The Financial Wizardry of ROI

a.k.a.

"Show me the money!"

Value Management Partners, LLC
3867 W. Market St. #302
Akron, OH 44333

330.329.0446

info@ValueManagementPartners.com

The Financial Wizardry of ROI

As a consultant, I'm constantly being asked by my clients to justify those big-budget project expenditures with more than fuzzy platitudes about increased productivity and enhanced communications. Variables relating to the success of our solutions—such as the client's readiness for change and willingness to act on my recommendations—make committing to a quantifiable financial benefit risky.

There are many different techniques to measure the financial attractiveness of any large financial endeavor such as an IT project or business process reengineering. The vast majority of companies use one or more of the following approaches to make their "go or no-go" investment decisions:

- Return on Investment (ROI)
- Net Present Value (NPV)
- Payback Period
- Internal Rate of Return (IRR)

To better understand the above terms we will work through all of them using the same simple example. Imagine "SomeGreat Company" plans to roll out "New Software" to one hundred employees within the next 12 months. Let's assume that the initial costs for this deployment will be $10,000 and that it brings a productivity boost to SomeGreat Company worth $5,000 per year.

Before discussing the above techniques, it is important to understand two concepts that form the basis for the financial metrics. They are:

- Discount Rate
- Present Value

Discount Rate

Assume SomeGreat Company has $10,000 cash it can use any way it wants. It could buy New Software, or it could invest it in the bank at a 10% interest rate. Let's say SomeGreat decides not to buy New Software and instead invests all $10,000. After one year, SomeGreat would have $10,000 plus interest on $10,000 at a 10% rate. So SomeGreat would have $10,000 + ($10,000 * (100% + 10%)), or $11,000.

During year two, SomeGreat decides not to take any money out of the bank. This means it is investing $11,000, not just the initial $10,000 amount. So at the end of the second year, it then has $11,000, the sum at the end of the first year, plus interest on $11,000 at a 10% rate. At the start of year three, this means SomeGreat has $11,000 *

($11,000 * 1.1), or $12,100. If SomeGreat leaves all its money invested during year three, it will build up 10% interest on $12,100 and will end the year with $12,100 * ($12,100 * 1.1), or $13,310.

This process easily can be expressed by saying that the amount SomeGreat has after "x" number of years is equal to its initial principal (here $10,000) multiplied by its rate of return to the power of "x." After three years, SomeGreat has $10,000 * (100%+10%)^3, or $13,310. This is defined as compound interest. The interest rate to the power of "x" is the compounded interest rate.

The discount rate is simply the opposite of the interest rate used in the above compound interest example. To calculate a discount rate, you have to start with your final amount and try to get back to your initial investment. At what rate would you have to discount the $13,310 SomeGreat has in year three for it to equal the initial $10,000. In other words, what discount rate would satisfy the equality $10,000 = $13,310/(100%+discount rate)^3? For SomeGreat's investment of $10,000, the discount rate is 10%.

Present Value

Imagine now SomeGreat is considering implementing New Software. SomeGreat then will want to compare the return, let's say over three years, from implementing New Software, to the return they could get just by leaving money in the bank and expending no effort. But the benefit of implementing New Software is not simply three years times $5,000 (annual benefit) per year, or $15,000. This approach does not take into account the time value of money.

Time value of money means that money received now is worth more than money received later. Intuitively, think of the concept of immediate gratification. Most people, for example, would prefer to get paid their entire lottery winnings at once, rather than to wait 20 years to receive all of it. The $5,000 annual benefit SomeGreat Company will receive for the next three years is worth less than $15,000 sitting in SomeGreat's bank account right now. SomeGreat cannot pay its employees or suppliers right now with money it won't have for three years.

In finance, time value of money is expressed as the present value of a future sum of money. Present value builds off of our earlier concepts of compound interest and the discount rate. To find the present value of a future benefit, one asks, "What is x number of dollars to be received in the future worth to me right now?" Clearly, based on the concept of time value of money, "x" dollars in the future is worth less than "x" dollars now. But how much less?

This is where the compound interest and the discount rate become important. $5,000 that SomeGreat will receive next year is numerically equal to some "y" amount of dollars SomeGreat has invested in the bank now. This "y" dollar is the present value. It answers the question, "What sum of money must I have today to equal $5,000 I will receive a year from now?"

To calculate this "y" dollar amount, we have to use the discount rate, which, as explained before, is the backwards interest rate. Present value is equal to the future benefit divided by the discount rate. So for SomeGreat, the present value of $5,000 received in 12 months is $5000/(100% + the 10% discount rate), or about $4500. If SomeGreat had $4500 now and invested it, it would have about $5,000 in 12 months.

However, SomeGreat Company wants to know the value of benefits it will receive over three Years. We need to find out the present value of $5,000 received after one year, $5,000 received after two years, and $5,000 received after three years.

Again, the concept of compound interest is useful. Think of the present value over multiple Years as a slightly reversed compound interest. Instead of multiplying by the compounded interest rate, you divide each annual benefit by the discount rate. So the present value of SomeGreat's annual benefit of $5,000 would be:

	End of Year One	End of Year Two	End of Year Three
Benefit	$5,000	$5,000	$5,000
Present Value of Benefit	$5,000/(1.1) = $4,545.45	$5,000/(1.1)^2 = $4,132.23	$5,000/(1.1)^3 = $3,756.57

The present value of all $15,000 received over three years would be $4545.45 + 4132.23 + 3756.57 = $12,434.26.

What is Return on Investment?

Return on Investment (ROI) is arguably the most popular metric when it is necessary to compare the attractiveness of one business investment to another. Your return on investment equals the present value of your accumulated net benefits (gross benefits less ongoing costs) over a certain time period, divided by your initial costs. It is expressed as a percentage over a specific amount of time; in IT purchasing, three years is the most common time span since technology often effectively is obsolete after this time. The equation for a three-year ROI is:

(Net benefit year 1 / (1+discount rate) + net benefit year 2 / (1+discount rate) + net benefit year 3 / (1+discount rate)) / initial cost.

So if the initial cost for your manufacturing company's small new software rollout was $10,000, your annual benefits less annual costs are constant at $5,000 for the next three years, and the discount rate is 10%, your 3-year ROI would be:

($5,000 / (1 + .1) + $5,000 / (1 + .1)^2 + $5,000 / (1 + .1)^3)/$10,000 = 124%

While ROI tells you what percentage return you will get over a specified period of time, it does not tell you anything about the magnitude of the project. So while a 124% return may seem attractive initially, would you rather have a 124% return on a $10,000 project or a 60% return on a $300,000 investment? That is why you will often want to know the Net Present Value.

What is Net Present Value?

Net Present Value (NPV) gives you a dollar value of your expected return and therefore indicates the magnitude of your project. It is calculated by summing the present value of the net benefits for each year over a specified period of time, then subtracting the initial costs of the project. A positive NPV means that the project generates a profit, while a negative NPV means that the project generates a loss. The equation for a three-year NPV is:

(net benefit year 1 / (1+discount rate) + net benefit year 2 / (1+discount rate)^2 + net benefit year 3 / (1+discount rate)^3) - initial costs.

If we take the hypothetical manufacturing company's new software rollout example, the NPV would equal:

$5,000 / (1 + .1) + $5,000 / (1 + .1)^2 + $5,000 / (1 + .1)^3 - $10,000 = $2,434

The great thing about NPV is that it tells you about the dollar value of your savings; the downside is that it doesn't tell you when savings will occur.

What is a Payback Period?

Simple Payback period is used to find out how long it will take for an investment to show a profit. It is important when time and cash flow are in issue. It is the time it takes for your project to recoup the funds expended, and normally is expressed in years or months. The equation for a simple payback period is: initial cost / annual net benefit

So if we use the same new software rollout example as before, your simple payback period is:

$10,000/$5,000 = 2 years

Payback is very easy to calculate but it doesn't tell you about the magnitude of your savings, or even how your investment performs after your benefits equal the initial costs.

What is Internal Rate of Return?

Internal Rate of Return (IRR) is the most sophisticated of the above metrics and often is used to analyze large, multi-year investments. IRR equals the percentage rate by which you have to discount the net benefits for your time period until the point that they equal the initial costs. IRR is closely related to net present value. The rate of return calculated by IRR is the discount rate you would need to apply to your benefits to obtain a net present value of zero. The expression for IRR (in this case, a three-year IRR) is:

initial costs = net benefit year 1 / (1+IRR) + net benefit year 2 / (1+IRR)^2 + net benefit year 3 / (1+IRR)^3.

IRR often is calculated through a trial-and-error process or data table, since solving the above equation is very time-consuming. If we use the same new software rollout example as before, the IRR would equal 23%. This gives an NPV of ($5000 / 1.23 + $5000 / 1.23^2 + $5000 / 1.23^3) - $10000 = 0

which follows the relationship between NPV and IRR.

IRR may be thought of as a kind of turbo-charged ROI. It is particularly useful when you are making a multi-year investment with costs that change radically from one year to the next. But it still suffers from ROI's main weakness, which is that it does not give any indication of the magnitude of the project involved.

The Bottom Line

Each of these financial measures has its own strengths and weaknesses. Different companies will place varying amounts of emphasis on each of the different metrics. To get a clear and complete picture of a prospective investment, you will benefit from having access to all of these measures.

While I, as a consultant, offer this framework for calculating value, there's no substitute for your participation in developing the figures for the hard-dollar estimates of value. Only you know what that improved productivity or employee retention is worth in your environment.

Oh, and don’t forget to listen to your gut. But that’s another story. (See “So What’s the ROI”)

-ajv-

Value Management Partners helps organizations reduce costs and increase productivity by improving business, project and process performance. Collaborating with your own internal resources in reviewing the projects and processes critical to your success, we provide practical and tactical recommendations for your improvement.

Please visit our website for additional information:

http://ValueManagementPartners.com

Value Management Partners, LLC
3867 W. Market St. #302
Akron, OH 44333

p.330.329.0446
f.330.867.5025

info@ValueManagementPartners.com