

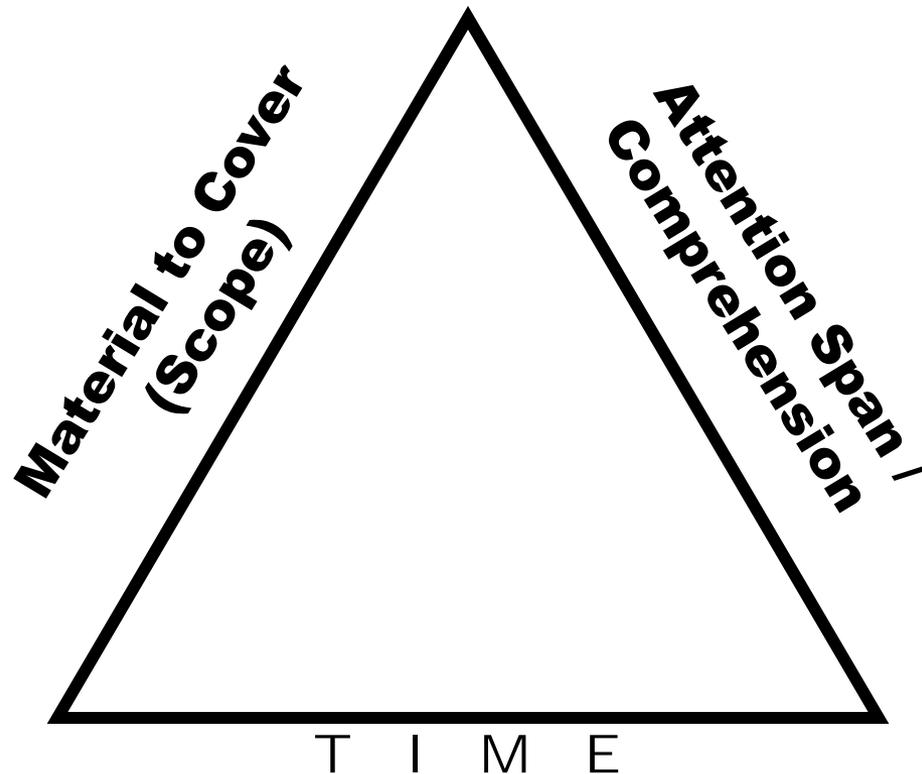


Cost Benefit Analysis (CBA) and the Commonwealth Technology Portfolio (CTP)

Pat Reynolds
Project Management Division

November 2016

Triple Constraints *du jour*



Today we will cover...

- Cost-Benefit Analysis (CBA)
 - Costs
 - Benefits
 - Analysis
 - Return on Investment (ROI)
 - Total Cost of Ownership (TCO)
 - Payback period
 - Spreadsheet example
 - CTP procedures

- And...



So What?



Virginia Information Technologies Agency



VITA enables diverse business needs

DBHDS

Virginia Department of Behavioral Health and Developmental Services



VIRGINIA DEPARTMENT OF SOCIAL SERVICES



Better, Faster, Cheaper, Smarter, Secure...

- *Guess what:* Information Technology can enable agencies to do all of the above.
- So, the Commonwealth INVESTS taxpayer money in information technology projects to serve its citizens better, faster, cheaper, etc.
- IT Projects (and Project Management) is the best method we know by which agencies develop and implement new capabilities.



Better, Faster, Cheaper, Smarter, Secure...

- Consequently, the Commonwealth currently has more than 1/3 of a BILLION dollar investment in IT Projects.
- Wow! That's a lot of money.
- \$356,048,137.35 as of October, 2016
- 37 Commonwealth-level IT Projects



CBA: Required!

- Supports the financial justification for choosing a given alternative IT investment.
- It's not the ONLY reason to choose a given alternative.
- We owe it to the Commonwealth citizens to make smart, justifiable IT investments.



Common Sense

CBA: Required!

COV ITRM Project Management Standard CPM 112-03.6:

- Cost Benefit Analysis required for Category 1, 2, 3 projects.
- Category 4 project:
 - “While a detailed Cost Benefit Analysis is not required for Category Four projects, the Business Case and Alternatives Analysis should, as a minimum, list the potential tangible and intangible benefits that are expected to accrue from completion of the project and the expected Return on Investment (ROI).”

CBA.xlsx

- CBA.xlsx replaces the CBA form in the Commonwealth Technology Portfolio (CTP)
- Complete the CBA.xlsx (Save As... your own version); upload to CTP when complete
- Analyze at least three scenarios:
 - “Do Nothing”
 - Alternative (Alt.) 1
 - Alternative (Alt.) 2
 - Alternative (Alt.) 3... is there if you need it.
- Period of analysis: Six years from project implementation
 - Use Fiscal Years (July 1 – June 30)



Cost-Benefit Analysis (CBA)

- Simple tool that will help you decide which solution makes the most sense from a financial point of view.
- CBA can help you:
 - Decide whether to make a change.
 - Identify costs associated with potential benefits.
 - Evaluate several options for financial impact.
 - Final selection should return the greatest overall benefit for incurred cost.

Ideally...

- Benefits will outweigh costs. But...
- Mandates may override purely financial analysis
- Maybe *no alternative* has net benefits; It may be a comparison of which alternative costs less.
- Still, CBA will help identify the best financial alternative.

CBA is “silent” on...

- Non-monetary measures.
 - Customer satisfaction
 - Probabilities of success.
 - iPhone
 - Political considerations.
 - Yes, political considerations.
- Based upon these analyses, a solution is proposed in the next step of the process.



More caveats...

- *Caveat: a warning or proviso of specific stipulations, conditions, or limitations.*
- Just because a project is mandated does not mean there is only one solution.
- Change in procedure is sometimes more cost effective than developing an automation solution.
- Assumptions abound! (Please annotate them.)



Car Scenario: Consider...



1. Costs

- Immediate / up-front
- Ongoing

2. Benefits

- Direct, tangible
- Indirect, intangible

3. Analysis

- TCO
- ROI

4. Decide!

- Other influencing factors

Cost Benefit Analysis: 3 Steps

1. Determine Costs

2. Calculate Benefits

3. Compare alternatives

• *BTW, Assumptions abound!*

CBA Step #1: Determine Costs

Internal Staff Labor
Services
Software Tools
Hardware
Maintenance
Facilities
Telecommunications
Training
IV&V
Contingency (Risk)
Pre-Project Initiation Costs
Other
Total

- Project costs
 - 12 budget categories in CTP (and CBA.xlsx)
 - Project (implementation) costs
 - Remember, include people costs!
 - Use real estimates

Staffing Costs
Full-time IT Staff (Salaries & Benefits)
Other Full-time Staff (Salaries & Benefi...
Contract Staff
Other Operational Costs
Services
Software Tools
Hardware
Maintenance
Facilities
Telecommunications
Training
Contingency
Misc. Operational Costs
Total Operational Costs

- Operation & Maintenance (O&M) Costs:
 - (Additional) Staffing Costs
 - 3 staffing categories in CTP (and CBA.xlsx)
 - Other Operational Costs
 - 9 budget categories in CTP (and CBA.xlsx)
 - Use real estimates; **NOT** +/- compared to today
 - Six years from project implementation!

Estimating Costs: Project and O&M

- Early estimates of costs in the Select and Initiation phases will be Rough Order of Magnitude, (ROM) with a range of +/- 50% (or more)
- Later in the Planning phase the range should be lower to +/- 10%
- Ballpark



Estimating Costs: Input ideas

- Scope statement
- WBS
- Schedule
- Risks register
- Market conditions
- Your organization's cost estimating policies
- Cost estimating templates
- Historical information
- Lessons learned
- Your own experiences and judgments



Estimating Costs: Tools, Techniques

- Expert judgement
- Analogous estimating
 - Uses actual costs of previous projects along with expert judgement
- Parametric
 - Uses formulas to determine costs
- Bottom up
 - Estimating individual components of work then adding up
- Three point estimating
 - Most likely, Optimistic, Pessimistic
- Some project management software tools have templates for determining project costs

Determine Costs: **‘Do Nothing’** Alt.

Do Nothing: What does it cost to maintain the current / legacy system?

1. Establishes a baseline cost.
2. The current “system” could be a manual process, an existing IT solution, or a combination of the two
3. Make assumptions about how costs may change during the period of analysis
 - Maintenance, upgrades
 - Additional staff
4. BTW, ‘Do Nothing’ might be the most economically feasible, but other factors may drive the decision



WE OFFER THREE KINDS OF SERVICE:

GOOD – CHEAP – FAST

YOU CAN PICK ANY TWO

GOOD SERVICE CHEAP WON'T BE FAST

GOOD SERVICE FAST WON'T BE CHEAP

FAST SERVICE CHEAP WON'T BE GOOD

Project Management: *Pick two, any two...*

Total Cost of Ownership: TCO

- *Total Cost of Ownership (TCO)* is the price of implementing a project plus the *costs* of operation & maintenance over a given time period. When choosing among alternatives, decision-makers should look not just at an investment's short-term cost, but also at its long-term cost, which is the *total cost of ownership*.
- Implementation Cost + O&M (for a given time period) = TCO

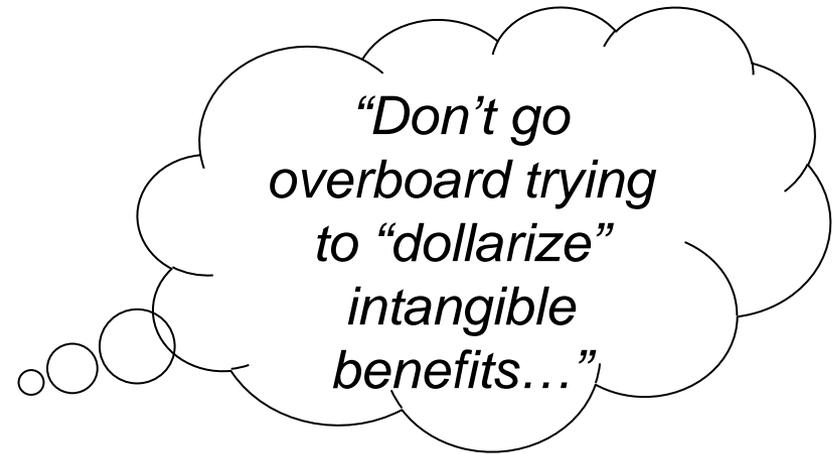
CBA Step #2: Calculate Benefits

- Value of labor saved
- Quality improvements
- Revenue increase
- Production (efficiency) increase
 - More efficient business processes
- Staffing reduction
 - More efficient staff
- Better information: customer, production, etc.
 - Better data management
 - More secure data - ?



Benefits overview

- **Tangible:**
 - Cost Savings
 - Cost Avoidance
 - Increased Revenue
 - What about Federal Grants?
- **Intangible:**
 - Improved quality of life
 - Increase in public safety or accessibility
 - Increased capacity / risk reduction
 - Better data management
 - More secure data - ?



Tangible Benefits

- Cost Savings

- Increased efficiency / throughput
- Higher quality = increased effectiveness
- CBA.xlsx: “Benefit 1. (Note 1.)” = calculated field. *O&M savings compared to "Do Nothing" alternative ("Do Nothing" row 38 - row 38)*

- Cost Avoidance

- Avoid hiring staff
- Avoid technical costs
- Avoid penalty costs
- CBA.xlsx: “Benefit 2. (Note 2.)” = *Cost Avoidance: If we select this alternative, we will NOT have to purchase _____ in the "Do Nothing" scenario.*



Tangible Benefits, cont'd.

- Increased Revenue

- This only applies to a few agencies...
- CBA.xlsx: "Benefit 3. (Note 3.)" = *Increased Revenues: If we select this alternative, our organization will collect additional revenues.*

38		Ops & Maint Cost	\$ 9,000,000
39		O&M Costs: Cumulative	\$ 9,000,000
40	Total Cost of Ownership (TCO)	TCO: Proj. + O&M Costs: Cumulative	\$ 9,000,000
41		Fed subsidy & grants for O&M	\$ 4,500,000
42		Cost to Virginia funds	\$ 4,500,000
43		Va. O&M Cost: Cumulative	\$ 4,500,000
44	Total Va. Cost of Ownership (TCO)	TCO: Va. Proj. + O&M Costs: Cumulative	\$ 4,500,000
45			

- What about Federal Grants?

- Considered a reduction to costs (rather than a benefit)
- Not many agencies will use this feature
- CBA.xlsx hide/unhide pink rows to reveal Virginia-specific costs

Qualify & Quantify Benefits

- Who are the beneficiaries (stakeholders)?
 - They should be identified in the charter
- Interview the stakeholders and identify the benefit to the stakeholder and how it is derived.
 - (Enter all notes, formulas and calculations in the BCAA)
- Identify all Business Objectives and Tangible Benefits in Measures of Success
 - What does success look like (Qualify)
 - How will it be measured (Quantify)

Remember: Better, Faster, Cheaper, Smarter, More Secure, etc.

Brainstorming Project Benefits

- If you know the product, Does another state use it? If so, research to see if they have done a CBA for that product.
- If you know the product, look at the vendor marketing material; it can give you ideas on how it can benefit your organization.
- Look at other projects in CTP for ideas; talk to PMD Consultant for ideas.
- Interview stakeholders, users, customers...

CBA Step #3: Compare Alternatives

CBA.xlsx automatically calculates (cumulative and total):

- Project costs
- Operations & Maintenance costs
- TCO
- Benefits:
 - Cost Savings
 - Cost Avoidance
 - Increased Revenues
- ROI
- Pretty graphs
- YOU have to calculate Breakeven point – but it is easy.

Return on Investment (ROI)

- ROI: The difference between the cost of a project and the financial benefits that the completed project provides.
- (PM Standard = over a six year period)
- Project Benefits – Project Cost = ROI
- ROI often expressed as a percentage:
- $((\text{Total Benefits} - \text{Total Cost}) / \text{Total Cost}) \times 100\% = \%ROI$
- CBA.xlsx calculates ROI automatically.

Breakeven Point

- Breakeven Point: The year when the ROI changes from negative to positive.
- Represents when the IT investment “pays for itself”
- Sooner = better
- On CBA.xlsx, examine the ROI over the six years of analysis; observe when the ROI becomes positive
- ROI might not become positive in six years

60	Note 5.					
61	Cumulative ROI	$ROI=(ben-cost)/cost$	-68%	-38%	-11%	16%
62						41%
	Note: The Breakeven year is where the ROI changes from a negative % to a positive %.					

Business Case and Alternatives Analysis (BCAA)

- BCAA provides an opportunity to elaborate on information in the CBA.
 - Explain summarized cost and benefit amounts.
 - Highlight intangible benefits and qualify mandates.
 - Document efforts to identify solutions in other organization or collaboration with other organization on a common solution
- Allows the project team to further justify the proposed solution with details not evident in the CBA

BCAA – Business Problem

Business Problem – a Question, Issue, or Situation which needs to be answered or resolved.

Business Problem

The Business Problem is a question, issue, or situation, pertaining to the business, which needs to be answered or resolved. State in specific terms the problem or issue this project will resolve. Often, the Business Problem is reflected as a critical business issue or initiative in the Agency's Strategic Plan or Information Technology Strategic Plan.

- Often to get the correct perspective you might phrase the statement beginning, “The problem exists that...”
- Do not enter here, the description of the solution. That will come later.

BCAA – Project Scope Statement

Project Scope – defines all of the products, services or results provided by a project and identifies the limits of the project. In this block enter:

Project Scope Statement

The Project Scope defines all of the products and services provided by a project, and identifies the limits of the project. The Project Scope establishes the boundaries of a project and addresses the who, what, where, when, and why of a project.

- High Level Project Requirements
- Project Boundaries – What is *IN* and *OUT* of scope
- Project Strategy – Development methodology
- Project Deliverables
- Acceptance Criteria
- Project Assumptions - circumstances and events that need to occur for the project to be successful, but are outside the total control of the project team.
- Cost Estimates

BCAA – Solution Comparison

Recommended Solution & Justification

Recommended Solution & Justification

Intangible Weighting Justification of Solution (from CBA tool)

- Intangible Weighting Justification of Solution

Specify the Recommended Solution selected as a result of the analysis.

- Specify the Recommended Solution selected as a result of the analysis

Explain why the Recommended Solution was chosen over the other solutions considered.

- Explain why the Recommended Solution was chosen over the other solutions considered

BCAA – Solution Comparison Matrix

Comparison of Solutions

Based on the analysis performed, rate how each solution measured up against each decision criterion. A recommended Rating is Good. Compare the rating results to determine which solution to recommend. Enter in the Solution Identifier in Boxes the

Project Analysis - Solution Comparison

Decision Criteria	Solution 1	Solution 2
Business Process Impact	Good	Good
Technical Feasibility	Good	Good
Maturity of Solution	Fair	Good
Resources Required	Fair	Good
Constraints Impact	Good	Fair
Cost Benefit Analysis	Good	Fair
Return on Investment	Good	Fair
Other	Good	Good
Total		

CTP Project Charter: Changes

“Resources & CBA” Tab:

- Project Resources table: Copy & paste Budget figures directly from CBA.xlsx
- O&M Resources table: Copy & paste O&M figures directly from CBA.xlsx
- CBA Summary:
 - Delete the CBA table and...
 - Add two text boxes:
 - Cost Benefit Analysis Summary: Copy & paste from the “Cost Benefit Analysis Summary” text block for the chosen solution in the BCAA form.
 - Return on Investment (ROI) Summary: Summarize the results of the ROI Analysis for the chosen solution. Copy & paste from the “Return on Investment (ROI) Summary” text block for the chosen solution in the BCAA form.

Summary: A Cost Benefit Analysis provides:

- An opportunity to:
 - identify the costs of a solution.
 - identify the benefits of a solution.
 - compare solutions from a financial perspective.
- Helps you identify a solution that makes the most sense for your particular situation.

