

A Refresher on Internal Rate of Return

By Amy Gallo
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You've got a great idea for a new product that will increase revenue or a new system that will cut the company's costs. But how can you be sure that it's a worthwhile investment? Any time you propose a capital expenditure, you can be sure senior leaders will want to know what the return on investment (ROI) is. There are a variety of methods you can use to calculate ROI — net present value, payback, breakeven — and internal rate of return, or IRR.

For help in deciphering this I talked with Joe Knight, author of *HBR TOOLS: Return on Investment* and cofounder and owner of the Business Literacy Institute, to learn more about how IRR works and when to use it.

What is internal rate of return?

The IRR is the rate at which the project breaks even. According to Knight, it's commonly used by financial analysts in conjunction with net present value, or NPV. That's because the two methods are similar but use different variables. With NPV you assume a particular discount rate for your company, then calculate the present value of the investment. But with IRR you calculate the actual return provided by the project's cash flows, then compare that rate of return with your company's hurdle rate (how much it mandates that investments return). If the IRR is higher, it's a worthwhile investment.

How is it calculated?

It's not a straightforward calculation. For example, say you're proposing a \$3,000 investment that will bring in \$1,300 in cash for each of the following three years. You can't just use the \$3,900 total cash flow to figure the rate of return because it's spread out over three years. Instead, you'll have to use an iterative process where you try different hurdle rates (or annual interest rates) until your NPV is equal to zero. Luckily, you can easily calculate IRR in Excel or on a financial calculator. "There's no point in going through the math, because it's always done electronically," says Knight.

What mistakes do people make when using IRR?

The biggest mistake, says Knight, is to use IRR exclusively. It's much better to analyze a project using at least one of the other methods — NPV and/or payback. Using it alone could lead you to make a poor decision about where to invest your company's hard-earned dollars, especially when comparing projects that have different durations. Say you have a one-year project that has an IRR of 20% and a 10-year project with an IRR of 13%. If you were basing your decision on IRR, you might favor the 20% IRR project. But that would be a mistake. You're better off getting an IRR of 13% for 10 years than 20% for one year if your corporate hurdle rate is 10% during that period.

You also have to be careful about how IRR takes into account the time value of money. IRR assumes future cash flows from a project are reinvested at the IRR, not at the company's cost of capital, and therefore doesn't tie as accurately to cost of capital and time value of money as NPV does. A modified internal rate of return (MIRR), which assumes that positive cash flows are reinvested at the firm's cost of capital and the initial outlays are financed at the firm's financing cost, more accurately reflects the cost and profitability of a project.

Still, it's a good rule of thumb to always use IRR in conjunction with NPV so that you're getting a more complete picture of what your investment will give back.

How do companies use it?

Companies generally use both NPV and IRR to evaluate investments, and while NPV tells you more about the return you can expect, financial analysts "often rely on IRR in presentations to nonfinancial folks." That's because IRR is much more intuitive and easy to understand. "If I have a project where IRR is 14% and our corporate hurdle rate is 10%, your audience thinks, 'Oh, I get it. We get 4% more return on this project,'" says Knight. Whereas if you said the NPV on this project is \$2 million, your audience may ask for a reminder of what NPV is and nod out before you get even partway through your explanation that "it means the present value of the future cash flows of this investment using our 10% corporate hurdle rate exceeds our initial investment by \$2 million."

The downside is that IRR is much more conceptual than NPV. With NPV you've quantified the contribution to the overall company: Assuming all of the assumptions are correct, this project will bring in \$2 million. IRR doesn't give you real dollars. Similarly, it doesn't address the issues of scale. For example, an IRR of 20% doesn't tell you anything about the amount of money you'll get. Is it 20% of \$1 million dollars? Or of \$1? You don't have to be a math whiz to know there's a big difference between the two.

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