

TCO/ROI Basics & Business Value Analysis



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Agenda

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- Objectives
- Why ROI?
 - How is ROI calculated
 - NPV Example
- TCO Overview
 - Intel – IT TCO
- Business Value Analysis
 - Methodology
- Glossary (backup)



Objectives

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- What this session is about
 - Provide an overview of industry trends and tools
 - Introduce concepts and steps of an ROI and TCO
 - Understand Business Analysis methodology
 - Five Step Methodology
 - <td>Sample Project

What this is not

- A hands-on training lab



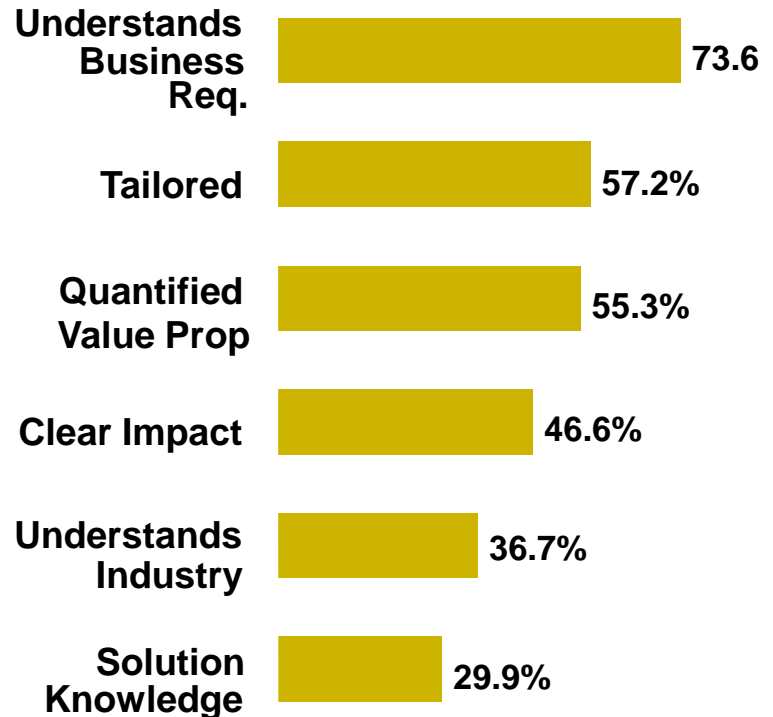
CXOs Interest Aligned With....

Tangible Value Analyses

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- ▲ If business users are provided with a tangible economic value analysis, they are 2.5x more likely to buy
- ▲ If economic assessment is prepared by an independent third party, there is a 64% increase in buying activity
- ▲ When armed with clear economic analyses, CxOs and line-of-business (LOB) managers approve purchases 25% faster

What Traits Are Important Among IT Providers?



Percentage of Respondents

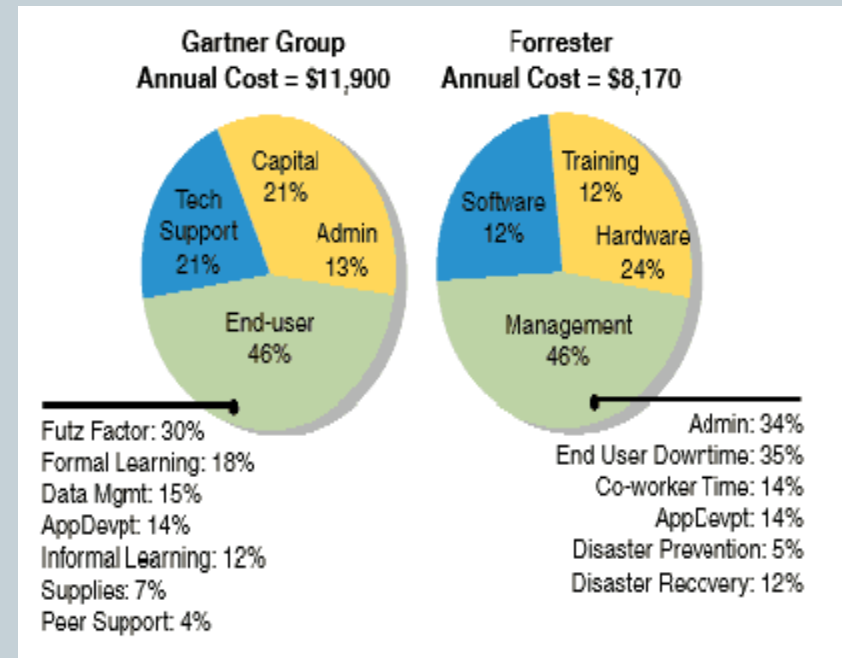
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Multiple Responses Allowed

Industry Tools

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- Industry Tools
 - Gartner – TCO, TVO
 - Forrester
 - Meta
 - CIO View
- No industry standards for set of accounts and processes for measuring computing costs
- Tools based on studies & averages with selected clients
 - Starting point for understanding IT costs
 - Does not help customers in identifying their own costs, begin controlling them, or the results



...Most large corporations do not use any of the Industry Tools for decision making

Key Definitions

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- **Net Present Value (NPV)** – Sum of a series of future payments and receivables in cash flow worth now (>0).
- **Discount Rate (Cost of Capital)** - % return per year shareholders expect from investments (15%)
- **Depreciation** – Accounting treatment of a purchase, spread over the useful life.

- **Return on Investment (ROI)** – Cash Inflow/Cash Outflow-NPV ($>0\%$).
- **Internal Rate of Return** – Discount rate that equates present value to the cost of the investment ($>$ Hurdle rate $\sim 14\%$).
- **Payback** – Number of years (or months) until the cumulative net benefit pays back the implementation costs (<24 months).

Why ROI ?

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- There is no “Correct” % of Revenue to Spend on IT:
 - Studies unable to prove correlation between IT investment (as a % of revenue) and shareholder return.
 - Can’t justify an overall amount
 - *Therefore, your customers must justify (or kill) each expenditure via analysis*
- Plus... Customer Decisions are subject to a lot of Scrutiny.And we should expect it.
 - Amounts of money are substantial
 - Not close to the source of revenue or profit
 - Seen as risky and uncertain
 - High profile “failures” (\$ overruns, system cancellations, benefits did not materialize, etc.)

To help tie Investment to Value and help manage Scrutiny,
we use **Business Value Analysis**

What “ROI” Means

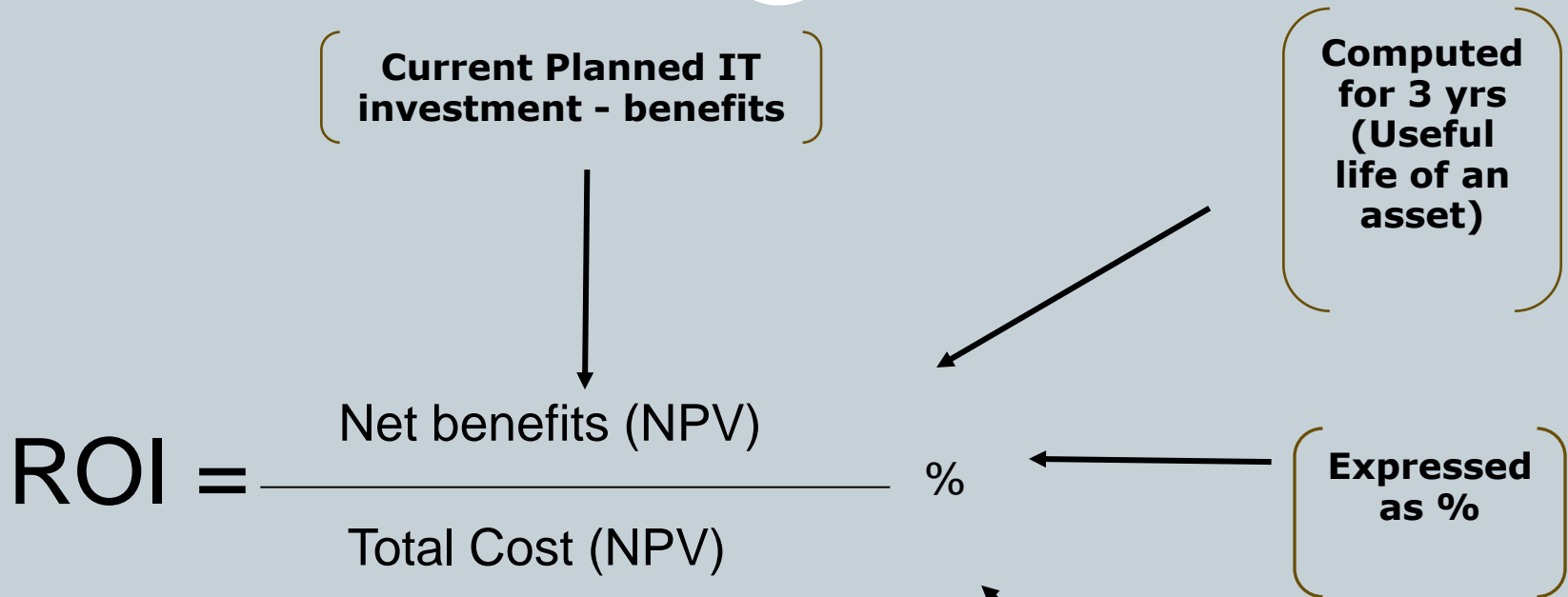
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- “ROI” is a common measure of Business Value however, it has been used to mean many things
 - Business value, Net Present Value, Strategic Value
 - Think of ROI as a “Set of Tools”
- ROI here uses Net Present Value (NPV)
 - NPV is one ROI tool
 - NPV tells the \$ value of an investment over its useful life
 - The Value TODAY of all Current and Future Cash Inflows & Outflows
 - The Concept of Discounting is central to NPV
 - Would you prefer I give you \$1 today... or \$1 next year?
- There are other tools
 - Real Options, Economic Value Add, Internal Rate of Return, Breakeven Analysis - These are supplements and augmentations of NPV analysis.

NPV will most often be used

How is ROI Calculated ?

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Most popular metric to compare one IT investment to another

Each years cash flow worth now

An NPV Example

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- Project Name: Franklin
- Project Life: 3 years
- Costs
 - **Implementation**
 - 15 HC for 3 quarters @25k/Q, Q1-Q3'01
 - Capital Hardware: 500k Q1
 - Capital Software: 1M Q1
 - **Maintenance**
 - 3 HC starting Q4'01
 - **Total Costs = 3.3M**
- Benefits
 - **HC Reduction: 15 HC starting in Q1'02**
 - **Reduced FG Inventory valued at \$3M in Q1'02**
 - **Total Benefits = 3.9M**

An NPV Example

	Q1'01	Q2'01	Q3'01	Q4'01	2001	2002	2003
CAPITAL							
Hardware	500				500		
Software	1,000				1,000		
Total capital	1,500	-	-	-	1,500	-	-
EXPENSES							
Implementation: 15 HC	375	375	375		1,125		
Maintenance				75	75	300	300
Depreciation		94	94	94	281	375	375
Total expenses	375	469	469	169	1,481	675	675
BENEFITS							
HC reduction						1,500	1,500
FG inventory reduction						450	450
Total benefits	-	-	-	-	-	1,950	1,950
EBIT					(1,481)	1,275	1,275
Taxes (38%)	-	-	-	-	143	143	143
NOPAT	-	-	-	-	(1,339)	1,418	1,418
FCF	(1,500)	94	94	94	(2,558)	1,793	1,793
NPV	310						

EBIT = Earnings Before Interest and Taxes

NOPAT = Net Operating Profit after Taxes

FCF = Free Cash Flow (NOPAT - Invested Capital + Depreciation)

Total Cost of Ownership

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Total Cost of Ownership Overview

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- TCO aims to understand, measure and manage the ‘whole life’ cost of IT assets.
 - *Year to Year comparison + Industry benchmarking*
- TCO Analysis demonstrates that true ‘cost’ of an asset is greater than the initial purchase price
 - *Analysis at the time of asset purchase*
- Benefits
 - **Improved use of assets – effectiveness of IT infrastructure & lower direct & indirect costs**
 - **Effective management of IT resources**
 - **Improved service levels**
 - **Alignment in critical/new areas**

Total Cost of Ownership – Key Elements

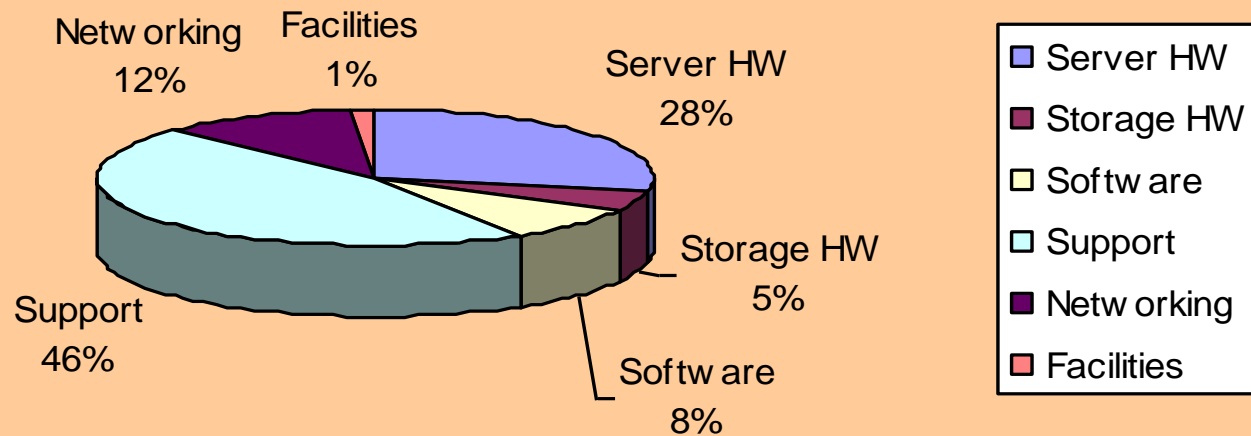
Aims to measure and manage the 'whole life' cost of IT assets

		Acquisition & Implementation	Operation Costs	Ongoing Change & Growth Costs
		<i>Costs at acquisition or during initial implementation</i>	<i>Periodic or frequently occurring costs (3-5yrs)</i>	<i>Adds, moves & changes to the computing environment</i>
Direct Costs	• Hardware	<ul style="list-style-type: none"> • PC client purchase • Server purchase 	<ul style="list-style-type: none"> • HW maintenance fees • HW lease expenses 	<ul style="list-style-type: none"> • Additional systems • Upgrades, peripheral HW
	• Software	<ul style="list-style-type: none"> • OS/NOS • Application purchase • Development/migration 	<ul style="list-style-type: none"> • Annual fees • Maintenance/warrant 	<ul style="list-style-type: none"> • OS/NOS upgrade • Migration software
	• Operations Costs	<ul style="list-style-type: none"> • Installation & setup labor – HW, SW, migration, training 	<ul style="list-style-type: none"> • Trouble shooting, system mgmt • User help/training 	<ul style="list-style-type: none"> • Additional user training
	• Network & Comms	<ul style="list-style-type: none"> • Hardware & software • Line acquisition & hookup 	<ul style="list-style-type: none"> • Usage charges, WAN charges, ISP's 	<ul style="list-style-type: none"> • Change planning • Additional HW & SW
	• Other Costs	<ul style="list-style-type: none"> • Floor space acquisition, renovation, construction 	<ul style="list-style-type: none"> • Electricity • Security 	<ul style="list-style-type: none"> • Site expansion, consolidation, renovation
	• End-user Operations	<ul style="list-style-type: none"> • User trouble shooting • continuing training 	<ul style="list-style-type: none"> • User trouble shooting • continuing training 	<ul style="list-style-type: none"> • User trouble shooting • continuing training
Indirect Costs	• Downtime	<ul style="list-style-type: none"> • Lost productivity 	<ul style="list-style-type: none"> • Lost productivity 	<ul style="list-style-type: none"> • Lost productivity

TCO Analysis – Server implementation

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Option 3 - 4 Way Dell/Linux	# Servers	TCO/Mo	Total Cost	% of TCO	Savings
Server HW	7	6123	293909	28%	
Storage HW		2012	48283	5%	
Software		1759	84426	8%	
Support		9828	471723	46%	
Networking		2528	121333	12%	
Facilities		308	14784	1%	\$ 1,156,873
Total Cost of Ownership		22557	\$ 1,034,459	100%	53%



ROI vs. TCO - Recap

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- ROI

- Method to compare alternative IT investments
- Comprehends the cash impact to the company – “now”
- Analysis is not based on depreciation cycle – accounts only for tax savings

- TCO

- Capture the entire life cycle of costs
- Yr to Yr. Comparison to measure improvement
- Analysis is based on the companies depreciation (non cash) cycle – normally 4 yrs.

Industry Best Practices - IT

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- Key Assumptions
- Discount Rate – 15%
- Income Tax Rate – 38%
- Depreciation Cycle – 3 yrs
 - Capital >2K
 - Expense <2K
- Annual cost of an IT employee – 120 k/yr

Industry & IT Metrics

- TCO
- ROI
- Breakeven/Payback
- IRR

IT Metrics

- Cost/user
- Price/TPM (transaction)

Be flexible, Test materiality with impact

Business Value Analysis - Methodology

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- Includes detailed TCO/ROI analysis



- Understand customer needs
- Gather available inventory & cost data
- Leverage industry cost data
- Intel IT & ISS experience

- Identify alternative solutions
- Integrate with current strategy
- Re-use available hardware
- Integrate with buying cycles

- TCO Study of current IT costs
- Cash flow analysis
- Analysis includes best case and worst case
- Recommendations based on impact to bottom-line

Key Indicators

- Total Cost of Ownership impact
- Return on investment
- Payback period
- Cumulative savings
- Qualitative benefits

ROI/TCO Analysis Methodology

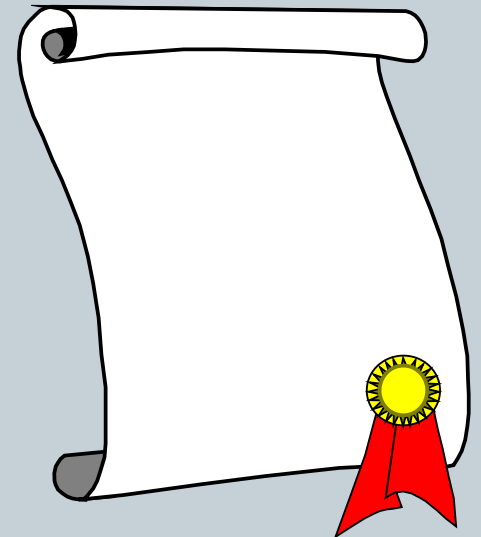
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- **Step 1: Understand Customer Expectations**
 - ROI in <18 mo.
 - New hardware only if justified
- **Step 2: Defining Problem Statement**
 - Define precisely what problem the analysis will address
 - Problem Definition drives data requirements
 - High level opportunity analysis
 - Valuation of a new technology or strategy
- **Step 3: Data Collection**
 - Acquisition, operation, on-going maintenance
 - Hardware, Software, Maintenance, Facilities, Networking
 - Accurate within Analysis materiality
 - Document Sources / Assumptions
 - Remember problem statement & materiality
- **Step 4: Analysis**
 - Identify options & alternatives
 - Ensure consistency
 - Inflection points & common-sense test
 - Hard Benefits
 - ROI & TCO Analysis
 - Sensitivity & Breakeven analysis
 - Monte Carlo Simulation – Dealing with uncertainty
 - Soft Benefits
 - Productivity impact
- **Step 5: Reporting**
 - Assumptions & options defined
 - Go easy on numbers
 - Be aware of motivations/biases data providers & managers have

Conclusions

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- Current economic conditions are driving customers to justify spending using ROI/TCO analysis
- ISS has a repeatable business value analysis methodology
- **Business Value Analysis Methodology**
 - Step 1: Understand Customer Expectations
 - Step 2: Problem Statement
 - Step 3: Data Collection
 - Step 4: Analysis
 - Step 5: Report Out



Understanding concepts & methodology is key to a successful analysis

Backup

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ROI Concepts

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- Net Present Value (NPV) is defined as the “present value [of future net cash flows] minus initial investment.” Present Value is defined as the “discounted value of future cash flows.” Net Present Value is the measure of “shareholder value” that finance has the fiduciary responsibility to maximize.
- Simply stated, NPV is the present value of all future cash inflows netted against the present value of all future cash outflows – a positive NPV is good, a negative NPV is bad!

ROI Concepts

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- Time value of money
 - The time value of money is a concept that incorporates the impact time has on a \$1 invested and the expectation of what the return should be - \$1 today is worth more than a \$1 tomorrow. Stated another way, if we invested \$1 today, we would expect to receive more than \$1 one year from now in return. This is due to the time value, or interest value of money. Investors (Sponsors) expect that we invest their money in areas with an expected annual return of > 15%, or your company's WACC (Weighted average cost of capital).
- WACC
 - Weighted Average Cost of capital is the weighted average annual rate of return that investors expect managers to return on their invested capital. It is the rate of return our investors could get elsewhere given a similar level of risk. Different companies have different WACC's. Average WACC is 15% and is also referred to as the "hurdle rate." Investments that do not return at least 15% destroy value for the investors and should not be made.

ROI Concepts

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- **Cash is King**
 - NPV analysis looks at the incremental, after-tax cash flows that a program is expected to generate for Intel. Ignore transfer price agreements among BU's within Intel. Look at \$s flowing into and out of Intel. For example, if we have an arrangement with IT to support an application and they allocate 10k per month for production support, we would ignore the charge and investigate the true cost to Intel for that support. If one person is dedicated 50% of their time to support the application, use an appropriate burden rate to account for their time. This may be more or less than what IT actually charges for support.
- **Sunk Costs**
 - Sunk costs are costs that occurred in the past. When making investment decisions, we focus on future PV of cash inflows and outflows. Don't account for sunk costs unless there is an opportunity cost (such as reuse or salvage value) associated with it. There is no sense in crying over spilt milk.
- **Opportunity Costs**
 - Some cash flows need to be modeled, even if no cash flow appears to be directly attributable to the project. Intel's assets have value going forward, even if the cost of that asset is sunk. If a project consumes an existing asset, the project must be "charged" for the economic value of the asset at its highest and best alternative use for the corporation. Opportunity cost may also apply to labor.

ROI Concepts

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- Capital costs
 - Although much analysis is done using incremental expenses for implementation and maintenance, do not forget to model the capital effects of the decision. This may include an investment in additional hardware or capital software, as well as opportunity cost. Also, when modeling capital, do not forget the depreciation tax shield. If depreciation is not modeled separately, you must multiply the cash outflow by a factor to account for the present value of the tax shield. For hardware, equipment, and capitalized software, the factor is 0.7182. This number is the after tax value of a \$1 investment in capital, incorporating the present value of the tax shield that the depreciation generates. Generally, we represent true capital costs and model depreciation effects separately.
 - Capital costs also include incremental investments in working capital (Cash + AR + Inventory – AP). Investment in working capital creates an annual opportunity cost of 15% x amount invested.
- Maintenance Costs vs Implementation costs
 - Model Implementation costs separately from maintenance costs. Generally, the differentiation does not matter in a straight NPV analysis, but becomes important when options analysis is performed.

ROI Concepts

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- Relevant Time horizon
 - The general guideline is as follows:
 - 0 - 3 yr: specific products, short term cost savings
 - 0 - 5 yr: product line analysis, process alternatives
 - 0 - 10 yr: long term asset analysis
 - For investments in eBusiness, appropriate time horizons will vary.
 - For smaller projects, a 3-year time horizon is appropriate. In fact, it may be even shorter if the solution considered is only expected to generate value for 1-2 years
 - For large-scale programs that span many organizations and multiple years to implement, a 4-5 year time horizon may be called for.
 - For major, long-term programs (RosettaNet) a much longer time horizon is necessary to comprehend the value of benefits generated far into the future.
 - *These are guidelines only; we should always use the “appropriate” time horizon, which is generally defined as the time horizon that captures all incremental cash flows.*

ROV – Real Options Valuation

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- The value of Flexibility
 - Unlike net present value measurements, real options analysis recognizes the flexibility inherent in most capital projects—and the value of that flexibility
 - A real option captures the value of a company's opportunity to start, expand, constrain, defer, or scrap a capital investment, depending on the investment's prospects
- Net present value ultimately boils down to one of two decisions: go or no-go
 - Real options valuation incorporates management's ability to adjust plans according to new information gathered over time.
 - NPV assumes a predictable trajectory of future operating cash flows and ignores management's ability to respond to a volatile environment, underestimating the value of choice
- Real options is the method for valuing management's ability to respond to uncertain conditions by delaying the decision to invest or disinvest as uncertainty is resolved over time
 - Uncertainty can be related to many factors 1) underlying value of program, 2) cost of implementation, 3) Vendor as a going concern, 4) competitive entries.
 - The methodology for valuing real options is the same methodology financial markets use to price stock options, futures, and other derivatives

EVA

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- The best opportunities draw the most capital from capital markets
- These alternatives help establish the “opportunity set” by which activities are measured
- If you want capital, have to offer at least a return that investors could earn elsewhere in investments of equivalent risk – their opportunity cost of capital
- You create wealth for investors only if you earn more than this benchmark rate of return
- Need a yardstick which tells us whether we are doing this → EVA
- At the beginning of a project, EVA gives the same answer as NPV: $NPV = PV$ of all future periodic EVAs
- If EVA gives the same answer as NPV, why use both methods?
 - If decisions are made later in the project lifecycle, decisions will be maximized by using NPV analysis. But this ignores “sunk costs” and will cloud the overall understanding of value created by the investment
 - EVA has memory – it takes a charge for capital invested in previous periods to show how the project history has created or destroyed shareholder value.
 - EVA is a perfect tool for measuring KTBR investments which are capital intensive – what is the economic value added from our server farm?
 - NPV is a point measure – EVA is a periodic measure of performance

Monte Carlo Simulation

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- Traditionally, analyses combine single “point” estimates of a model’s variables to predict a single result. This is the standard NPV analysis. Estimates of model variables must be used because the values which actually will occur are not known with certainty. In reality, however, many things just don’t turn out the way that you have planned. Maybe you were too conservative with some estimates and too optimistic with others.
- The combined errors in each estimate often lead to a real-life result that is significantly different from the estimated result. The decision you made based on your “expected” result might be the wrong decision, and a decision you never would have made if you had a more complete picture of all possible outcomes.
- With Monte Carlo simulation, you can explicitly include the uncertainty present in your estimates to generate results that show all possible outcomes.

Risk Analysis

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- Risk can be either objective or subjective. Flipping a coin is an objective risk because the odds are well known. Even though the outcome is uncertain, an objective risk can be described precisely based on theory, experiment, or common sense. Everyone agrees with the description of an objective risk. Describing the odds for rain next Thursday is not so clear cut, and represents a subjective risk. Given the same information, theory, computers, etc., weatherman A may think the odds of rain are 30% while weatherman B may think the odds are 65%. Neither is wrong. Describing a subjective risk is open-ended in the sense that you could always refine your assessment with new information, further study, or by giving weight to the opinion of others. Most risks are subjective, and this has important implications for anyone analyzing risk or making decisions based on Risk Analysis.
- Deciding that something is risky requires personal judgment, even for objective risks. For example, imagine flipping a coin where you win \$1 for a heads and lose \$1 for a tails. The range between \$1 and -\$1 would not be overly significant to most people. If the stakes were \$100,000 and -\$100,000 respectively, most people would find the situation to be quite risky. There would be a wealthy few, however, who would not find this range of outcomes to be significant.
- Risky actions and therefore risk are things that we often can choose or avoid. Individuals differ in the amount of risk they willingly accept. For example, two individuals of equal net worth may react quite differently to the \$100,000 coin flip bet described above—one may accept it while the other refuses it. Their personal preference for risk differs.
- For subjective risk, there is no mathematical formula that you can solve to get the risk associated with the possible outcomes. You have to estimate the risk using the best information you have available

Calculate NPV Using Excel

Period	0	1	2	3	4	5	
		2001	2002	2003	2004	2005	2006
A Buy Tool		\$ (1,000,000)					
Depreciation		\$ 200,000	\$ 320,000	\$ 192,000	\$ 115,200	\$ 115,200	\$ 57,600
B Tax Impact (@38%)		\$ 76,000	\$ 121,600	\$ 72,960	\$ 43,776	\$ 43,776	\$ 21,888
CASH FLOW (A+B)		\$ (924,000)	\$ 121,600	\$ 72,960	\$ 43,776	\$ 43,776	\$ 21,888
DISCOUNT FACTOR	1.00	0.87	0.76	0.66	0.57	0.50	
PV OF CASH FLOW	\$ (924,000)	\$ 105,739	\$ 55,168	\$ 28,783	\$ 25,029	\$ 10,882	
TOTAL PV	\$ (698,398)						

- Excel's NPV function calculates the net present value of an investment by using a discount rate and a series of future payments (negative values) and income (positive values).
- NPV(rate,value1,value2, ...) or NPV(rate,value1:value27)
 - Rate is the rate of discount over the length of one period.
 - Value1, value2, ... must be equally spaced in time and occur at the end of each period.
 - NPV uses the order of value1, value2, ... to interpret the order of cash flows. Be sure to enter your payment and income values in the correct sequence.
 - Cells that are blank or error values or text that cannot be translated into numbers are ignored. (If your 3rd value column is blank it counts your 4th column as value3)
- Example
 - Formula for above would be:
 - =NPV(.15, 121600, 72960, 43776, 43776, 27188)-924000
 - If First cash flow was to occur in period 3 shifting the tool purchase out formula would be:
 - =NPV(.15, 0, 0, 924000, 121600, 72960, 43776, 43776, 27188)