****

**FW Solutions – Cost Benefit Analysis**

About the Tool

Jules Dupuit, a French engineer, first introduced the concept of in the 1930s. It became popular in the 1950s as a simple way of weighing up project costs and benefits, to determine whether to go ahead with a project.

As its name suggests, Cost-Benefit Analysis involves adding up the benefits of a course of action, and then comparing these with the costs associated with it.

The results of the analysis are often expressed as a payback period – this is the time it takes for benefits to repay costs. Many people who use it look for payback in less than a specific period – for example, three years.

You can use the technique in a wide variety of situations. For example, when you are:

* Deciding whether to hire new team members.
* Evaluating a new project or change initiative.
* Determining the feasibility of a capital purchase.

However, bear in mind that it is best for making quick and simple financial decisions. More robust approaches are commonly used for more complex, business-critical or high cost decisions.

How to Use the Tool

Follow these steps to do a Cost-Benefit Analysis.

Step One: Brainstorm Costs and Benefits

First, take time to [**brainstorm**](http://www.mindtools.com/brainstm.html)   all of the costs associated with the project, and make a list of these. Then, do the same for all of the benefits of the project. Can you think of any unexpected costs? And are there benefits that you may not initially have anticipated?

When you come up with the costs and benefits, think about the lifetime of the project. What are the costs and benefits likely to be over time?

Step Two: Assign a Monetary Value to the Costs

Costs include the costs of physical resources needed, as well as the cost of the human effort involved in all phases of a project. Costs are often relatively easy to estimate (compared with revenues).

It's important that you think about as many related costs as you can. For example, what will any training cost? Will there be a decrease in productivity while people are learning a new system or technology, and how much will this cost?

Remember to think about costs that will continue to be incurred once the project is finished. For example, consider whether you will need additional staff, if your team will need ongoing training, or if you'll have increased overheads.

Step Three: Assign a Monetary Value to the Benefits

This step is less straightforward than step two! Firstly, it's often very difficult to predict revenues accurately, especially for new products. Secondly, along with the financial benefits that you anticipate, there are often intangible, or soft, benefits that are important outcomes of the project.

For instance, what is the impact on the environment, employee satisfaction, or health and safety? What is the monetary value of that impact?

As an example, is preserving an ancient monument worth $500,000, or is it worth $5,000,000 because of its historical importance? Or, what is the value of stress-free travel to work in the morning? Here, it's important to consult with other stakeholders and decide how you'll value these intangible items.

Step Four: Compare Costs and Benefits

Finally, compare the value of your costs to the value of your benefits, and use this analysis to decide your course of action.

To do this, calculate your total costs and your total benefits, and compare the two values to determine whether your benefits outweigh your costs. At this stage it's important to consider the payback time, to find out how long it will take for you to reach the break even point – the point in time at which the benefits have just repaid the costs.

For simple examples, where the same benefits are received each period, you can calculate the [**payback period**](http://www.qfinance.com/business-strategy-calculations/payback-period) by dividing the projected total cost of the project by the projected total revenues:

Total cost / total revenue (or benefits) = length of time (payback period).

Example

Custom Graphic Works has been operating for just over a year, and sales are exceeding targets. Currently, two designers are working full-time, and the owner is considering increasing capacity to meet demand. (This would involve leasing more space and hiring two new designers.)

He decides to complete a Cost-Benefit Analysis to explore his choices.

Assumptions

* Currently, the owner of the company has more work than he can cope with, and he is outsourcing to other design firms at a cost of $50 an hour. The company outsources an average of 100 hours of work each month.
* He estimates that revenue will increase by 50 percent with increased capacity.
* Per-person production will increase by 10 percent with more working space.
* The analysis horizon is one year: that is, he expects benefits to accrue within the year.

Costs

| **Category** | **Details** | **Cost in First Year** |
| --- | --- | --- |
| Lease | 750 square feet available next door at $18 per square foot | $13,500 |
| Leasehold improvements | Knock out walls and reconfigure office space | $15,000 |
| Hire two more designers | Salary, including benefits  Recruitment costs  Orientation and training | $75,000  $11,250  $3,000 |
| Two additional workstations | Furniture and hardware  Software licenses | $6,000  $1,000 |
| Construction downtime | Two weeks at approximately $7,500 revenue per week | $15,000 |
| **Total** | | **$139,750** |

Benefits

| **Benefit** | **Benefit Within 12 Months** |
| --- | --- |
| 50 percent revenue increase | $195,000 |
| Paying in-house designers $15 an hour, versus $50 an hour outsourcing (100 hours per month, on average: savings equals $3,500 a month) | $42,000 |
| 10 percent improved productivity per designer ($7,500 + $3,750 = $11,250 revenue per week with a 10 percent increase = $1,125/week) | $58,500 |
| Improved customer service and retention as a result of 100 percent in-house design | $10,000 |
| **Total** | **$305,500** |

He calculates the payback time as shown below:

$139,750 / $305,500 = 0.46 of a year, or approximately 5.5 months.

Inevitably, the estimates of the benefit are subjective, and there is a degree of uncertainty associated with the anticipated revenue increase. Despite this, the owner of Custom Graphic Works decides to go ahead with the expansion and hiring, given the extent to which the benefits outweigh the costs within the first year.

Flaws of Cost-Benefit Analysis

Cost-Benefit Analysis struggles as an approach where a project has cash flows that come in over a number of periods of time, particularly where returns vary from period to period. In these cases, use [**Net Present Value**](http://www.mindtools.com/pages/article/newTED_74.htm)   (NPV) and [**Internal Rate of Return**](http://www.mindtools.com/pages/article/newTED_74.htm)   (IRR) calculations together to evaluate the project, rather than using Cost-Benefit Analysis. (These also have the advantage of bringing "time value of money" into the calculation.)

Also, the revenue that will be generated by a project can be very hard to predict, and the value that people place on intangible benefits can be very subjective. This can often make the assessment of possible revenues unreliable (this is a flaw in many approaches to financial evaluation). So, how realistic and objective are the benefit values used?

Key Points

Cost-benefit analysis is a relatively straightforward tool for deciding whether to pursue a project.

To use the tool, first list all the anticipated costs associated with the project, and then estimate the benefits that you'll receive from it.

Where benefits are received over time, work out the time it will take for the benefits to repay the costs.

You can carry out an analysis using only financial costs and benefits. However, you may decide to include intangible items within the analysis. As you must estimate a value for these items, this inevitably brings more subjectivity into the process.