Cost Benefit Analysis (CBA) Training for Decision Makers and Managers

FM LEVEL III

Visit our CBA Website for more information regarding locations, signing up, upcoming training sessions, and more
https://cpp.army.mil
Welcome

• The Army's senior leaders are committed in making resource-informed decisions by means of CBAs

• Army leaders have identified cost culture as one of the highest priorities in adapting to an increasingly resource-constrained environment.

Mr. Stephen G. Barth  
Deputy Assistant Secretary of the Army  
(Cost & Economics)
A Cost Culture entails developing – through leadership, education, discipline, and experience an understanding of the importance of:

- making cost-informed decisions
- making effective trade-off decisions to achieve the best possible use of limited resources
- holding people accountable for understanding and being able to explain the costs of their organizations, products, services, and customers
- focusing on continuously improving the efficiency and effectiveness of operations

• Culture: Common Beliefs and Behavior in an Organization
Comparative Analysis Approach

Cost Benefit Analysis—Making the case for a project or proposal:
Weighing the total expected costs against the total expected benefits over the near, far, and lifecycle timeframes from an Army enterprise perspective.

COSTS
- Quantifiable costs
  - Direct
  - Indirect
  - Initial/Start up
  - Sustainment
  - Procurement
- Non Quantifiable Costs
  - Life/Safety/Health
  - Perception/Image
  - Opportunity
  - Risk/Uncertainty
  - Political

BENEFITS
- The total of quantifiable (e.g. cycle-time) and non-quantifiable (e.g. quality) benefits
- Financial benefits
  - Return on Investments
  - Cost Avoidances
  - Break-even Pt
- Non-Financial benefits
  - Greater capability
  - Faster availability
  - Better quality
  - Improved morale
  - Other?

BENEFITS MUST BALANCE OR OUTWEIGH COSTS
Army’s Demand for CBA

Total CBAs Created

Submitting Organizations

CBAs by Decision Forum

CBAs by DOTMLPF
Training Objectives

Objectives:

• Understand Army’s CBA methodology
• Understand how to use CBA to improve decision making
• Develop managerial guidelines to encourage good analysis
• Explore development of policies and regulations
• Illustrate the methodology
CBA METHODOLOGY
Cost-Benefit Analysis:

• Is a structured methodology used to identify alternative solutions to a problem, determine the costs and benefits of each alternative, define the appropriate decision criteria, and select the best alternative.

• Produces a strong value proposition – a clear statement that the benefits outweigh the costs and risks.

• In English:
  1. Define a problem or opportunity
  2. Identify alternatives
  3. Determine their costs and benefits
  4. Evaluate and select the best alternative
Why Do We Need CBAs?

**Purpose:**

- Supplement (but not replace) professional experience, subject matter expertise, and military judgment with rigorous analytical techniques
- Make best possible use of constrained resources
- When making resource decisions:
  - Ensure that all decisions are resource-informed
  - Treat cost a consideration from the outset, not as an afterthought
  - Understand how much benefit will be derived
  - Identify billpayers
  - Consider second- and third-order effects
Surprisingly Simple Concept

CBA is easy to do!
It’s not rocket science.
Eight-Step Methodology

1. Define Problem/Opportunity and Objective
2. Define CBA Boundaries and Parameters
3. Define Alternatives
4. Develop Cost Estimate for each Alternative
5. Identify Quantifiable and Non-Quantifiable Benefits
6. Define Alternative Selection Criteria
7. Compare Alternatives
8. Report Results and Recommendations
Cost Benefit Analysis and the MDMP

CBA Methodology

1. Define Problem/Opportunity and Objective
2. Define Scope; Formulate Facts and Assumptions
3. Define Alternatives
4. Develop Cost Estimate for each Alternative
5. Identify Quantifiable and Non-Quantifiable Benefits
6. Define Alternative Selection Criteria
7. Compare Alternatives
8. Report Results and Recommendations

Military Decision-Making Process (MDMP) *

Receive Mission
Analyze Restated Mission (includes assumptions and constraints)
Develop Alternatives
Analyze Alternatives
Compare Alternatives
Approve Alternatives
Issue Implementing Orders

* As prescribed in FM 5-0.
CBA is Not a Linear Process

- At any step in the process, the team’s findings and analysis might make it necessary to revisit previous steps.
- Significant findings might require asking the decision maker for revised guidance.
RESOURCE INFORMED DECISION MAKING
Although this course draws largely on policies and activities at Headquarters, Department of the Army, the content and guidance are readily transferrable to other agencies (e.g. Navy, AF...) and levels of command.
Decision Points

• **Initial decisions are most important!**
  – Drive subsequent decisions
  – Largest driver of impact

• In the Army, **requirements** decisions usually precede design or funding decisions

• **Example 1: Personal Transportation Decision Tree**
  1. Public vs Private auto to commute to work
  2. If private auto, what type, model?
  3. Funding decision on financing, leasing, etc.

• **Example 2: Army Mobility Requirement Decision Tree**
  1. DOTMLPF decision
  2. If material, what type of equipment?
  3. Tradeoff decisions
  4. Vendor & Model selection
  5. Funding and schedule decisions
Subject of Analysis

- Which decision is analysis supporting?
- Addressing multiple decision points increases number of alternatives
  - 3 decisions and 2 choice/each = 8 COAS
  - 3 decisions and 3 choice/each = 27 COAS
- Addressing multiple decisions simultaneously requires addressing uncertainty and risk with **more assumptions!**
Special Notes on Cost

• Cost is the consumption of resources
• Type of funding or appropriation should not affect cost
• Approved funding ≠ Free of cost
• What if something is funded (funding reqt exists) or unfunded (no funding reqt)?
  – Funded ≠ Free
  – Spending ≠ cost of requirements
  – Cutting overhires ≠ savings
  – People/equipment already in use ≠ requirements
GOOD CBA GUIDANCE
Army CBA Guide

• Establishes the standard procedure for preparation of CBAs
• All preparers should refer to and follow the procedures set forth in the CBA guide. These are the standards against which all CBAs will be evaluated.

## Questions for Reviewers

**Problem Statement, Assumptions, and Constraints**
- Is the Problem Statement clear, and does it accurately identify the issue?
- Are the assumptions clearly stated and realistic?
- Are all relevant constraints identified?
- Is the Problem Statement, assumptions, or constraints structured in a manner that is clearly intended to favor one alternative?

**Alternatives Development**
- Is each of the alternatives feasible?
- Are the alternatives distinctly different?
- Are there obvious alternatives that are not presented?
- Does the CBA adequately identify (with supporting documentation) the costs and benefits of each alternative?

**Accuracy**
- Is the CBA technically correct (math, formulas, models, data sources, etc.)?
- Is the CBA functionally correct (facts, not opinions)?

**Analysis and Conclusions**
- Are the decision criteria clearly identified?
- Does the CBA use appropriate analytical techniques for the situation?
- Is the recommended alternative compatible with the assumptions and constraints?
- Does the analysis clearly explain how the recommended alternative is better than the others at satisfying the decision criteria?
- Does the recommended alternative satisfy the Problem Statement?
- Have the risks been adequately expressed in the analysis and recommendation?
- Does the decision briefing (or other final product) support the recommended alternative?
Common Mistakes

- Problem stated as **predetermined solution** instead of as problem, as in the form, “We need more money.”
- Problem does not reflect the **stakeholder concerns**
- Problem is **based on anecdotal information**
Normalization of Value

Normalization:

• The values of alternatives can easily be compared
  – Costs of today with costs of tomorrow
  – Present with future benefits
  – Costs with benefits

• Appropriate method must be chosen from many choices

• Costs and benefits may have to be recalculated based upon chosen method

• Common methods:
  – Discounting
  – Constant (base) year
The scope chosen for the CBA

- Must be the same across all COAs.
- Must allow for a fair comparison between the costs and benefits of all alternatives. “Normalization.”

For instance, if the cost of COA1 starts off very high in the first year but drops off sharply in later years, and the cost of COA2 starts off low but rises sharply in later years, the time scope chosen should be sufficiently large to accurately capture the effects of both trends.
Boundaries and Parameters

• Boundaries and parameters provide the limiting conditions that make a controlled analysis of alternatives possible. Consider:
  – Difficulty of analysis in an unbounded problem: how to achieve world peace.
  – Possibility of analysis in a bounded problem: how to determine the best balance between network connectivity, implementation risk, and total costs utilizing current off the shelf technologies.
Developing Alternative Courses of Action

- Beyond defining the status quo, there is no prescribed doctrine or methodology for developing other courses of action.
- So long as facts, assumptions, and scope are taken into account, any COA that falls within the boundaries and parameters thus defined can be a potential solution to the problem statement. Only COAs that are potentially optimal solutions should be included in the CBA.
Feasible Alternatives

• Too many alternatives is as bad as too few
• Alternatives should illustrate the realm of feasible solutions
• In analysis, an optimal solution often exists

Presenting 3 of these does not help
Assess the Status Quo for Viability

Is the status quo a viable alternative?

• The CBA must be forward-looking, not historical. Therefore, the status quo is not always static—it must account for scheduled changes that might occur within the timeframe of the analysis.

• Ask this question: Can the status quo solve the problem, given the scope and facts/constraints we’re dealing with?
  – Yes: Status quo is viable
  – No: Status quo is not viable

• For example:
  – Problem: A storage depot is given a new task to store sensitive items that cannot be exposed to the weather
  – Fact: Existing storage facilities are concrete pads with overhead cover but no walls
  – Conclusion: Status quo cannot solve the problem and is therefore not viable

If the status quo is not viable:
- Will inclusion in the analysis provide a valuable reference?
- Why the status quo was rejected?
Developing Alternative Courses of Action

- The number of possible COAs generally increase with the number of decisions being made.
• “Over-averaging” for sake of simplification:
  – Example:
    ▪ “Fort Hood data is representative of all bases.”

• Assuming away cost:
  – Examples:
    ▪ “Year-end funds will be available,” when that’s not the case
    ▪ “Higher headquarters will pay for it.”
    ▪ “Other organizations will pay for it.”
    ▪ “Military personnel are free.”

• Assuming away the problem:
  – Example:
    ▪ “Unused office space is available.”
    ▪ “Chief of Staff said we need this.”
    ▪ Adding a layer of oversight will increase process efficiency
The Cost of a Green Chiclet

- “Green (fill in blank, i.e., funding, status...) for $55M is the preferred alternative”

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Cost ($M)</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative 1</td>
<td>55</td>
<td>Good</td>
</tr>
<tr>
<td>Alternative 2</td>
<td>45</td>
<td>Average</td>
</tr>
<tr>
<td>Alternative 3</td>
<td>30</td>
<td>Critical</td>
</tr>
</tbody>
</table>

Which alternative has the best value?
Effects of Over simplification

<table>
<thead>
<tr>
<th>Metric</th>
<th>Benefit</th>
<th>Score/Rank</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative 1</td>
<td>20 widgets/yr</td>
<td>Good</td>
<td>3</td>
</tr>
<tr>
<td>Alternative 2</td>
<td>15 widgets/yr</td>
<td>Average</td>
<td>2</td>
</tr>
<tr>
<td>Alternative 3</td>
<td>10 widgets/yr</td>
<td>Bad</td>
<td>1</td>
</tr>
</tbody>
</table>

- What happens when using a per cost or per benefit metric?

<table>
<thead>
<tr>
<th>Metric</th>
<th>CBI</th>
<th>BCI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative 1</td>
<td>8.3</td>
<td>0.12</td>
</tr>
<tr>
<td>Alternative 2</td>
<td>7.5</td>
<td>0.13</td>
</tr>
<tr>
<td>Alternative 3</td>
<td>10</td>
<td>0.10</td>
</tr>
</tbody>
</table>

Best Case: COA 2 is best?
Decision Matrix

**Decision Matrix:**

- A tool that compares benefits with costs to produce a single value score

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**COSTS**

- The total of quantifiable and non-quantifiable costs
  - Quantifiable costs
    - Salary and benefits
    - Procurement
    - Sustainment
  - Non-quantifiable costs
    - Opportunity costs
    - Externalities

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**BENEFITS**

- The total of quantifiable and non-quantifiable benefits
  - Quantifiable benefits
    - Cost Savings / Avoidance
    - Operational Measures
  - Non-quantifiable benefits
    - Greater capability
    - Faster availability
    - Better quality
    - Improved morale

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**Comparing Two or More Alternatives in Terms of Cost & Benefits**

**Benefits Should Outweigh Costs**

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One of the best ways to elucidate the resource-informed decision to senior leadership is to include a **Decision Matrix** in the Decision Brief.
## Decision Matrix Merits

<table>
<thead>
<tr>
<th><strong>Pros</strong></th>
<th><strong>Cons</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Easy to use</td>
<td>Error prone</td>
</tr>
<tr>
<td>Normalizes costs and benefits</td>
<td>Highly judgmental</td>
</tr>
<tr>
<td>Is a familiar tool</td>
<td>Loss of information via normalization</td>
</tr>
<tr>
<td>Flexible</td>
<td>Results not definitive</td>
</tr>
<tr>
<td></td>
<td>Scoring is subjective</td>
</tr>
</tbody>
</table>
Example - Decision Matrix

<table>
<thead>
<tr>
<th>Benefit Criteria</th>
<th>Weight</th>
<th>COA-1</th>
<th>COA-2</th>
<th>COA-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lethality</td>
<td>30%</td>
<td>9</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Safety</td>
<td>45%</td>
<td>4</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Survivability</td>
<td>25%</td>
<td>6</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>

Score: 6.0 5.8 4.1

Cost $M in BY-2011

- COA-1: $20
- COA-2: $16
- COA-3: $12

Cost = $ quantifiable cost – $ quantifiable benefit or saving

<table>
<thead>
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<th>COA-1</th>
<th>COA-2</th>
<th>COA-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost per Benefit</td>
<td>$3.33</td>
<td>$2.78</td>
<td>$2.96</td>
</tr>
</tbody>
</table>

Benefit = $ non-quantifiable benefit and $ non-quantifiable risk

Rating: 1 (worst) to 9 (best)
• The _____ headquarters has staffed a proposal to align the interests of the staff and now that is needs funding, the CBA needs to be started...

• What is the cost of a new conference room?

• When buying a car, I should compare the forty six models that fit my criteria in order to cover the full spectrum of decisions.
POLICY GUIDANCE
### CBA Policies: OSD and the Army

<table>
<thead>
<tr>
<th>Policy Type</th>
<th>Directive</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secretary of Defense Directive</td>
<td>(Dec 27, 2010)</td>
<td></td>
</tr>
<tr>
<td>Department of Army Directive</td>
<td>(Jan 07, 2011)</td>
<td></td>
</tr>
<tr>
<td>Department of Army Directive</td>
<td>(Dec 30, 2009)</td>
<td></td>
</tr>
</tbody>
</table>

- **The Secretary of Defense Directive (Dec 27, 2010)**
  - “every new proposal or initiative will come with a cost estimate”
  - “effective 1 Feb 2011, calculate costs associated with [studies & events]”

- **Department of Army Directive (Jan 07, 2011)**
  - “Require a cost estimate for all program and policy proposals”

- **Department of Army Directive (Dec 30, 2009)**
  - “use Cost-Benefit Analysis (CBA) or similar analytical approaches/tools to support resource-informed decision making”
  - “each unfunded requirement and new or expanded program...be accompanied by a thorough cost-benefit analysis”
Army Leadership Expectations

**Compliance**
- CBA results and efficiencies comply with Department of Defense, Department of the Army, and Congressional guidance

**Priorities**
- Allocate limited funding to efficiently achieve Army’s top priorities

**Functional Involvement**
- Collaborate with stakeholders to develop effective and efficient solutions
- Use CBA to:
  - Make resource-informed decisions
  - Deliver strong value proposition for the Army
Impact of the Army Directive

- USA/VCSA memo was sent to HQDA principal officials (see back-up section for complete list of addressees)
- As expected, the requirement is “trickling down.”
  - HQDA officials are requesting CBAs from the field
  - Subordinate commands are requiring CBAs internally
CBAs Requiring HQDA Review

- Unfunded requirements, new program proposals, or expansions being presented to the Senior Leaders of the Department of the Army.

- Issues presented to HQDA forums/processes:
  - POM/BES
  - Army Campaign Plan (ACP)
  - Army Requirements and Resourcing Board (AR2B)
  - Force Design Update (FDU)
  - Army Requirements Oversight Council (AROC)
  - Training Resources Arbitration Panel (TRAP)
  - ... and more to follow

- Issues that are important to the Army leadership, OSD, or Congress
Role of CBA Review Board (CBARB)

- **CBARB reviews CBA:**
  - Cost estimate
  - Analytical rigor
  - Assumptions
  - Methodology and logic
- **DASA-CE decision, based on CBARB recommendation:**
  - Is the CBA suitable or adequate to support decision making?
  - DASA-CE approval is not approval of the recommendation in the CBA

- **CBARB members:**
  - Board chair - Division Chief
  - Standing members:
    - Army Budget Office (ABO)
    - PAED
    - G-3/5/7
  - Other members, as needed based on the subject matter:
    - Appropriate DASA(CE) divisions
    - PEG representatives (as determined by PAED)
    - ABO appropriation sponsors
    - HQDA functional proponents
    - Manpower specialist from G-1
    - Other functional proponent(s)

Commands and installations are encouraged to establish similar teams to review and validate CBAs
Process of Reviewing a CBA

**Decision-Making Individual/Body**

**Analyst/Functional Proponent**

**CBA Review Board (CBARB)**

**Deputy Assistant Secretary of the Army (Cost and Economics) (DASA(CE))**

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**Assessment:** Is the CBA suitable to support decision making?

**Tasking:** Develop a CBA

**Cost Benefit Analysis and Supporting Documentation**

**Recommendation**

The individual or body that needs the CBA to support a decision. Could be a PEG, HQDA staff principal, ACP process, BRP process, etc.

* CBA may be submitted by analyst or decision-making body. Decision-making body is responsible for ensuring the CBA is submitted.
• Best case scenario: Independent 3\textsuperscript{rd} party analysis
• Real life: Interested (i.e. biased) stakeholder usually conducts analysis
• Sensitivity analysis
  – Good way to check CBA
  – Sensitivity to assumptions validates analysis
  – Enables reviewer to understand analysis
• Review of CBA is often a good time to check sensitivities
  – Reviewer should conduct analysis
  – Memo is good place to show sensitivities
ILLUSTRATION
### Exercise - Present Value

1. Which costs more?
2. How much more?

<table>
<thead>
<tr>
<th>Year</th>
<th>Alternative 1</th>
<th>Alternative 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>(85)</td>
<td>(150)</td>
</tr>
<tr>
<td>2001</td>
<td>(21)</td>
<td>(10)</td>
</tr>
<tr>
<td>2002</td>
<td>(21)</td>
<td>(11)</td>
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<tr>
<td>2003</td>
<td>(22)</td>
<td>(11)</td>
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<tr>
<td>2004</td>
<td>(23)</td>
<td>(11)</td>
</tr>
<tr>
<td>2005</td>
<td>(23)</td>
<td>(12)</td>
</tr>
<tr>
<td>2006</td>
<td>(24)</td>
<td>(12)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>(219)</td>
<td>(217)</td>
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Current/Then year $MM

**Inflation:** 3%

**Discount Rate:** 5%
## Which costs more?

### Current/Then year $MM

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<td>(12)</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>(219)</strong></td>
<td><strong>(217)</strong></td>
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### Constant/Base year $MM

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</tr>
<tr>
<td>2006</td>
<td>(20)</td>
<td>(10)</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>(205)</strong></td>
<td><strong>(210)</strong></td>
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</table>

### PV $MM discounted at 5% rate

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<td>2003</td>
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<td>(9)</td>
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<tr>
<td>2004</td>
<td>(19)</td>
<td>(9)</td>
</tr>
<tr>
<td>2005</td>
<td>(18)</td>
<td>(9)</td>
</tr>
<tr>
<td>2006</td>
<td>(18)</td>
<td>(9)</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>(197)</strong></td>
<td><strong>(206)</strong></td>
</tr>
</tbody>
</table>
The DOD has identified $198M for the procurement of two different models of the multiple rocket launcher systems—class X and class Y—for deployment to Afghanistan. The class Y system costs $9M each and weighs 27,000 pounds. The class X system costs $11M and weighs 12,000 pounds. After procurement, all the launchers will be transported to Afghanistan by a single sortie of C-130 Hercules aircraft, each with a total maximum payload of 405,000 pounds.
How do you maximize the total number of launchers procured?

If you buy only Class X, you can afford 18.

If you buy only Class Y, you can carry 15.

So is “buy 18 Class X launcher systems” the optimal solution?
Example: Finding Optimal Solutions

COA 1 (Status Quo)

COA 2

COA 3

COA 4
Example: Finding Optimal Solutions

• You can procure 9 Class X and 11 Class Y launchers, for a total of 20.

• Moral of the exercise: analysis is sometimes necessary to determine the optimal solution.
CBA Example

Situation: The Army would like to increase its battlefield capability by increasing anti-personnel lethality. OSD, SA, CSA are involved in the decision.

Proposal is to upgrade the MX system to BL IV capability.

Considerations:

– How does $20B lifecycle cost estimate compare to other alternatives rather than to the entire PEG or acquisition program?
– Policy changes are not “free”. e.g. Impacts to accessions will increase Army costs
– Why is the remaining force structure assumed to be fixed or “off the table”? Increased lethality per soldier now requires less of other systems/soldiers.
Decision is the potential realignment and relocation of an Army school with approximately 50 staff members and 2000 students/year.

### Decision Matrix

<table>
<thead>
<tr>
<th>Benefit Criteria</th>
<th>Weight</th>
<th>COA-1</th>
<th>COA-2</th>
<th>COA-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Political support</td>
<td>75%</td>
<td>8</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Quality of life/post support</td>
<td>25%</td>
<td>5</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td><strong>Score</strong></td>
<td></td>
<td><strong>7.25</strong></td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

### Cost Matrix

<table>
<thead>
<tr>
<th></th>
<th>COA-1</th>
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<td>Cost- Investment</td>
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<td>$40M</td>
<td>$25M</td>
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<tr>
<td>Cost - Recurring (FY 1-6)</td>
<td>$648M</td>
<td>$527M</td>
<td>$612M</td>
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</table>

**Rating:** 1 (worst) to 9 (best)
Summary

• CBA has top-down support and is becoming embedded in Army decision-making processes.
• CBA is a collaborative process ... it requires a team.
• CBA is an opportunity to apply new thinking to find solutions to solve problems.
• CBA helps leaders and managers make better resource-informed decisions and thus helps the Army make better use of resources that are becoming increasingly constrained.
• Robust analysis makes it easier to explain and defend Army resource requirements
• Support is available – tools, models, guidebooks, dedicated mailbox, additional training
• CBA is based on a sound, logical approach to problem solving.
QUESTIONS
Decision is the potential realignment and relocation of a Army school with approximately 50 staff members and 2000 students/year.

<table>
<thead>
<tr>
<th>Cost- Investment</th>
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<th>COA-2</th>
<th>COA-3</th>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Decision Matrix</th>
<th>Rating or Ranking</th>
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<tr>
<td>Benefit Criteria</td>
<td>Weight</td>
</tr>
<tr>
<td>Cost</td>
<td>30%</td>
</tr>
<tr>
<td>Political support</td>
<td>45%</td>
</tr>
<tr>
<td>Quality of life/post support</td>
<td>25%</td>
</tr>
<tr>
<td>Score</td>
<td>6.4</td>
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</table>

COA-1 highest benefit, COA-2 best value, COA-3 lowest cost. Rating: 1 (worst) to 9 (best)
Considerations for Decision Maker

**Decision makers should ensure:**

- Analysis clearly demonstrates how the recommended COA best satisfies the selection criteria.
- Weightings for selection criteria are consistent with decision maker’s guidance.
- Second- and third-order effects are identified, and the negative impacts have been taken into account.
- Sensitivity analysis has been conducted to determine how sensitive the recommendation is to possible changes in costs, benefits, assumptions, etc.
- All reasonably likely risks and their impacts been identified, and the recommended mitigation approaches are adequate and affordable.
Step 6: Alternative Selection Criteria

- Alternative selection criteria are the standards/bases on which the decision will be based.
- CBAs must contain documentation that identifies recommended decision criteria and the extent to which each alternative satisfies each of the criteria.

Questions for the reviewer:
- Are the selection criteria consistent with the problem statement or objective?
- Do the selection criteria incorporate appropriate guidance from higher headquarters?
- Has consideration been given to a mix of cost and non-cost criteria?
- Are the selection criteria inappropriately skewed to favor one course of action?
CBA Costing Process

**Preparation**
- Establish Ground Rules and Assumptions
- Develop Work Breakdown Structure
- Identify Data Requirements and Sources
- Obtain or Develop Detailed Process Map

**Review and Validation**
- Prepare Back-Up Documentation
- Review for Accuracy and Reasonableness
- Conduct Sensitivity Analysis and Risk Assessment

**Develop the Cost Estimate**

If you do all this, you’ll have a good cost estimate
CBA Training

• DASA-CE published enablers in the CPP:
  – Cost Benefit Analysis Guide Book
  – CBA Briefing Template
  – CBA Examples and Case Studies
  – Question and Answer Mailbox: usarmy.pentagon.hqda-asa-fm.mbx.army-cost-benefit-analysis@mail.mil

• CBA Training:
  – 4 Hour familiarization training
  – 4 Day course
  – 4 Day course for trainers offer by DASA(CE)
  – Introduction in various other classes: FM Classes, CMCC, PCAM, ICAM, CMBC
Resources

- DASA-CE has put together the following set of enablers:
  - Cost Benefit Analysis Guide Book
  - CBA Briefing Template
  - CBA Examples and Case Studies
  - Question and Answer Mailbox

- All documents are posted in the Cost and Performance Portal: [https://cpp.army.mil](https://cpp.army.mil)

- Question and Answer Mailbox (24-hour turn around) [usarmy.pentagon.hqda-asa-fm.mbx.army-cost-benefit-analysis@mail.mil](mailto:usarmy.pentagon.hqda-asa-fm.mbx.army-cost-benefit-analysis@mail.mil) (link in cpp)

- CBA Training:
  - 4 Hour familiarization training
  - 4 Day course
  - Introduction in various other classes: FM Classes, CMCC, PCAM, ICAM..

Assistance is available from DASA(CE)

Cost Benefit Analysis Review Board (CBARB)
Deputy Assistant Secretary of the Army Cost & Economics (DASA – CE)
Available Tools and Models for Cost Data

Data Sources
- Personnel
- Facilities
- Equipment

AMCOS
The Army Military-Civilian Cost System
Modeling costs

AMCOS must be used for military and civilian personnel compensation and benefits

US Army Corps of Engineers
Form 1391 – MILCON construction costs

Unified Facilities Criteria
Facilities sustainment costs estimation

Army Equipping Enterprise System
Equipment costs by LIN

FORCES
OPTEMPO, equipment, force structure, transportation, CONOPS

Electronic Document Access
Contract data

GSA Advantage!
Services, leases, and equipment

www.gsaAdvantage.gov
A Note from the Leadership

Mr. Stephen G. Barth
DASA
Cost and Economics

Historically, Army has focused on managing by the budget; whereas, we are focusing now on managing by costs. Our financial systems provide Senior Leaders and Commanders the information they need to make Resource-Informed Decisions such as: total costs, quantitative data in Statistical Key Figures, and Return on Investment.

We understand that moving toward full implementation of Cost Management is going to be an evolutionary process. Our resource management professionals and our operational managers Army-wide have been impacted. In an effort to capture all the Cost Management information in one area, we have created a Cost Management Knowledge Center on the Cost and Performance Portal.

The information you will find on this site includes, but is not limited to: Guidance on Cost Management and the Cost Management in GFEB, Training Opportunities, Cost Warrior publications, and a Command Corner with command specific resources.

We hope this new site will foster a positive and open environment to Share Best Practices and lessons learned across Army organizations.

What’s New...

March Cost Warrior Roundtable Discussion
Date/Time: 26 Mar 14 1130-1230 EST
Topic: Reporting Using Cost Object Attributes
Presenter: Mark Gaydos, Chief, Fiscal and Policy Division, ATEC

Cost Warrior Newsletter
Feb 2014 Cost Warrior Newsletter

What is Cost Management?

- Considering total costs when making a decision
- Using Army Financial Systems to identify, calculate, and assess benefits and related costs to meet mission requirements
- Linking expenses with operational outcomes and performance data in a way that directly ties it to mission requirements for the analytical assessment of best practices and best value decisions

What does Success look like?

Resource Managers and Operational Managers working together, using cost and performance data in conjunction with experience-based knowledge, to make more effective use of scarce resources
Available Tools and Models for Cost Data

Some of the websites listed here require user accounts. In most cases, anyone with a dot mil address can obtain an account. You are encouraged to scan these sites and request an account to any site that you think will be useful to you. This will save time when you need to use any sites to support a CBA or other projects.

<table>
<thead>
<tr>
<th>Tool/Model</th>
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<th>Purpose</th>
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<tr>
<td>FORCES Cost Models</td>
<td><a href="https://www.osmisweb.army.mil/forces/login.aspx">https://www.osmisweb.army.mil/forces/login.aspx</a></td>
<td>Suite of models that provides quick and reasonable unit cost estimates to a wide variety of users</td>
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<tr>
<td>Army Military-Civilian Cost System (AMCOS)</td>
<td><a href="https://www.osmisweb.army.mil/amcos/app/home.aspx">https://www.osmisweb.army.mil/amcos/app/home.aspx</a></td>
<td>Personnel costs for military, civilian, and/or contractor</td>
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<tr>
<td>Operating and Support Management Information System (OSMIS)</td>
<td><a href="https://www.osmisweb.army.mil/osmisrdb/login.aspx">https://www.osmisweb.army.mil/osmisrdb/login.aspx</a></td>
<td>Operating and support information for major weapon/material systems</td>
</tr>
</tbody>
</table>

Access links through the “Resources” tab in the CBA Portal at https://cpp.army.mil
AMCOS

AMCOS → Applications → AMCOS lite
Capabilities Knowledge Base

The Capabilities Knowledge Base (CKB) was designed and developed to facilitate the use of capabilities-based cost estimating. The CKB contains data and tools that will aid the analyst and high-level decision maker throughout the entire lifecycle of a defense program. The CKB is extremely beneficial in addressing the requirement for service component cost estimates at Milestone A as required by the December 2008 DoD 5000.92.

The CKB contains the cross-service program capability, cost, and performance data required to produce cost forecasts within shorter timelines. The CKB, which is intended for cross-service and DoD-wide use, currently houses over 50,000 data points.

The CKB is fundamentally composed of two major elements: the Analytical Tools and the Data Navigator.

- The Analytical Tools greatly aid the user when performing a capabilities-based analysis. There are currently two tools available:
  - Analogous Programs and Capability Gaps. The Analogous Programs tool identifies and provides the user with the list of the most similar or analogous existing programs to a set of capabilities that were specified. The Capability Gaps tool identifies and provides a summary of the capability gaps for a given set of programs contained within the CKB.
  - The Data Navigator allows the user to access the capability mappings, cost/budgetary data, and technical characteristics for over 200 existing Department of Defense (DoD) military programs. This historical as well as the most current cost/budgetary data is available for each program. The source documents for all data are also made available to the user.

The CKB is the result of an ongoing study conducted by the Early Cost Team within the Office of the Deputy Assistant Secretary of the Army for Cost and Economics (DASA-CE).

For additional information regarding the CKB, please visit About the CKB.

Home | About | Links | Contact | Help
### Program Details: ABRAMS UPGRADE

**Program:** ABRAMS UPGRADE  
**Program Type:** Surface  
**Program Sub-Type:** Tracked Ground Vehicle  
**DARIF Status:** Inactive  
**Research Area:** Force Application  
**FCA:** Force Application  
**DAES Group:** NA  

**Mission and Description:**

The Abrams tank modernization strategy supports the Army Vision and Transformation Strategy. The Abrams tank coexists with and destroys enemy forces on the integrated battlefield using mobility, firepower, situational awareness, and shock effect. The 120mm main gun on the M1A1 and M1A2, combined with the powerful 1,500 hp turbine engine and special armor, makes the Abrams tank particularly suitable for attacking or defending against large concentrations of heavy armor forces in a highly lethal battlefield. The M1A2 Upgrade provides the Abrams tank with the necessary improvements in lethality, survivability, and flexibility required to defeat advanced threats. The M1A2 includes a commander's

### Program Costs ($M)

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</tr>
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</table>

*Download Program Costs*

(row(s) 1 - 15 of 256 Next)
OSMIS

Notice: FY 2010 Data is now available!

SHADOW UAS DATA
OSMIS now includes flying hours for the SHADOW UAS from FY05 through FY08. The flying hours are displayed on an annual basis from FY05-FY08, while the FY09 flying hours are reported quarterly. OSMIS will update the flying hours quarterly. Also included in a weapons definition of major components for the SHADOW along with a crosswalk of the major components line to NMAP. All data is courtesy of the PM, UAS.

(ATEC) TEST AND EVALUATION DATA
The (ATEC) TEST AND EVALUATION DATA files are now available for download under the top menu:

OSMIS NEWS
- OSMIS DATA NEWS
- TRAINING NEWS

FY10 DATA
The FY10 Data is now available!

Changes to MMR Reports
The MMR reports are now separated by Air and Ground and the new Air report is at serial (S/N) number level.

The Secret Way Africa ops may be just starting
12/6/2011 11:38:03 PM
There was clearly something suspicious about the two western-looking “civilians” and their interpreter into the Ethiopian security forces were questioning.

Rare sectarian attack kills 36 in Kabul
12/6/2011 12:28:03 PM
KABUL, Afghanistan — At least 36 people were killed when a suicide bomber struck a crowd of Shiite worshipers who gathered in Kabul mosques Tuesday to mark a holy day. A second bombing in another city killed four more Shias. They were the first major sectarian attacks since the fall of the Taliban a decade ago.

76 years on, Dooly Harbor survivors share tales
12/6/2011 11:52:17 PM
MONTGOMERY — Clarence Roundtree was standing in front of his locker on the battleship Maryland when a fellow sailor told him they were being bombed by Japanese planes.

Attorneys: Cabot to blame for troops' deaths
12/6/2011 10:29:48 PM
TAMPA, Fla. — Attorneys for a woman accused of killing her teenage children say her Army officer-ex-husband was negligent to have them in the mentally ill woman's care.

Cell dies in Germany from Afghanistan mission
12/6/2011 12:09:52 PM
104400 FALLO, Soldier in special forces who died after injuries sustained in an explosion in Afghanistan. Family members say.

Coming soon: Stenchen nomination list
12/6/2011 11:39:29 AM
Results of the fiscal 2011 Army Combativity Category special promotion selection board will be released Dec. 14.

101st donors report relief from hyperbaric oxygen
12/6/2011 10:37:36 AM
Rear Adm. Sigs, Marissa Wailes believes in hyperbaric oxygen a pressurized chamber used the manifestations of her brain injury — migraines, memory loss and facial paralysis.

Pakistan pulls some troops from border posts
12/6/2011 8:31:44 AM