cash flow after 2.5 years.
- After three years, the project has produced total inflows of 12M$ resulting in cumulated cash flow and a net value of 2M$.



Have you noticed that our project will not create value instantly? We will have to wait a few years. Another consideration of importance comes into play: the time value of money. Because the modern project manager operates in an increasingly competitive and global business world, project alternatives often need to be evaluated with more sophisticated financial tools. We will need to calculate the Present Value of cash flow by applying a yearly discounting factor.

The concept behind the discounted rate is that "*$1 in the future is worth less than $1 in the present".* What causes this shift of value in time? Inflation is an important factor but there is also the additional cost of raising money to invest in projects. It varies with organizations, but in any case an investing expense is incurred. When cash is used for the project, there will be a loss of investment returns and when borrowing is required loan fees will also apply. To account for this, we use a factor known as the "cost of capital" that is part of the discount rate for future cash flow.

Net Present value is a more realistic projection of the outcome of a project and should be provided in CBA process as soon as the project takes more than one year to complete.

DISCOUNT FACTOR (YEAR n) = $\frac{1}{(1+r)^n}$
Where r is the assumed discount rate

DISCOUNTED CASH FLOW = Discount Factor x Cash Flow

NET PRESENT VALUE = SUM of (Net Discounted Cash Flows)

Although CBA presents itself as a rather simple method, one should be well aware of the complexities that inevitably come from real world application. CBA ratio, ROI and PBP are simple to calculate and useful for making quick decisions for short term projects but they are usually insufficient to make more sophisticated decisions when time value of money needs to be accounted for. NPV is a more reliable financial formula but uncertainties associated with estimating costs and intangible benefits may lead to inaccurate outcomes.