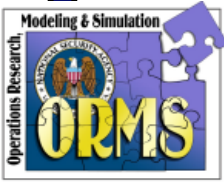


How to Convince a Large DoD Agency to Use Decision Analysis for Budgeting

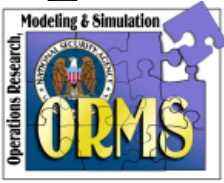
David J. Caswell
William Hensley
Dr. Greg Parnell, IDI
Dr. Bill Klimack, IDI
Donald Buckshaw, IDI

For agency support you must present a consistent vision of the end-state.



- Present clear objectives
- Identify the problem space
- Identify alternative approaches and allow leadership selection
- Expound the benefits of MODA
- Continuously work with leadership for understanding and buy-in

The objective must directly explain why you are working and for what goal.



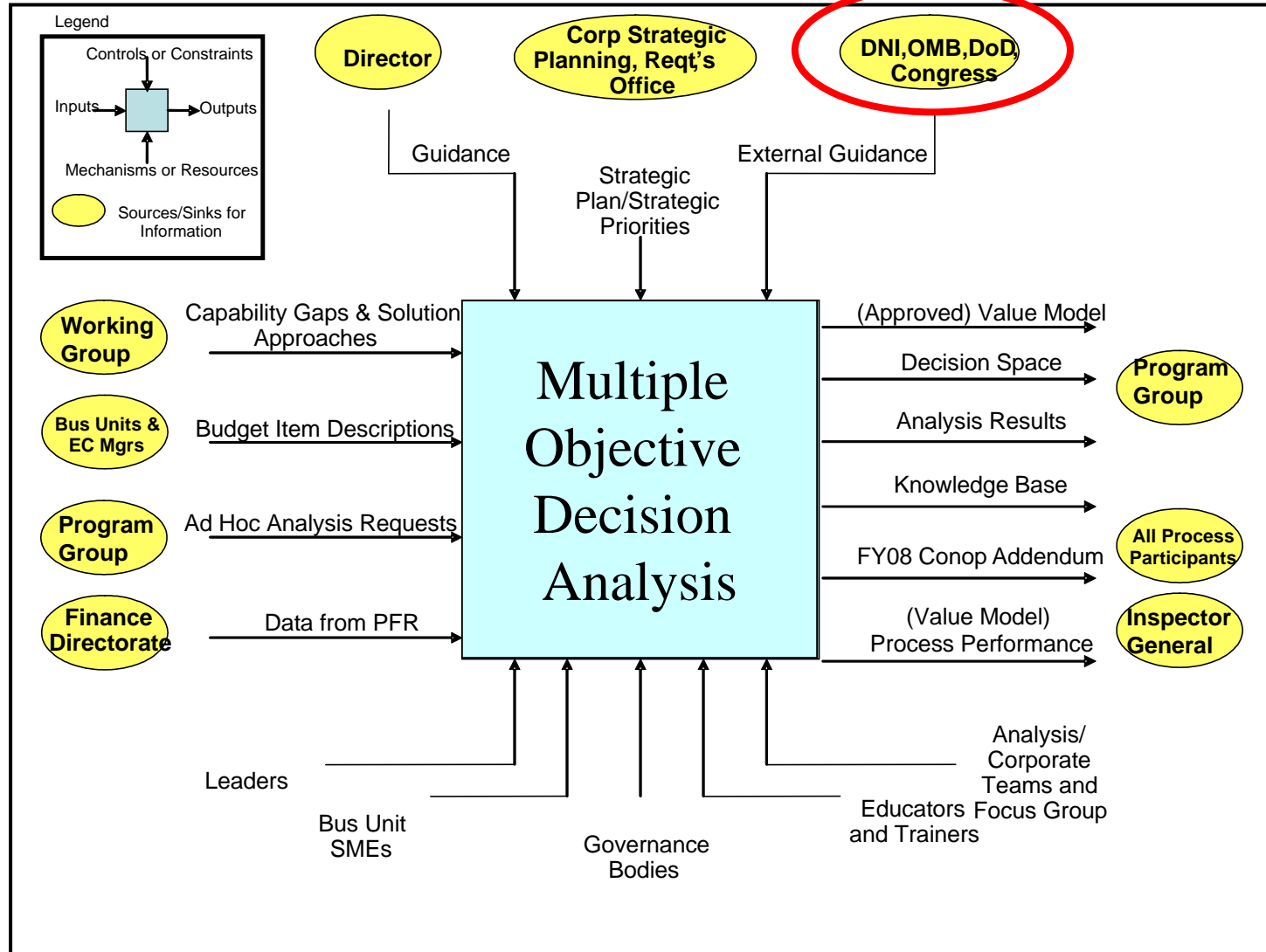
To provide decision, risk and budget analysis to support senior leader decision making of the FY08 Program Build.

- Provide multiple decision perspectives
- Traceable, defensible, and repeatable

“... an achievable vision, a broad strategy to achieve that vision, and a process by which the <Operating Body> can play that vision and strategy against fiscal constraints...in a more analytic and considered fashion.”

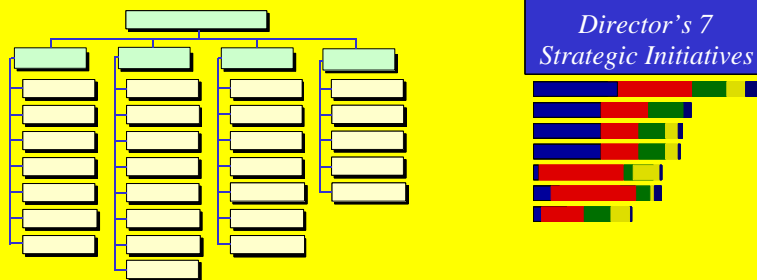
-Leadership statement

Illustrate the complexity of the environment.



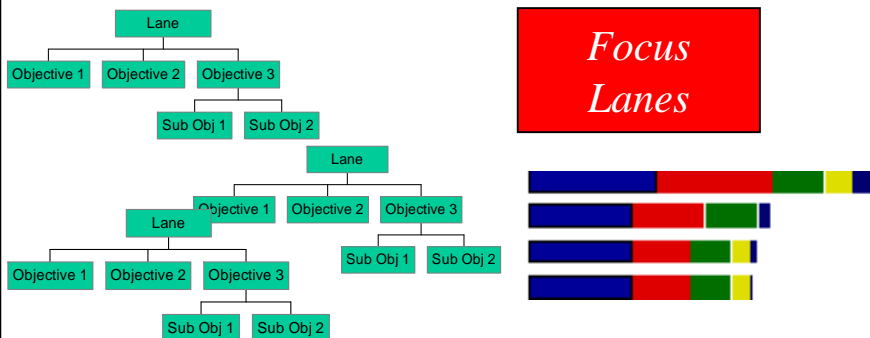
There are multiple approaches which may be combined for evaluating a budget.

Value-Focused



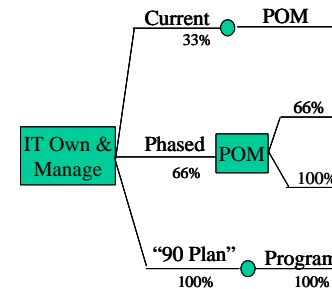
Define measures to quantify the Program's potential to achieve strategic objectives.

Organization-Focused



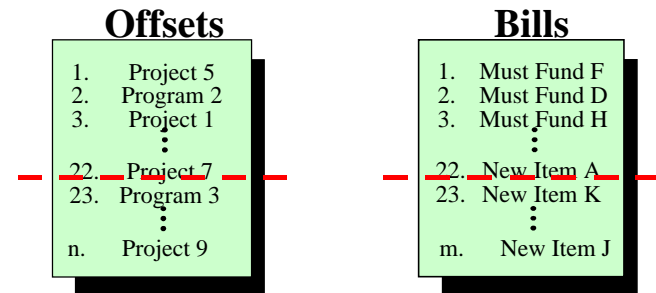
Provide analysis for subordinate managers.

Decision-Focused



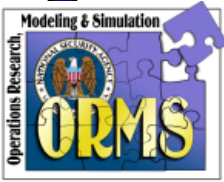
Provide analysis for sequential critical decisions.

Finance-Focused



Use decision criteria to evaluate offsets and bills.

Compare current/proposed approaches peer organizations.



Unknown

FY08

How do we evaluate?

Value Focused

Decision Focused

Organization Focused

Finance Focused

What is evaluated?

All	Decision Packages	Army	Air Force			
	Programs	Navy	NRO			
	Projects	USMC	NGA			
Deltas	Decision Packages					
	Programs					FY06
	Projects					

Leadership's expectations will dictate approach.

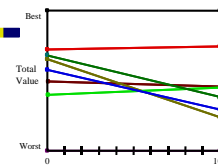
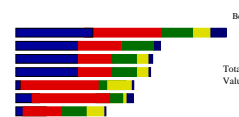
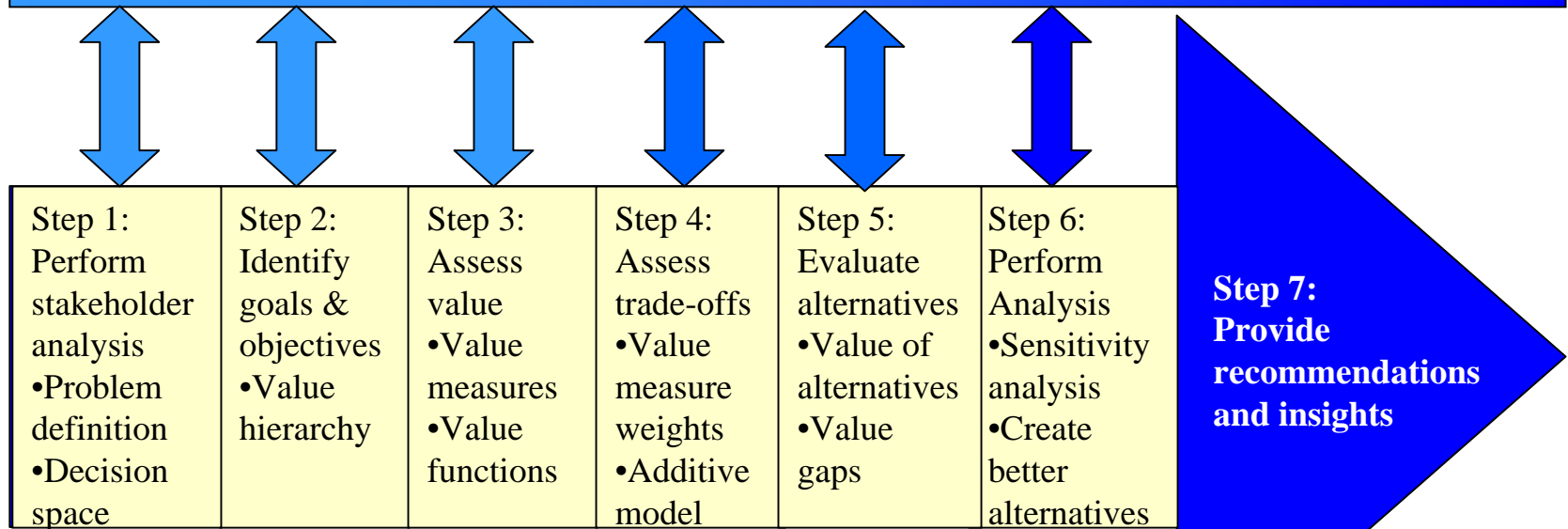
	Start	Executive Agent	Decision Perspective	Basis for Decision
<u>Themes</u>				
Value	Strategy	Corporate Review Gp	Strategic Focus Area	Value Assessment
Decision	Outlined Decision	Program Review Gp	Critical Decisions	Decision Analysis (critical decisions)
Organization	Organization	Budgeting Led Group	Expenditure Owners	Issue Slides
Finance	Bills/Offsets	Budgeteers Only	Directorates Programs	

Envision the end-state (backwards planning).

- It is critical that leaders understand and accept that MODA is a well-used and applicable process
 - Provide technical justification
 - Provide credible examples of applications
- Leaders must understand how MODA works and see it applied to their problem

Explain how MODA is a structured way of aligning strategic objectives with planning.

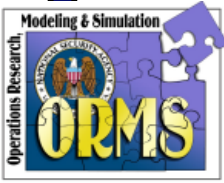
Senior leader and key stakeholder interaction (Dialog Decision Process)



Alternative	Utility
Option 13	0.810
Option 9	0.470
Option 1	0.420
Option 10	0.420
Option 2	0.360
Option 4	0.370
Option 11	0.300
Option 12	0.340
Option 15	0.310
Option 18	0.320
Option 1	0.324
Option 20	0.310
Option 7	0.403
Option 8	0.473
Option 14	0.450
Option 16	0.420
Option 4	0.410
Option 12	0.370
Option 11	0.320
Option 3	0.234

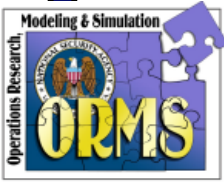


Historical examples help to demonstrate analytical rigor and acceptance to leadership.



- **Operations research/management science technique (informs.org)**
- **Decision Analysis (1968):** Discipline for evaluating complex alternatives by systematically examining:
 - Decisions
 - Uncertainty (probabilities and scenarios)
 - Preferences (value, risk and time)
- **Multiple Objective Decision Analysis (1976):** Part of decision analysis widely used for defense and intelligence resources allocation decisions
 - Multiple conflicting objectives
- **Value-Focused Thinking (1992):** Philosophy and techniques to create future value.
 - Uses Multiple Objective Decision Analysis
- **Decision Analysis Society formed in 1984**
 - Over 800 academic and practitioner members
(www.informs.org/Subdiv/Society/DA)
- **Decision Analysis Affinity Group formed 1995**
 - (<http://www.daag.net/>)

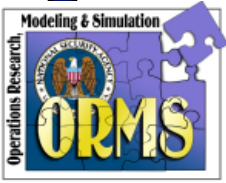
It is especially important to demonstrate how MODA supports well-known large organizations.



- Private
 - Oil & Gas
 - Chevron
 - Phillips Petroleum
 - Pharmaceutical
 - Pfizer
 - Amgen
 - Genentech
 - Novartis
 - Automobile
 - Ford
 - GM
 - Chrysler
 - Aeronautics
 - Boeing
 - Lockheed Martin
 - Raytheon
 - Medical
 - Johnson & Johnson
 - Pfizer
 - IT
 - Kodak
 - R&D Portfolios
 - Etc...
- Public
 - DoD
 - Army Base Realignment and Closure
 - Joint Staff
 - Air Force
 - Army
 - Marines
 - Navy
 - Air Force
 - Defense Waste
 - Hazardous Chemicals
 - Defense Community
 - CIA
 - NRO
 - NSA
 - CIFA
 - NGA
 - NASA
 - Etc...

Agency leaders understood the problem domain, customer set and the scope and can relate the budgeting issues to the choices made for the BRAC.

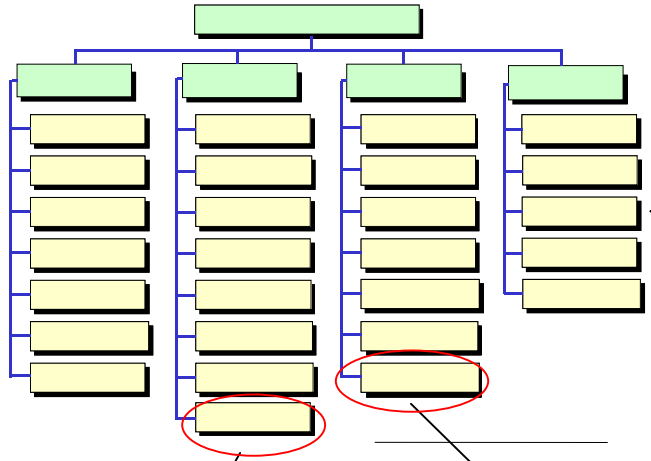
Simple examples of how MODA can be applied to the specific problem helps facilitate understanding.



$$V = \sum_{i=1} w_i v_i(x)$$

$w_i =$ weights
 $v_i(x) =$ values

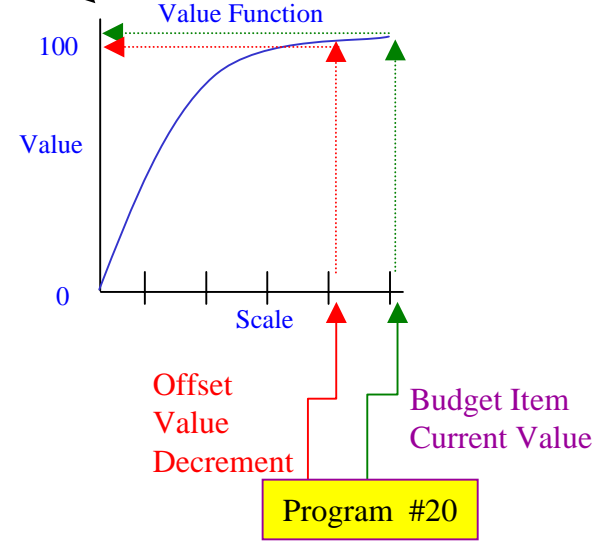
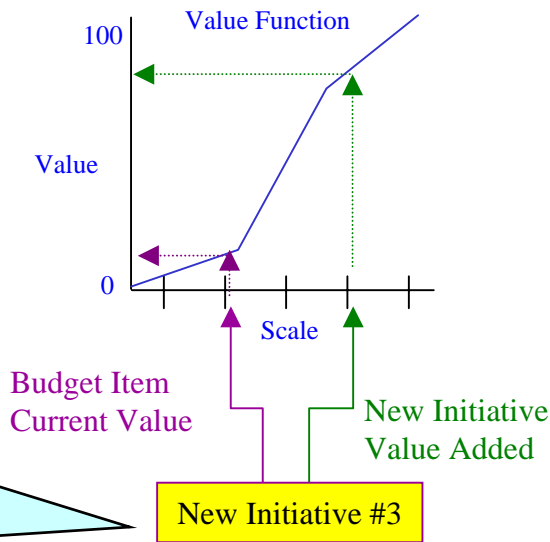
Value is calculated using multiplication and addition.



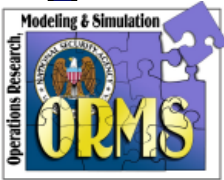
Value hierarchy is based on Director approved strategy.

Advisory body will develop one or more value functions.

Managers will score current capability and budget items using the value measures.



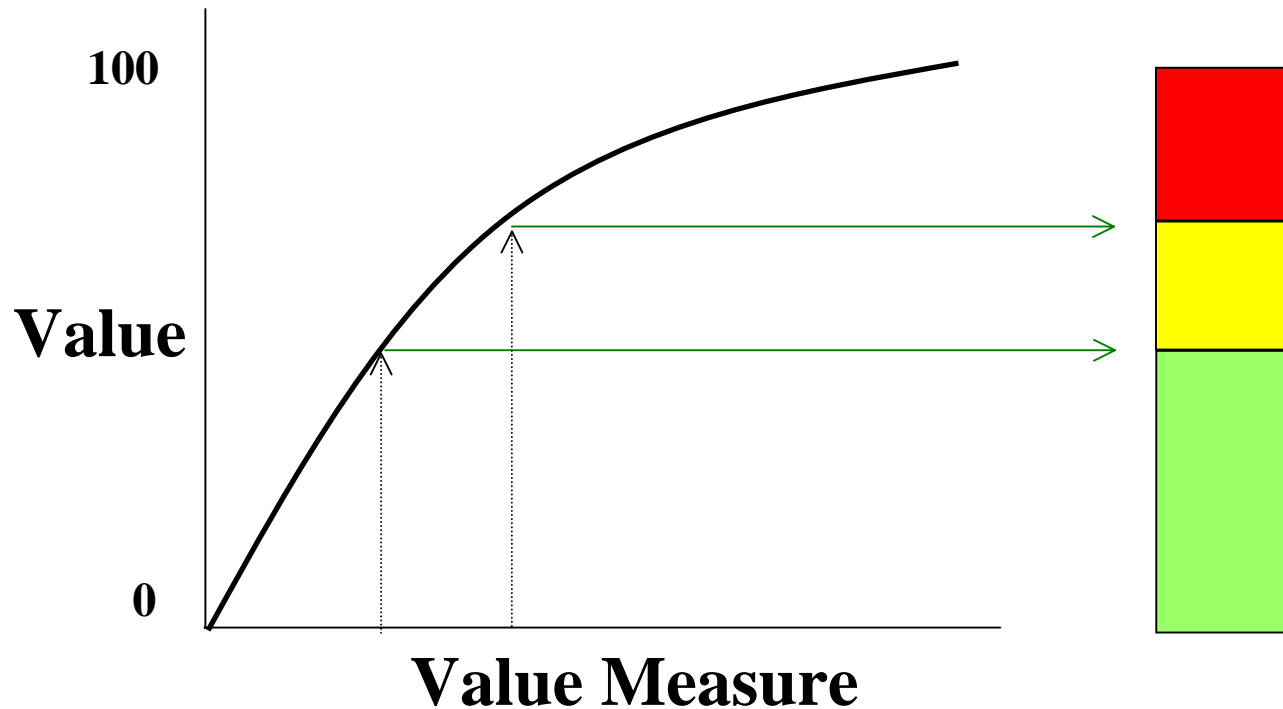
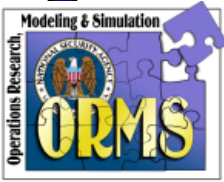
Use dialog centered processes- like the swing weight matrix to facilitate customer interactions.



		← Importance →			
		Critical National Security Risk	Ability to Perform Current Missions	Ability to Perform Future Missions	Good Business Practices
Decision Space ↑	High	1.1 Do really great things with large variance	1.2 Do good things that have large variance		
	Medium				
	Low				3.6 Do things that need to be done, and have low variance

Swing Weight Matrix method used in DoD Report to BRAC 2005 Commission, Army Appendix III, May 2005

Asking the right questions enables us to evaluate offsets/bills and budget items.



1. First identify the value provided by the budget item in current FY 08
2. Then assess the value added (lost) for the FY 08 Program Build
3. Remaining value gap

Providing results in different formats enables different customers to understand analysis

Evaluate Offset and Bills

Offsets

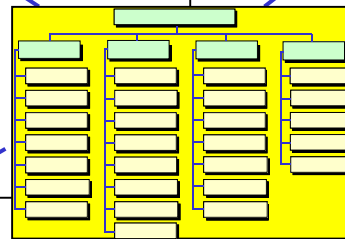
1. Project 5
2. Program 2
3. Project 1
- ⋮
- ~~22. Project 7~~
23. Program 3
- ⋮
- n. Project 9

Bills

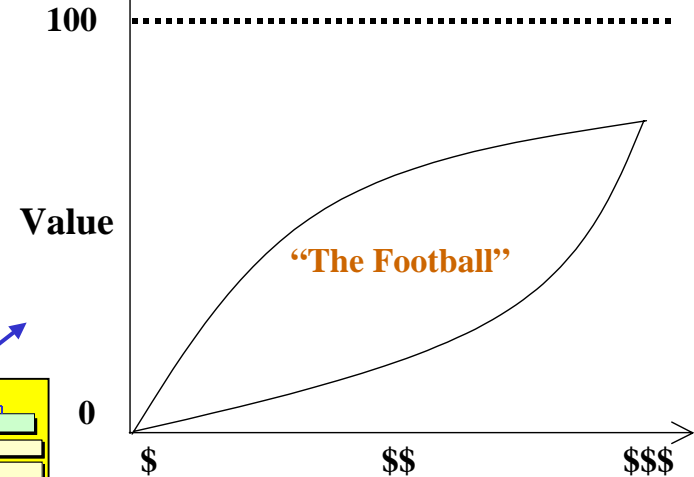
1. Must Fund F
2. Must Fund D
3. Must Fund H
- ⋮
- ~~22. New Item A~~
23. New Item K
- ⋮
- m. New Item J

1 To N Budget List

1. Program F
2. Program D
3. Program H
- ⋮
- ~~22. Program A~~
23. Program K
- ⋮
- B. Program J



Portfolio Value Per Dollar



Value by Goal & Objective

Goal 4 - Create and Integrate Business Management Capabilities

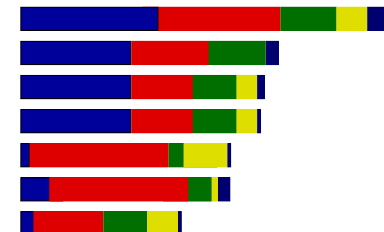


4.1 Integrate budget and performance management



Multiple Perspectives

Director's 7 Strategic Initiatives

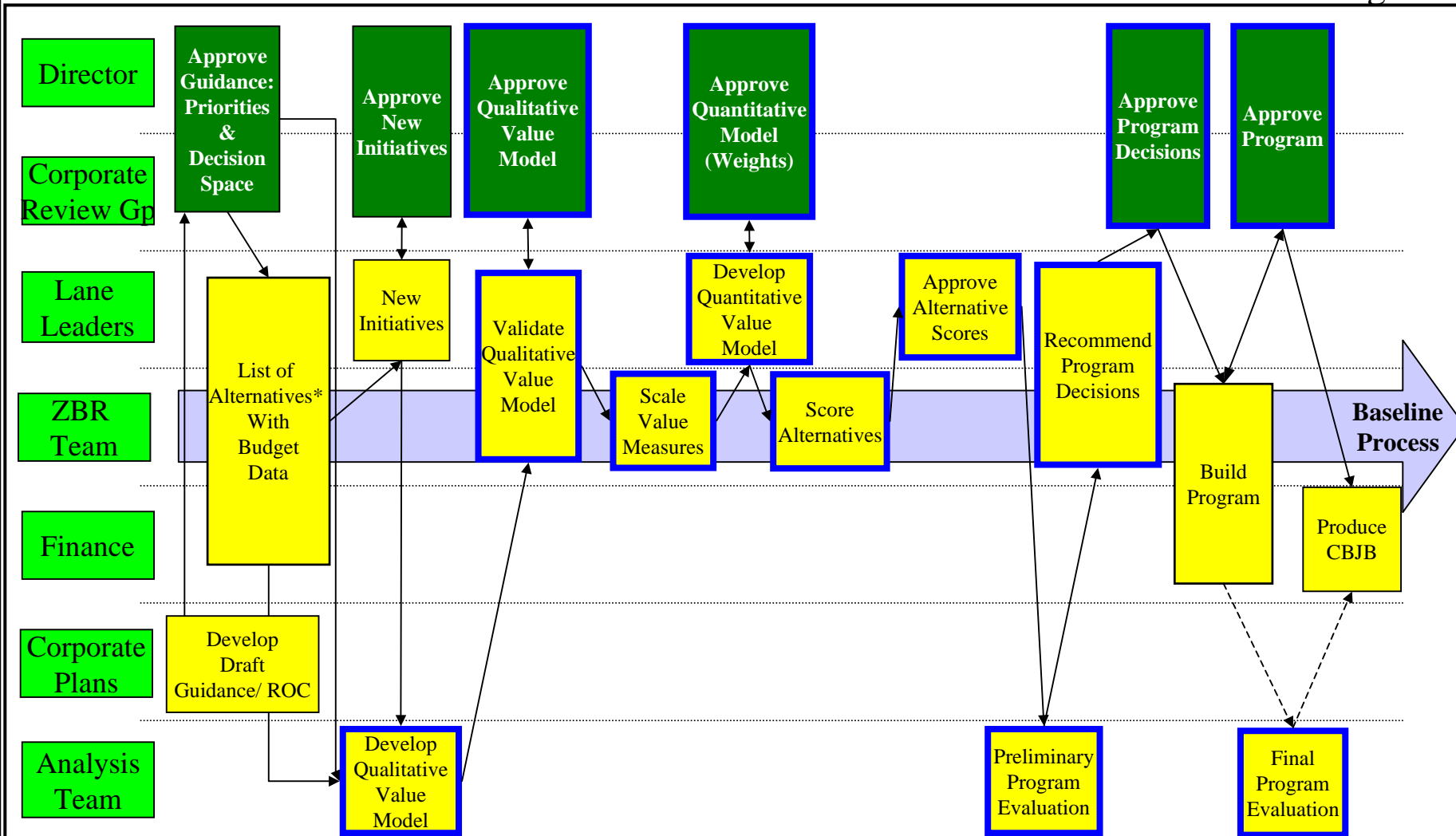


Focus Lanes



Show to leadership how MODA can be applied to their specific program build.

Start ← Timeline? → Aug '06



Facilitated/Supported by Analysis Team

*Alternatives include Programs, Projects, Services and Activities

Conclusions

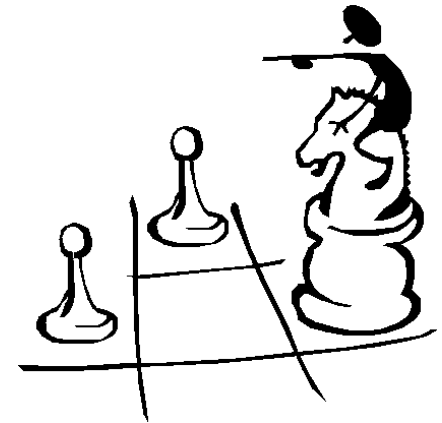
- MODA cannot “sell itself”
 - Careful work by the analyst to educate and guide allows leaders to gain acceptance
- Our approach involved
 - Consistent referral to MODA concepts
 - Technically based
 - Agency specific
 - Leadership interaction for support

Modeling & Simulation

Operations Research,

The graphic is set against a blue background with a puzzle pattern. The NSA seal is on the left, and the acronym 'ORMS' is in large, bold, yellow letters in the center. A large purple puzzle piece is missing from the top right corner of the graphic area.

Overview of Multi-Objective Decision Analysis (MODA)

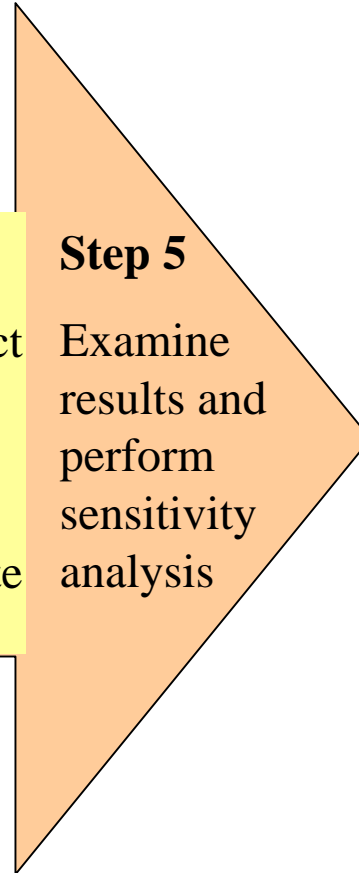
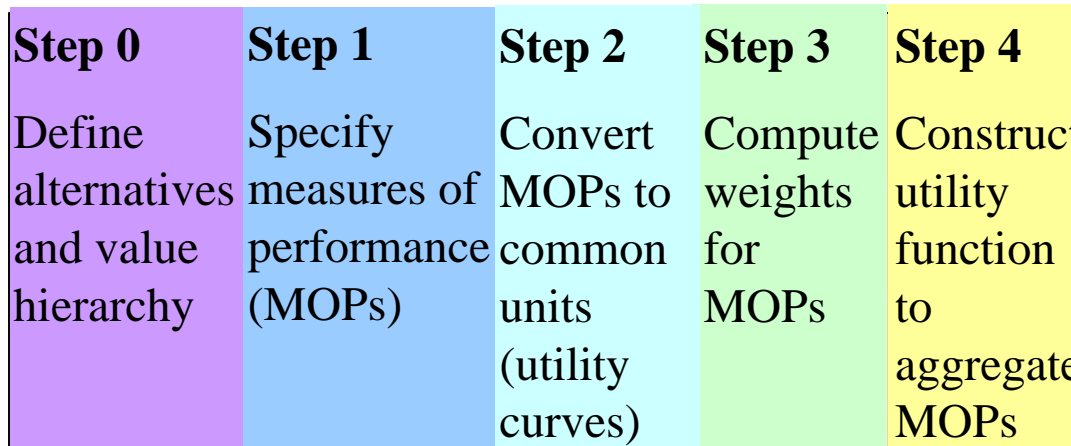


Decision & Strategic Analysis Division
Office of Operations Research, Modeling & Simulation

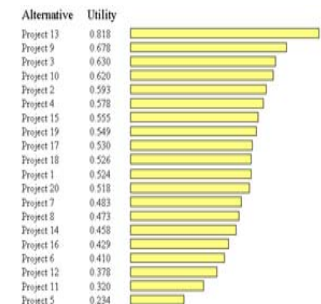
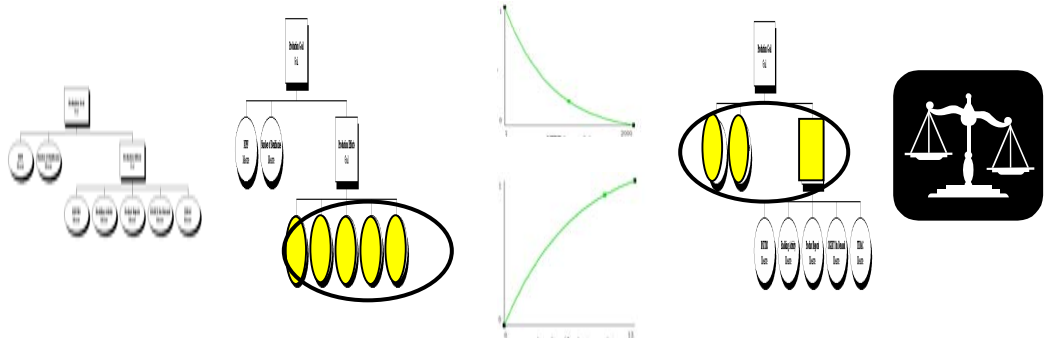
What is MODA?

- **A structured, logical way for understanding and making difficult decisions**
- **Used to understand the decision space where there are multiple, conflicting objectives**
- **Accounts for different stakeholder perspectives**
- **Often used for ranking different alternatives in a manner consistent with the decision makers' information and values**

MODA Methodology



Output:
 Rank-Ordered List of Alternatives



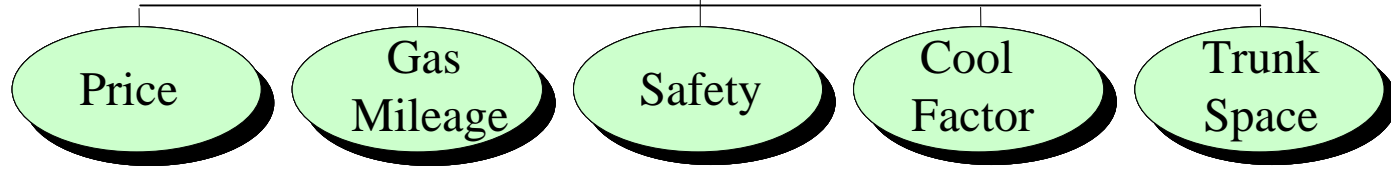
MODA Example – Buying a Car



0 Value Hierarchy

Pick the best car

1 Measures



2 Value Function

	Price	Gas Mileage	Safety	Kid's Cool Factor	Trunk Space
Honda Civic	\$15,000	30 MPG	3 Stars	Not so cool	Small - Medium
Value	75	100	75	0	25
X weight	30%	20%	30%	10%	10%
Weighted Value	22.5	20	22.5	0	2.5

3 Weights

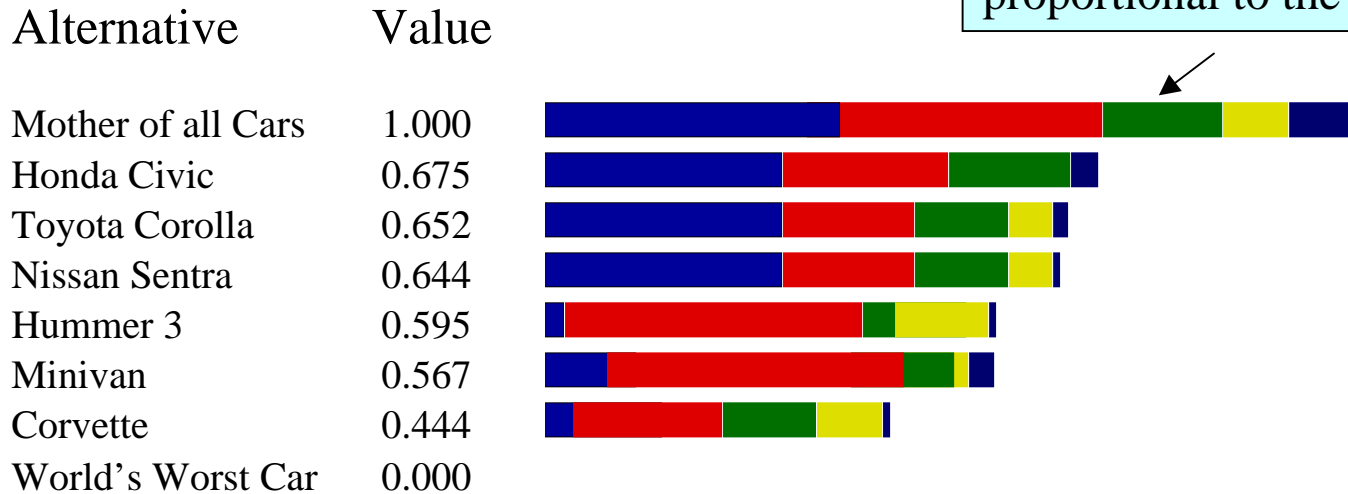
Total Value for Honda Civic = 67.5 → 68

4 Scoring the alternatives (Honda Civic)

Analyze results

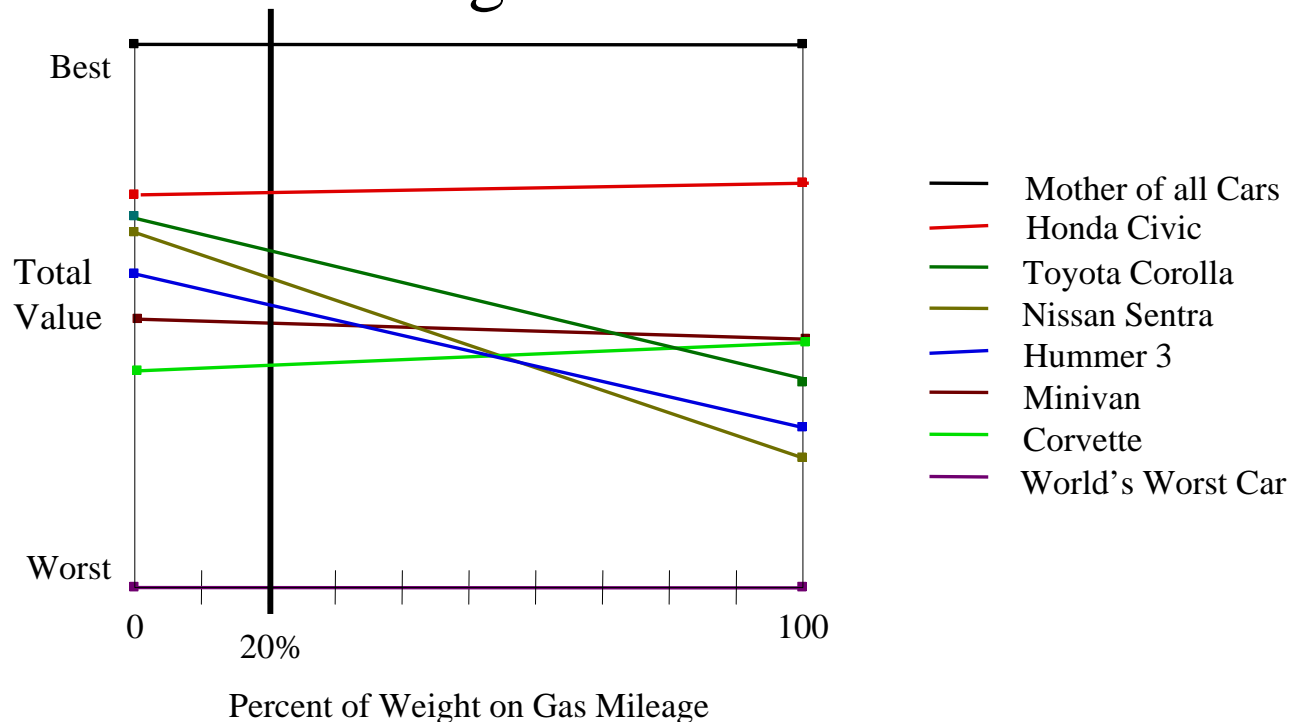
5 There are many ways to examine the results

The length of the bars is proportional to the weight



■ Price
 ■ Safety
 ■ Gas Mileage
 ■ Cool Factor
 ■ Trunk Space

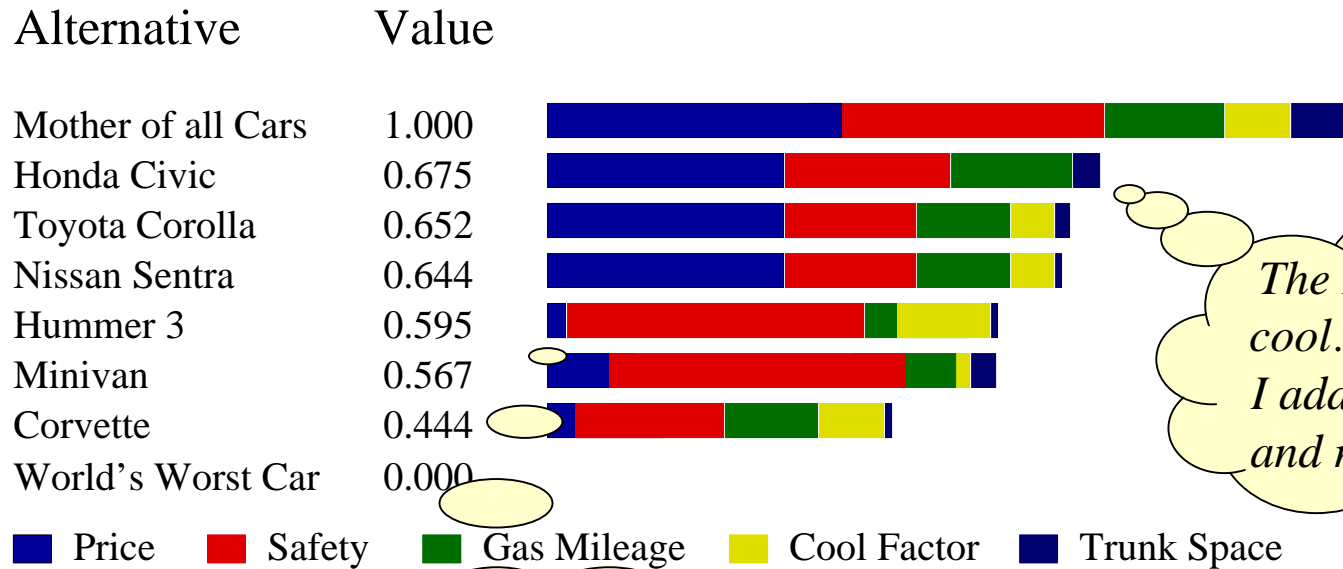
- The most common technique for “sensitivity analysis” is
- 5 to determine how the recommendations change based on different weights



Find better alternatives

5

- We can use the model to improve upon alternatives to add more value



The Honda isn't cool...but what if I added a spoiler and new wheels?

The Hummer is too expensive...but what if I buy a used one?

Define model to quantify the Program's potential to achieve strategic objectives.

Pro's

Aligns full program with strategy

Defensible/traceable

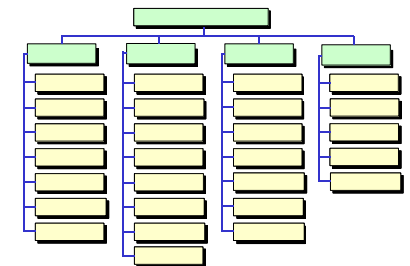
DoD/IC accepted best practice

Near-optimal solution

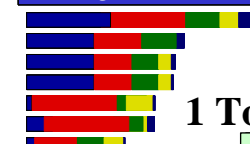
Con's

Requires upfront strategic guidance

Organizational time and effort for scoring



Director's 7 Strategic Initiatives



1 To N Budget List

1. Program F
2. Program D
3. Program H
- ⋮
22. Program A
23. Program K
- ⋮
- B. Program J

Provide analysis for sequential critical decisions.

Pro's

Directly supports the Director's priorities

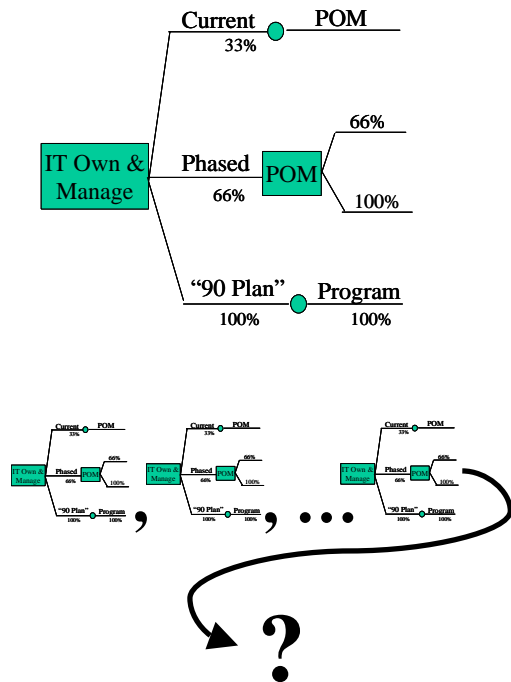
Incremental process

Con's

Only evaluates subset of budget items

Suboptimal solution

Requires iterative and follow-on efforts



Provide analysis for subordinate managers.

Pro's

Engages senior managers

Able to be lane centric

More flexible for subordinate managers

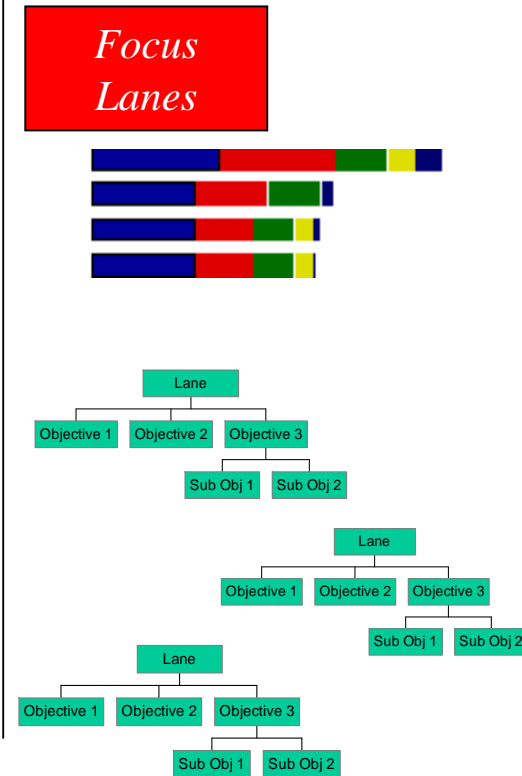
Con's

Decision making delegated below top-level

Lanes create a matrix management challenge

Lose organizational efficiencies

Fosters stovepipes



Use decision criteria to evaluate offsets and bills.

Pro's

Books balance
Organization is familiar with process

Con's

Does not reflect senior leader priorities
Less defensible
Encourages status-quo
Suboptimal
Limited scope

Bills

1. Must Fund F
2. Must Fund D
3. Must Fund H
- ⋮
- ~~22. New Item A~~
23. New Item K
- ⋮
- m. New Item J

Offsets

1. Project 5
2. Program 2
3. Project 1
- ⋮
- ~~22. Project 7~~
23. Program 3
- ⋮
- n. Project 9