



# TCO, NPV, EVA, IRR, ROI Getting the Terms Right

A CIOview White Paper  
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## **TCO, NPV, EVA, IRR, ROI - Getting the Terms Right**

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TCO, ROI, IRR, NPV, EVA. These acronyms remind me of my college professor, who had CPT after his name. Curious, I politely asked if that stood for a post-doctoral qualification. He smiled and explained that many academicians put all their qualifications on routine correspondence, making such acronyms all but meaningless without their context. As part of his revolt against useless acronyms he had latched onto CPT -- which stands for "Cycling Proficiency Test," a routine award for most kids in the United Kingdom.

Any Total Cost of Ownership (TCO) discussion will begin with basic terms. Even a cursory review of Web sites, such as Oracle's, reveals that many are under the illusion that ROI is a dollar number! With that faux pas as a reference point, here are the common terms:

- Total Cost of Ownership (TCO)
- Return on Investment (ROI)
- Net Present Value (NPV)
- Internal Rate of Return (IRR)
- Net Present Value (NPV)
- Equity Value Analysis (EVA)

### **Total Cost of Ownership (TCO)**

TCO refers to the deployment and operational cost of a system for a specified period of time, usually 3 years. The basic idea is to highlight one TCO as opposed to another, as compared to an ROI analysis which will weigh the costs and benefits of a particular project. A TCO inherently suggests that you've already decided to do a particular project; now the question is which is the lowest-cost solution.

At its simplest level of benefit, TCO helps companies quickly realize that the hardware and software acquisition costs for a new project rarely exceed 28% of the TCO over 3 years. Immediately companies can see that the vendor which is the lowest cost provider of hardware and software -- in other words, the lowest acquisition costs -- is not necessarily the best solution over time.

An IBM mainframe is a classic example of this situation. The cost of an IBM mainframe, even when compared to a high-end UNIX alternative, routinely is more costly for applications such as ERP and CRM. However the IBM mainframe's TCO very often is much more attractive, particularly when running the application on UNIX and the database on the mainframe.

## TCO, NPV, EVA, IRR, ROI- Getting the Terms Right

### The pluses of TCO include:

- TCO is a great way to provide a side-by-side cost comparison to two different solutions
- TCO underscores that the costs over time dwarf the acquisition costs for most IT projects
- TCO highlights that determining the optimal server configuration is the keystone to TCO analysis because the vast majority of project costs are driven by the number and type of servers required
- Unless a TCO tool has a configuration capability it is pretty useless
- TCO is a wonderful way to highlight the economic benefits of partitioning, clustering, high availability architectures and Storage Area Networks (SANs)

### The minuses of TCO include:

- It exclusively focuses on costs and therefore a solution with a richer feature/function set will not get the attention it deserves
- It does not take into account the time value of money
- It requires a much better technical understanding of computing than most business people have
- It requires the vendors to divulge information they traditionally have considered confidential

### Return on Investment (ROI)

Return on Investment is a little confusing. Sometimes it is used to mean a specific financial measurement while other times it is used as a collective term to refer to ROI and the other traditional financial measures such as Payback, Internal Rate of Return (IRR), and Net Present Value (NPV).

However, as a measure in its own right ROI is expressed as a percentage over a specific period of time. Therefore a typical ROI may be 45% over 3 years.

### The pluses of ROI include:

- It specifies a particular time period
- It takes into account the time value of money
- It is simple to calculate

ROI has one deficiency: It does not tell you anything about the magnitude of the project.

The formula for ROI is simply

$$\frac{(\text{net benefit year 1} / (1+\text{discount rate}) + \text{net benefit year 2} / (1+\text{discount rate}) + \text{net benefit year 3} / (1+\text{discount rate}))}{\text{initial cost}}$$

## TCO, NPV, EVA, IRR, ROI- Getting the Terms Right

### Net Present Value (NPV)

The NPV of a project is simple, the benefits minus the costs, and is expressed in dollar terms. Not unlike a profit and loss statement NPV tells you the magnitude of the project.

The pluses of NPV include:

- It is simple to calculate
- It takes into account the time value of money

The big shortfall of NPV is that it is difficult to calculate. The equation for a three-year NPV is

$(\text{net benefit year 1} / (1+\text{discount rate}) + \text{net benefit year 2} / (1+\text{discount rate})^2 + \text{net benefit year 3} / (1+\text{discount rate})^3) - \text{initial costs}$

### Payback Period

Payback period is important when time and cash flow are an issue. Simple payback period shows how long it will take for an investment to show a profit. It is the time it takes for your project to recoup the funds expended and normally is expressed in years or months.

The biggest plus of payback period is that it is simple to calculate. The equation for a simple payback period is

$$\text{initial cost} / \text{annual net benefit}$$

**Payback period does have a few drawbacks:**

- It does not tell you anything about the performance of your investment after the payback period
- It does not tell you anything about the magnitude of your project
- It does not take into account the time value of money

### 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 related closely to net present value. The discount rate you would need to apply to your benefits to obtain a net present value of zero is the rate of return calculated by IRR.

**The pluses of Internal Rate of Return include:**

- It takes into account the time value of money
- It is particularly good for measuring uneven annualized returns

**Minuses? There are a couple:**

- It is complex to calculate
- It offers no magnitude for a project

**The expression for IRR (in this case, a three-year IRR) is:**

$$\text{initial costs} = \text{net benefit year 1} / (1+\text{IRR}) + \text{net benefit year 2} / (1+\text{IRR})^2 + \text{net benefit year 3} / (1+\text{IRR})^3.$$

IRR is often calculated through a trial-and-error process or data table since solving the above equation is very time-consuming.

## TCO, NPV, EVA, IRR, ROI- Getting the Terms Right

### Equity Value Analysis (EVA)

Each of the traditional financial measures has its respective strengths and weaknesses. As a result most companies require that more than one measure be present in evaluating the attractiveness of a project.

One of the flaws in all of the above metrics is that they work very well for companies that have an industrial capital structure in the form of plants and buildings. But they may be less appropriate where the main asset of the company is intellectual property, goodwill or marketing allure.

As a result financial theorists are kept busy trying to come up with better measures for project analysis. EVA is one such measure and at its simplest EVA looks to measure the effects that a new project will have on share value. This is very appealing to the folks with a 50,000-foot perspective, but most IT and line-of-business managers are held to somewhat more mundane issues such as departmental profitability and budgets. Unfortunately as the recent stock market highs and lows have taught many of us, stock prices by nature are not entirely logical and there are many factors which affect a company's stock that are not based on financial reality. Therefore, corporate America still relies largely on traditional financial measures when it comes to making alternative investment choices.

Getting agreement on terms is key to a common understanding of your project goals. One can proceed from there to explain the financial relevance of specific product features and performance issues. However the product discussion becomes increasingly irrelevant unless one can trace back a feature to a financial benefit or reduction in cost.

### About CIOview

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Established in 1997, CIOview has spent more than five years gathering data from IT customers, IT consultants, and the major hardware and software companies. The result is an industry standard method to measure the business value of IT products. CIOview's TCOnow! and ROINow! software combines customer data with a sophisticated system configuration engine, making it quick and easy for each customer to generate their own business case report.

CIOview has created 55 distinct products all of which use the same desktop player application and a product-specific content module. This provides customers access to a complete portfolio of business case analyzers for all of their IT purchase decisions.

### Where Can You Go From Here?

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- Learn more about software to develop your own virtualization TCO analysis:
  - TCOnow! for Industry Application Server Consolidation:  
[http://www.cioview.com/products/prod\\_indust\\_app.html](http://www.cioview.com/products/prod_indust_app.html)
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