



Cost Benefit Analysis Overview

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Business / Corporate / Academic View of Terms

Business Case Analysis (BCA)

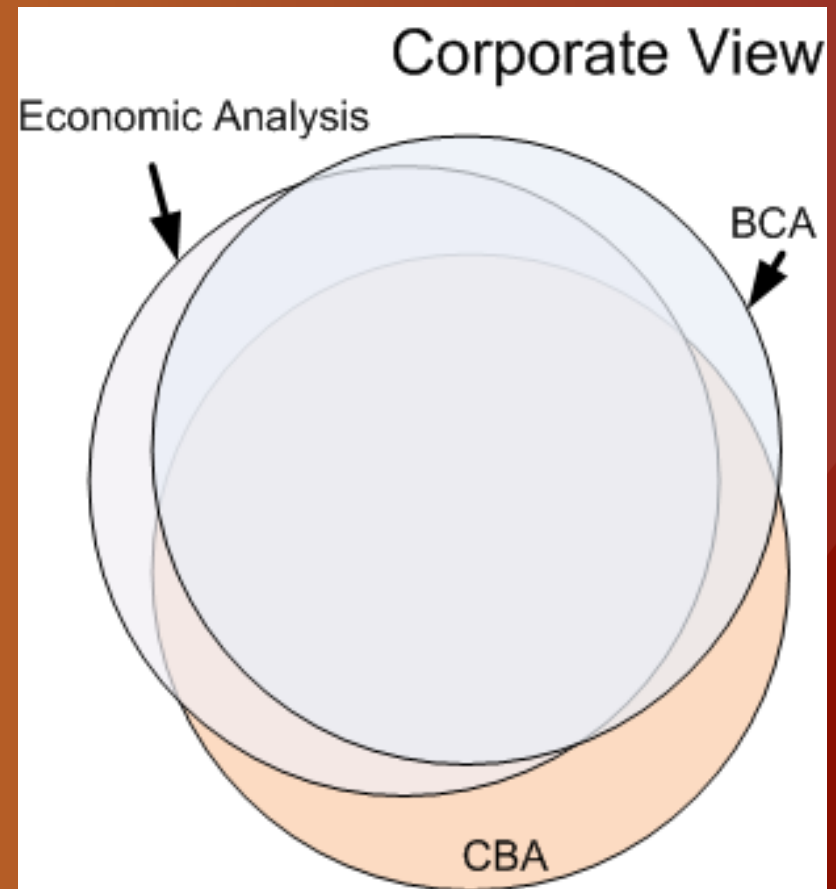
≈ Cost Benefit Analysis (CBA)

≈ Economic Analysis

- Can include a wide range of definitions

- Example:

- *Economic Development Handbook, NPS, 2nd Edition*



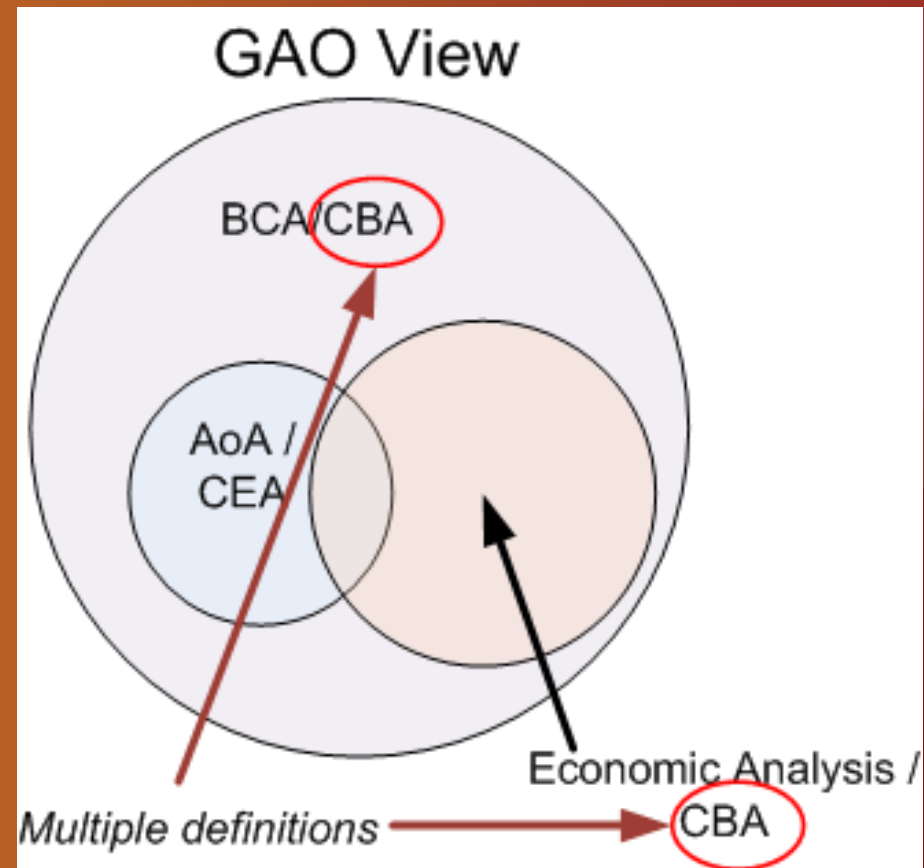
Corporate View is all terms are synonymous



GAO View of Terms

GAO-09-3SP Cost Estimating and Assessment Guide, Mar 2009

“A **business case analysis**, sometimes referred to as a **cost benefit analysis**, is a comparative analysis that presents facts and supporting details among competing alternatives.”

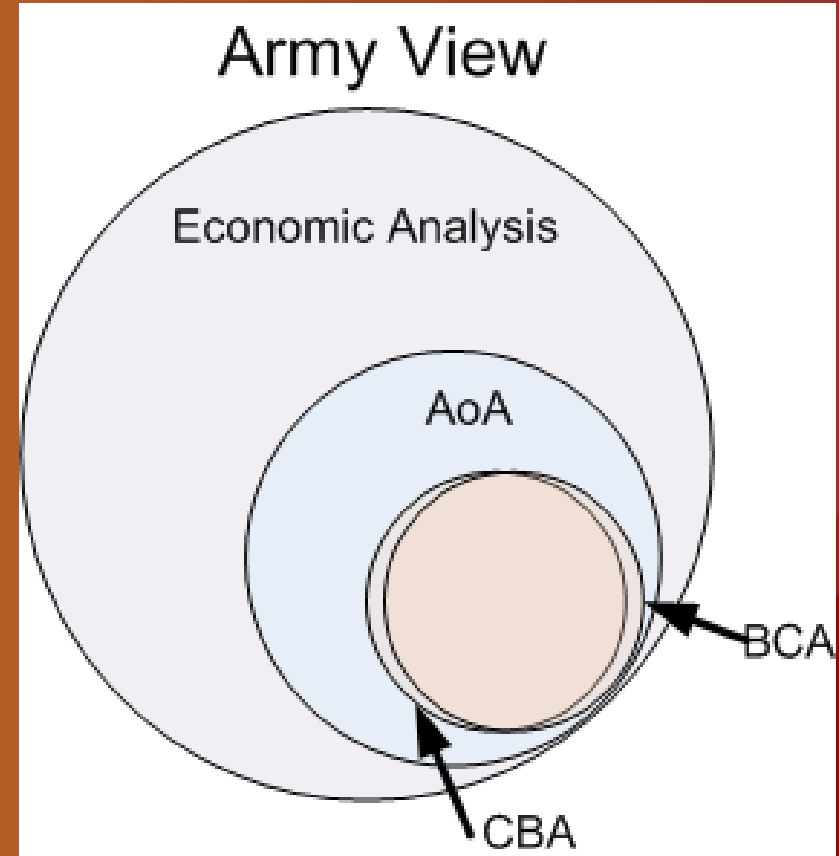


GAO has multiple definitions depending on source



Army View of Terms

- Economic Analysis
 - A broader term that includes
 - CBA
 - What-if analysis
 - Should Cost analysis
 - Analysis of Alternatives
 - A-76 study (Outsourcing)
- Analysis of Alternatives
 - CBA is a type of AoA
- ARMY makes a distinction
 - BCA is associated with PBL implementation planning
 - CBA is associated with an Unfunded Requirement (UFR) analysis

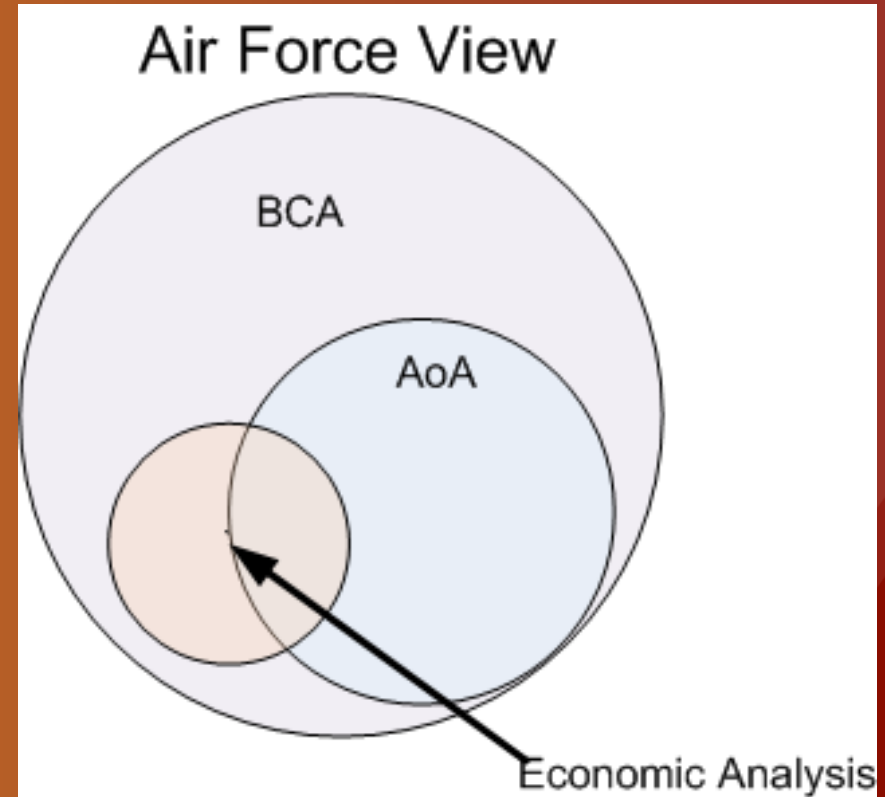


Army has CBA as a kind of Economic Analysis



Air Force View of Terms

- A BCA is considerably broader in scope
 - focuses on value to the organization from an enterprise-wide perspective; it seeks alignment with organizational goals and has a strategic focus
- An EA
 - focuses on value to the unit or installation, and tends to be more limited in scope, usually dealing with a small number of alternatives.
- An AoA
 - focuses on the value of a particular system solution, based on the costs and capabilities of that system



Source: AFI 65-509 "Business Case Analysis" , 19 Sept 2008

Air Force has Economic Analysis as a part of BCAs



Navy View of Terms

- “BCA” tends to be used regardless of the context
 - Dictates specific formats for:
 - PBL BCAs - *PBL BCA Guide, 1 Nov 2005*
 - IT BCAs - *Standard Business Case Analysis Template , 15 July 2011*
- Facilities Management appear to use EA and BCA interchangeably
- BCA, CBA, EA relationships are not standardized.
 - Context rules
 - Also called “Investment initiative”

Navy definitions are flexible in context



What is a Cost Benefit Analysis?

- For this discussion CBA is synonymous with BCA, EA, AoA, CoA
- In light of the various definitions,
 - A decision-support tool or framework to systematically identify, analyze, and compare benefits & costs of alternative courses of action
 - A communication vehicle that answers the questions:
 - What are the financial and non-financial consequences if a proposed action or decision is implemented?
 - What are the proposed investment's scope and objectives, as well as a basis for measuring future performance?
 - Which attributes of the project contribute most to the business objectives?

A CBA is a decision support tool & a communication vehicle



Compare to LCCE

LCCE

CBA

Breadth of Estimate

- Cradle to grave cost profile regardless of when calculated
- Snapshot profile that is tailored to the question

Depth of Estimate

- Includes sunk costs
- Broken down by appropriation
- Rarely includes sunk costs
- Does not have to include costs common to all alternatives
- Is required to use fully-burdened cost of fuel and fully burdened cost to the government for personnel
 - *DODI 5000.02, Enclosure 7, "Energy Considerations"*
 - *OSD-CAPE, Directive-Type Memo (DTM) 09-007 dtd 29 Jan 10*

Purpose

- Part of the budgeting process
- May or may not be part of the budgeting process

CBA numbers rarely match LCCE numbers



When is a BCA/CBA required?

- **All Acquisition Programs** require AoA
 - MDAP, MAIS programs & ACAT II (Info Sys) by law
 - Material Development Decision, Milestone A & New Ship start
 - Updates at Milestone B & C
 - DODI 5000.02, Enclosure 7 & Enclosure 4, Table 2-1
- **Performance-based logistics (PBL) implementation strategy**
 - **Army** - AR 70-1 & DA memo, 18 Aug 05
 - **Navy** - PBL BCA Guide, 1 Nov 2005
 - **DoD** – USD (AT&L) Memo, “Performance Based Logistics (PBL) and Business Case Analysis (BCA)”, 23 Jan 2004
 - **DoD** - Product Support Business Case Guidebook, Apr 2011
- **All unfunded and reprogram requests**
 - **Army** - DA Memo, “Cost-Benefit Analysis to Support Army Enterprise Decision Making”, 30 Dec 09
- **IT Evaluations**
 - **Navy** – Standard Business Case Analysis Template , 15 July 2011

CBAs are due prior to making important long-term decisions

Minimum Elements per DODI 7041.3

“Economic Analysis for Decision Making”

- **Objective**

- Clearly define and quantify (to the extent possible) the function to be accomplished

- **Assumptions**

- Base CBA on facts and data when possible. Assumptions are made to account for uncertainties.

- **Alternatives**

- Feasible ways of satisfying the objective.

- **Costs and Benefits**

- Quantifiable and significant qualitative costs and benefits associated with each alternative.

- **Compare Alternatives**

- Compare the costs and benefits of each alternative and rank by net present value.

- **Sensitivity and Uncertainty Analyses**

- Account for uncertainties in the analysis by testing the sensitivity of the economic analysis results to various factors.

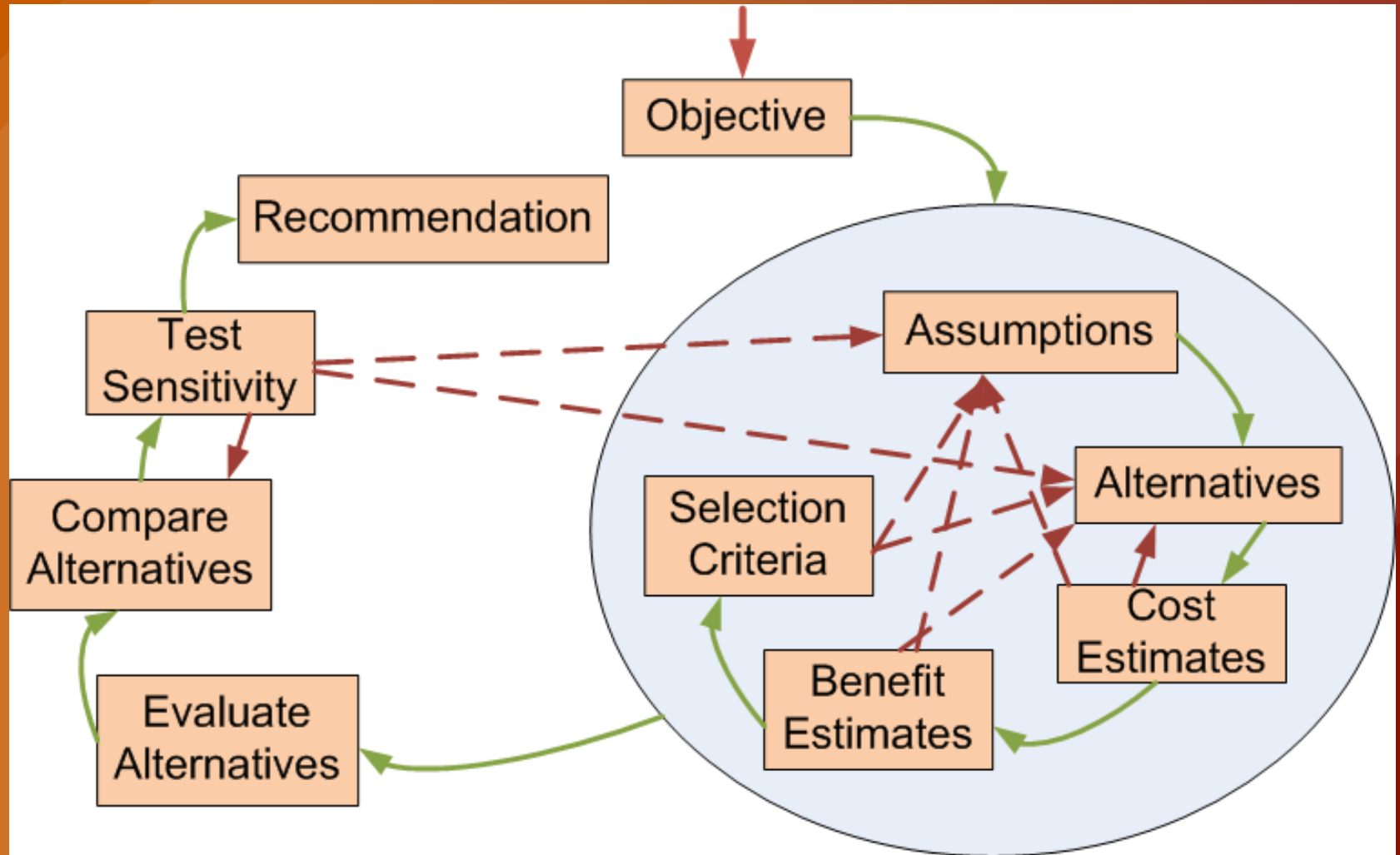
- **Results and Recommendations**

- Interpret the results and include a recommendation of the preferred alternative.

All Service Templates meet the minimum structure



CBA is a Non-Linear Process





Executive Keys

- A CBA
 - Must be tailored to fit the problem
 - There are many recommended templates, none work “best” all the time
 - Will not produce a result that is more valid than the input data
 - Will not make a final decision; that will be the responsibility of the decision maker/leadership
 - Will not act as a substitute for sound judgment, management, or control
- CBAs are decision documents
 - They are subject to audit
 - Must be accurate
 - Documented to the extent needed to justify the decision

CBA formats are tailored to the objective

PITS AND PITFALLS



Be Wary of Problem Statements

- Word the Objective statement carefully
- Determine the **real** requirements
 - Nice-to-haves get mixed up with must-haves
 - Rule of thumb: 3 Categories
 - **Fall-on-your-sword** (okay to kill the program if not able to meet)
 - **Must haves** (okay to cancel other programs to get)
 - **Highly desirable** (try real hard to get)
 - Slight changes in requirements can have tremendous consequences to costs
 - Rule of thumb: The stronger the demand for the requirement, the higher the risk cost

Pay attention to overstated requirements



Be Wary of Assumptions

- It is easy to:
 - Assume away an issue that really should have been researched
 - “will be easier to maintain” – should be able to quantify
 - Be overwhelmed by trivial assumptions
 - What are the key driving assumptions?
 - Assume things that can never exist
 - e.g. Technology solution
 - Assume what is intended to be proved
 - “will save \$10K”
- All Real Assumptions drive a cost or benefit
 - Simple test – if you remove the assumption, does the cost change?

Watch for run-away assumptions



Be Wary of Cost Reduction Claims

- If claiming a benefit for a reduction be sure the cost is completely eliminated and not just transferred
 - Manpower reductions are a common mistake
 - Position must be completely terminated, not moved to another section
 - Validate work being performed by reduced personnel; what positions are currently doing the work and what percentage of their time is currently spent doing the work that is to be eliminated
 - Very easy to transfer costs to the Operation and Support (O&S) phase on a development project by adjusting maintenance parameters
- Often cost reductions are based on assuming that everything else holds steady
 - Rarely does everything else hold steady
 - Very common when objectives involve human decisions (e.g. tax policy)

It is easy to invent believable cost reductions



Be Wary of Optimistic Benefits

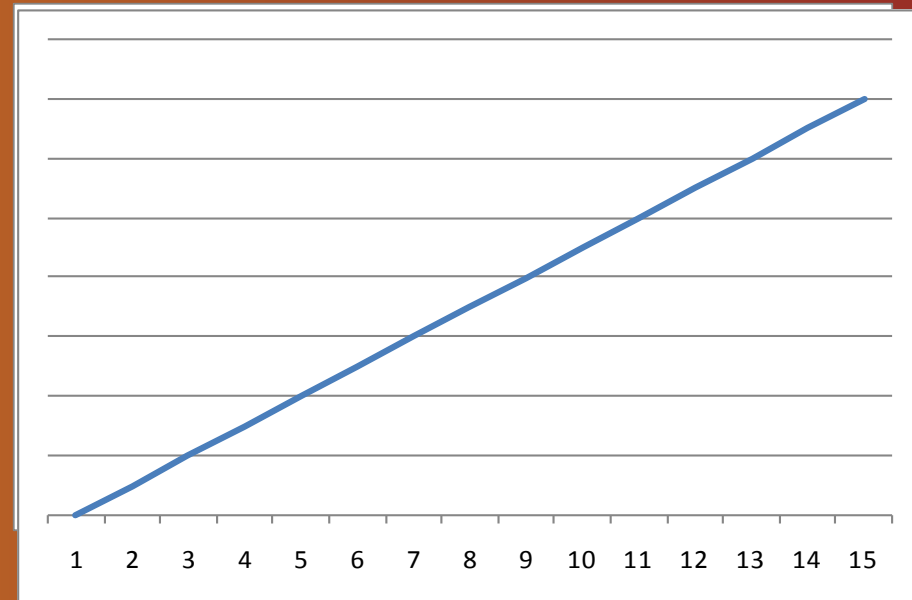
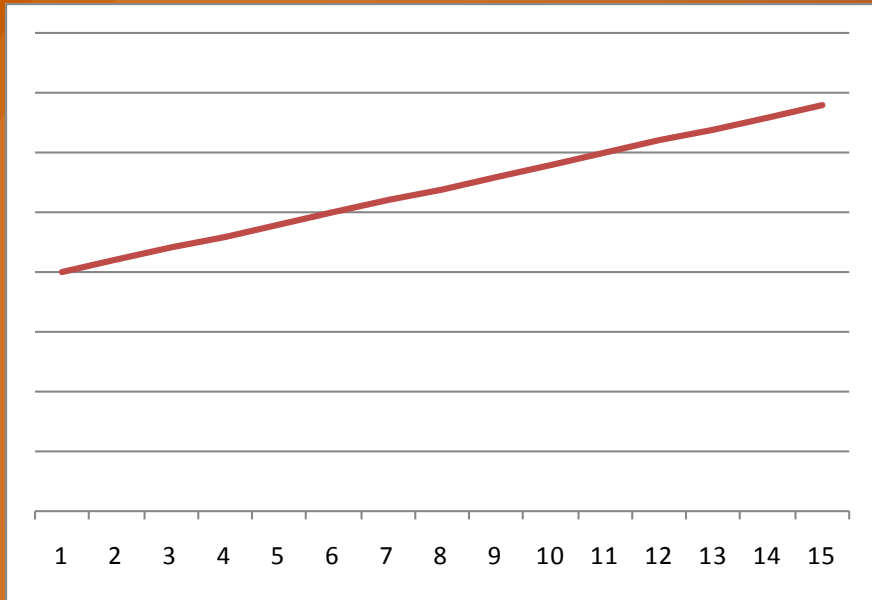
- Common to include Soft Benefits as a Hard Benefit
 - Businesses often assign no value to Soft Benefits, ergo analysts are motivated to push as much as possible to the Hard category
 - Hard benefits have tangible dollars, i.e., hits the US Treasury bottom line
 - Soft benefits can be expressed as dollars, even if they are not tangible
 - “Soldiers will decrease task X by 8 minutes, thereby saving the government \$Y”
 - 8 minutes of savings per soldier does not hit the US treasury bottom line
 - This can become tangible if the minutes can be consolidated and result in a decrease in personnel

Watch out for “Hard sounding” Soft benefits



Be Wary of Graphs

Which system is experiencing more rapid growth?



They are actually the same



Be Wary of Risk Analysis

- Too much risk will overstate the budget needed
- Too little risk and the program will fail due to lack of budget
- WSARA of 2009 requires analysis to 80% confidence level
 - 2011 Defense Authorization Act expected to decrease that to 50%
- Risk is complex to capture and is often either over done or under done
 - If done right, risk is assigned primarily to the main cost drivers (which are discovered during sensitivity analysis)
 - An indication of poorly done CBA is all the component risk profiles look the same
- Rule of thumb: the Point Estimate (PE) is at the 15-35% confidence level
 - If the PE is lower than that (0-10%), then the analyst assumed a rosy profile for “most likely”

Cost risk estimation is a balancing act

Be Wary of Reliance on a Single Metric

- Reporting the NPV is required
- The NPV is not sufficient to describe the best solution

Alternative		A	B	C	D	E
Investment Costs in 2010		150	125	125	92	200
		Operating Savings				
2010		0	0	0	0	55
2011		20	20	23	17	30
2012		30	30	35	26	35
2013		30	40	38	28	45
2014		30	45	41	31	50
2015		30	42	44	33	50
2016		55	30	47	35	50
2017		55	30	50	38	40
2018		55	30	54	40	50
NPV	2.20%	\$120	\$114	\$169	\$128	\$167
IRR		16%	20%	24%	25%	23%
Break Even		5.2	3.8	2.8	2.8	2.7
Discounted Benefit/Cost Ratio		1.78	1.89	2.33	2.37	1.81

Best?

Reporting NPV is required, but not sufficient



Summary

- Define Cost Benefit Analysis (CBA)
 - Many definitions. Will use as synonyms
- When is a CBA required?
 - All big decisions
- Structure of a CBA
 - Formats are far less important than content
- Key Components
 - Garbage In = Garbage Out
- Pitfalls to avoid when reviewing a CBA
 - CBA/BCA are great tools with sharp edges



Shameless Commercial

TTB 011 Cost-Benefit Analysis for Army Programs

See details at:

http://icatalog.dau.mil/onlinecatalog/courses.aspx?crs_id=1894

OR

<http://icatalog.dau.mil/>

And select **“Targeted Training”** and **“TTB 011”**