

## Given the very uncertain state of the economy and the spending constraints under which every corporation is operating, CIOs are looking for new ways to defend their IT projects.

But deciding which projects to shelve and which to move ahead on is tough. In the past, such calls were highly subjective: There was little hard data to show how a project would affect the bottom line. Senior management might demand an analysis of return on investment, but even that is frequently a best-guess estimate, based as much on promises from vendors as on objectively derived numbers. The result: More large-scale initiatives keep coming in over budget, past deadline and without adding any clear and measurable value to the company.

But what if CIOs were to think more like investment managers, who spend every day of their working lives using quantitative analysis to manage the value of potential investments? This month's Whiteboard presents a way to determine the value of an IT investment to a company's bottom line in terms of its likely addition to the company's share price. It is based on the concept of discounted cash flow—the present value of the money the new system will bring in over the course of its life. The authors, Christopher Gardner, formerly head of PricewaterhouseCoopers' IT strategy group, and Ray Trotta, a former financial services consultant at KPMG—and now cofounders of iValue—devel-

oped this methodology as part of an overall effort to construct an objective basis for making IT investment decisions, selecting the most valuable investments and managing ongoing projects.

The goal of this whiteboard is not to turn CIOs into CFOs, but to acquaint them with the kind of thinking that executive teams are increasingly

using to determine what their companies should invest in. To that end, this whiteboard is designed to provide a guide to the logic behind quantitatively valuing IT projects, rather than a step-by-step guide to evaluating your own projects. There is no guarantee that any project you analyze will throw off the benefits

you've calculated. Indeed, the process of calculating the benefits and the cost of any particular project go beyond what can be described in this whiteboard. Nor does the method guarantee your company's share price will go up by a particular amount if you complete a certain project; the goal is to determine objectively the value of sometimes competing projects. The hope is that you will begin to get familiar with the quantitative thinking that is increasingly a part of creating and managing a portfolio of IT projects that differ in size, duration and level of risk.

### HOW TO DETERMINE THE VALUE OF A PROJECT

**CHRISTOPHER GARDNER** is a partner and cofounder of iValue, an IT strategy firm based in New York, and the author of *The Valuation of Information Technology: A Guide for Strategy Development, Valuation and Financial Planning* (John Wiley & Sons, 2000). **RAY TROTTA**, a partner and cofounder of iValue, teaches, speaks and consults on technology and finance topics. He is also a member of the graduate school faculty of the Walter E. Heller College of Business Administration at Roosevelt University.



## HOW TO DETERMINE THE VALUE OF A PROJECT

HOW MUCH INFLUENCE WILL A PROPOSED IT project have on your company's share price? It's impossible to say exactly, but the technique presented in this whiteboard can help you get an approximate answer that is close enough. It's what's known as a discounted cash flow model, and it sizes up the value today of a proposed project: how much the project is expected to bring in for the company in revenues over the lifetime of its use minus its total cost over time, including any taxes paid on benefits to the company from the project. This technique, used for decades to evaluate all kinds of business assets, is now being applied to IT.

Put simply, the technique asks a relatively straightforward question: "What would the money I'm expecting over the life of the project be worth to me if I had it all right now?" Of course, money you're expecting in the future isn't the same thing as money in the bank right now: Inflation will eat away at its value over time, and money you risk is worth less than money you have in hand. The future benefits of an expensive grid-computing project are significantly less assured than the benefits from a faster Web page server, and projects taken on by early adopters are typically riskier than those cautiously embarked on by technology laggards.

What to do? Determine the value of the future cash flow from the project by taking into account both the time and risk involved in going forward with the project, and then translate that discounted cash flow into a potential change in the share price. Here's how to do the calculations:

### 1 BENEFITS

In the framework of this model, consider the benefits of an IT project to include all of its potential sources of cash, such as sales from a Web site, for instance, or reductions in the cost of labor. Other examples might include increased productivity that allows you to avoid hiring additional call-center employees. Accurately calculating a project's benefit stream involves getting a sense of who your potential customers—both internal and external—are and how effective the technology you're using is likely to be over time. And remember that while the benefit stream of an IT initiative is finite, sometimes it is quite short, and sometimes very long.

### 2 TOTAL COST OF OWNERSHIP

Next, size up a project's total cost of ownership—investment costs as well as operating costs—throughout its lifetime. The investment costs include the development and infrastructure costs as well as all associated non-IT expenses, such as costs associated with taking a system live and the cost of reengineering your business processes to accommodate the technology initiative. The operating costs include what you have to spend to keep a project up and running. Labor costs will no doubt be incurred in both categories, and don't forget to include so-called "exit" costs—expenses associated with phasing out a system or a piece of hardware.

### 3 TAXES

Taxes must be paid on the difference between a project's benefits and its total cost of ownership, and these payments can be sizeable—indeed, they can in some cases make or break a project financially. Therefore, it's important to know what the taxes will be before you begin. To calculate the tax bite, subtract the total cost of a project from the benefits expected. That gives you a figure for the project's likely gross earnings. Multiply gross earnings by the tax rate. Then, factor in annual tax deductions that can help minimize the tax bite, such as depreciation and amortization. The total tax is the difference between the tax on gross earnings and the tax benefit.

### 5 VALUE

The value of an IT project can be found by adding up all annual cash flows after adjusting those sums to take into account time and risk. The resulting number shows you how much new net cash you can expect to get from the project—and thus, the project's value to the bottom line.

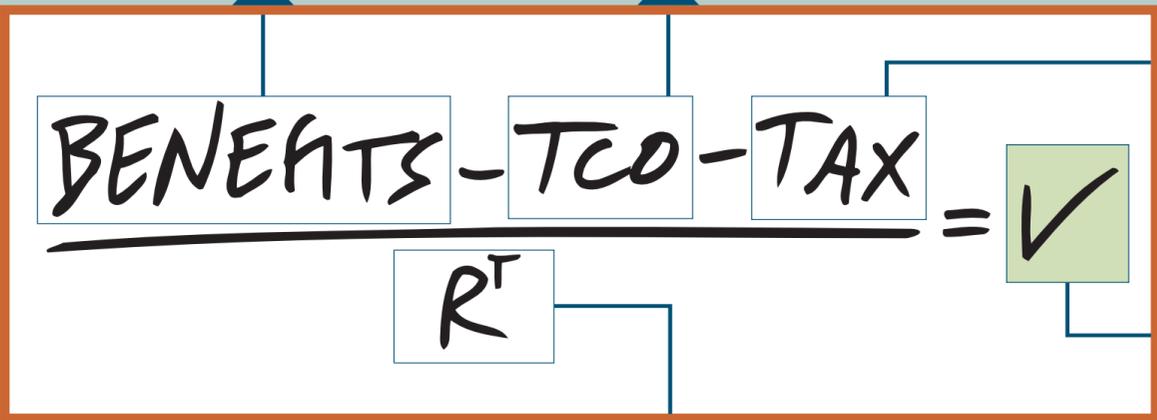
Finally, dividing this figure by the number of the company's outstanding shares gives you an equivalent change in the price per share. If that number is positive, you can safely assume that the IT project will increase the value of the business, and that the business should proceed with the project. If the value is negative—in other words, that it drains value—then the project should be halted.

### 4 TIME AND RISK

The key to this valuation method is that you must adjust the cash flow you expect from the project in the future for both time and risk in order to be able to analyze what it's worth to you right now. The time factor is straightforward: Thanks to inflation and opportunity costs, money you receive in the future isn't worth as much as money in your pocket now.

The risk factor is a bit more complicated. While every investment entails some risk, some are more risky than others. The goal here is to assess just how risky the project you're considering is, and then to adjust the cash flow you're expecting from the project for that risk. The effect of the calculation, when put in present terms, is to discount the cash you're expecting in the future.

The risk factor referred to, called the annual discount rate, is an adjustment you make to compensate yourself for taking a risk. If you feel the risk of the project is high, then you may assign a discount rate of 50% or more on the total value of the project. That's a rate commonly used by venture capitalists when assessing start-up investments. If your risk is low, you may assign a discount rate of 10%—about the rate you would assume if you bought a building to house your corporate offices. The further out in time a project's useful life has to run, the larger the discount must be, since the risk compounds. Your company's CFO can help you determine the appropriate discount rate based on your company's cost of capital—the minimum return needed to compensate a company for making an investment in new corporate assets—and other corporate investments.



## CASE IN POINT AMALGAMATED WIDGETS

AMALGAMATED WIDGETS, A FICTITIOUS MANUFACTURING COMPANY WITH \$500 MILLION IN ANNUAL REVENUES, was under pressure from its shareholders and from Wall Street to increase its profitability. One possibility considered by top management: Install an online procurement system to cut purchasing costs for just about everything the company buys, from raw materials for its widgets to such commoditized items as safety helmets, work gloves and office supplies, on which the company spends a total of about \$225 million a year. There's been a lot of hype surrounding e-purchasing, and the company's executives, ordinarily a pretty conservative bunch, were uneasy about making a significant investment in a new—and, in their minds, unproven—technology. So they asked their CIO and CFO a simple question: How much actual value might such a system bring to Amalgamated's shareholders?

To answer that question, Amalgamated's CIO and CFO began by estimating the life of such an online purchasing system to be about four years, given the rapid advance of such information technology. In addition, Amalgamated's new system would not be up and running for a year because of the time it would take to build and install the system, train the company's purchasing employees, connect the system to suppliers and educate them in its use.

#### BENEFITS

The goal of the system was to boost Amalgamated's ability to drive higher discounts on bulk purchases. Even though the company spends about \$225 million on such buys, in reality, the team estimated, it would save just 3% to 5% of the total spent using the system—significantly lower than the amount estimated by Amalgamated's potential IT vendors, who assumed 100% adoption by both employees and suppliers.

On the upside, the system would give Amalgamated new data about its buying patterns, which in turn would give Amalgamated more negotiating leverage over its suppliers. But the savings wouldn't start until Amalgamated could cut new purchasing contracts with them, so there would be a lag in realizing the benefits. The result: Amalgamated felt it would realize no savings the first year, \$850,000 in year two, \$3.5 million in year three and \$7.4 million in year four.

#### TOTAL COST OF OWNERSHIP

Amalgamated decided to outsource the system to an Application Service Provider (ASP), a move it felt would minimize the investment costs for the system to \$1.2 million. The ASP quoted the operating costs at about \$610,000 per year, a sure figure since the contract was written so that the ASP had to assume all other costs, including any incurred after year four, such as exit and migration costs.

#### TAXES

Amalgamated's corporate tax rate is 32% of earnings, and the company can take a tax break of approximately \$96,000 each year of the life of the project from the non-cash charges generated from its investment costs. This assumes that Amalgamated spreads out the deduction it can take for the investment costs evenly over the four years.

#### TIME AND RISK

The cash flows Amalgamated's team expected from the system were adjusted using a discount rate of 20% based on a 10% benchmark (cost of capital) plus a 10% premium reflecting their analysis of the project's risk. The premium was selected because the history has been that only one in two IT projects at Amalgamated result in a return. The major risk: Would Amalgamated's employees and suppliers adopt the new system?

#### VALUE

Amalgamated's team calculated the value of the proposed e-procurement system by adding up the discounted cash flows for each year of the project, for a total of \$2,382,686. With 23.5 million shares outstanding, the figure represented an increase of 10 cents per share or a 1% increase on a single share price of \$10. Management, therefore, decided to approve this project.

## RUNNING THE NUMBERS

Calculating the actual discounted cash flows from the project involves doing a separate calculation for each year in the life of the project. Here we use year three as an example:

Subtract the operating costs from the benefits to get the gross earnings.	$\$3,500,000 - \$610,000 = \$2,890,000$
Then calculate the taxes on this amount.	$32\% \times \$2,890,000 = \$924,800$
Adjust for the year three tax benefit of depreciating your investment costs over four years.	$32\% \times (\$1,200,000 \div 4 \text{ years}) = \$96,000$
Then subtract the tax benefit from the taxes to get the total tax for year three.	$\$924,800 - \$96,000 = \$828,800$
Subtract the investment costs and the total tax from the gross earnings to get the cash flow from operation.	$\$2,890,000 - \$828,800 - \$0 = \$2,061,200$
Apply the formula for the adjustment for risk and time $(1 + r)^t$ , where "r" is the annual discount rate and "t" is the time in years.	$(1 + .20)^3 = 1.73$
The cash flow from operations is divided by the adjustment to get the net present value of the cash flow for that year.	$\$2,061,200 / 1.73 = \$1,191,445$
Doing this for each year in the project's life cycle provides the total net present value of the project's cash flows, or \$2,382,686.	$-\$1,265,667 + \$180,000 + \$1,191,445 + \$2,276,908 = \$2,382,686$
Finally, divide that figure by Amalgamated Widgets' 23.5 million outstanding shares.	$\$2,382,686 / 23,500,000 = 10\text{¢ per share}$

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	
<b>BENEFITS</b>	\$0	\$850,000	\$3,500,000	\$7,400,000	
<b>- OPERATING COSTS</b>	\$610,000	\$610,000	\$610,000	\$610,000	
<b>GROSS EARNINGS</b>	-\$610,000	\$240,000	\$2,890,000	\$6,790,000	
<b>- INVESTMENT COSTS</b>	\$1,200,000				
<b>- TAXES</b>	-\$291,200	-\$19,200	\$828,800	\$2,076,800	
<b>CASH FLOW</b>	-\$1,518,800	\$259,200	\$2,061,200	\$4,713,200	
<b>DISCOUNT RATE @ 20%</b>	1.2	1.44	1.73	2.07	<b>TOTAL</b>
<b>PRESENT VALUE</b>	-\$1,265,667	\$180,000	\$1,191,445	\$2,276,908	\$2,382,686

## THE RESULT

It is estimated that the project will lift Amalgamated's share price by 10¢ a share. And since the company's shares are selling for \$10, that's a **1% increase over its current value.**



For more discussion of some of the inputs that go into the value calculation presented here, please visit [www.cioinsight.com](http://www.cioinsight.com).