


## Public Decisionmaking and Decision Conferencing



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**Professor, Doctor in Systems Engineering, Head of Department**

- DEG - Department of Engineering and Management
- IST - Instituto Superior Técnico (School of Engineering of UTL)
- UTL - Technical University of Lisbon
- CEG-IST - Centre for Management Studies of IST

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Member of the Decision Capability Unit of LSE

- LSE - London School of Economics and Political Science
- Former Centennial and Visiting Professor of Decision Sciences (1999-2010)



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Co-author of the MACBETH Approach


- Founding partner of BANA Consulting (a SPIN-OFF of IST)

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Member of the professional society International Decision Conferencing Forum








<http://web.ist.utl.pt/carlosbana/>



## Public Decisionmaking and Decision Conferencing

by Carlos A. Bana e Costa  
Chaired by Pekka Korhonen





## Abstract

*In this talk, I shall reflect on lessons learned from **my professional involvement**, as a decision-analyst and process consultant, **in** a variety of **socio-technical processes**, in which multicriteria value measurement techniques were used during **decision conferences**, with the participation of several types of social actors and stakeholders, with the common aim of **facilitating** better **public decisionmaking**.*



IDCF - The International Decision Conferencing Forum



## Abstract

*In this talk, I shall reflect on lessons learned from **my professional involvement**, as a decision-analyst and process consultant, **in** a variety of **socio-technical processes**, in which multicriteria value measurement techniques were used during **decision conferences**, with the participation of several types of social actors and stakeholders, with the common aim of **facilitating** better **public decisionmaking**.*


## Agenda

We will go with the flow...  
(Schein's sixth principle of process consultation)  
... and the time still available 😊



IDCF - The International Decision Conferencing Forum





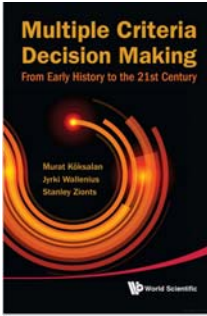
**International Society on  
Multiple Criteria Decision Making**

Our Society has been primarily **technically oriented** (concepts and maths).

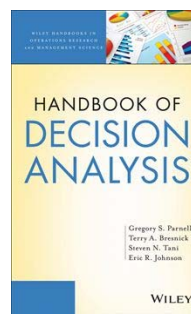
Technical skills are necessary but often they are not enough for good support to complex decisions ...

... they must be complemented with **soft skills** (personal and interpersonal).


**Focused on socio-technical approach**





Multiple Criteria Decision Making:  
From Early History to the 21st Century  
M. Koksalan, J. Wallenius, S. Zionts  
World Scientific (2011)



Handbook of decision analysis  
**G.S. Parnell, T.A. Bresnick, S.N. Tani, E.R. Johnson**  
John Wiley & Sons (2013)

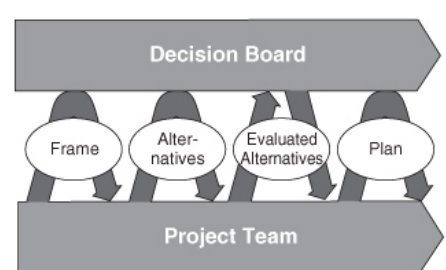




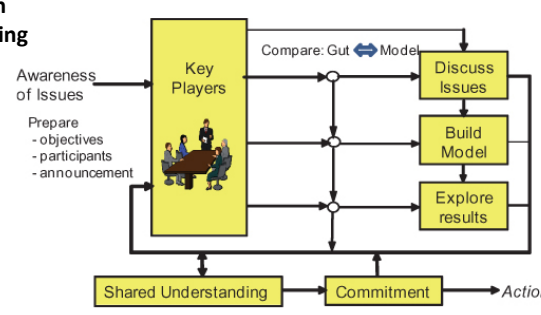


### Two best practices decision (aid) processes

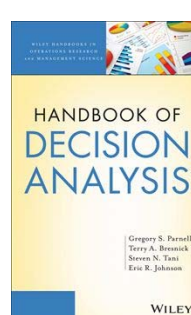
**Dialogue decision Process (SDG)**





**Decision conferencing**



Adapted from

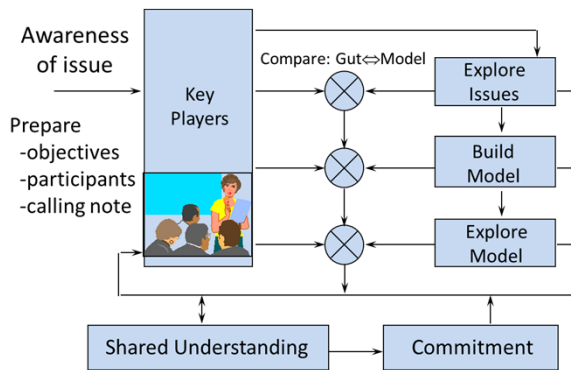






From my experience, in public decisionmaking, the **best socio-technical practice to tackle organizational, content and analytical complexity is decision conferencing**

Cameron Peterson  
1979 **decisions and designs**



*A **decision conference** is a gathering of key players who wish to resolve important issues facing their organisation, assisted by an impartial facilitator who is a specialist in decision analysis and works as a process consultant, using a model of relevant data and judgements created on-the-spot to assist the group in thinking more clearly about the issues.*

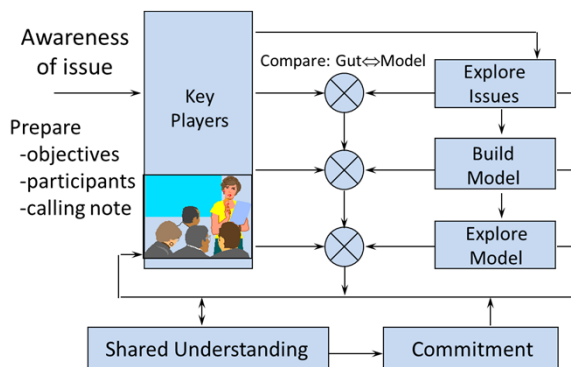


Phillips, L.D., Bana e Costa, C.A. (2007)  
Transparent prioritisation, budgeting and resource allocation with multi-criteria decision analysis and decision conferencing  
Annals of Operations Research, 154, 1 (51-68).



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### Generic objectives of a decision conferencing process




- To generate shared understanding of the issues (not necessarily consensus)
- To develop a sense of common purpose (allowing individual differences of opinion)
- To agree about the way forward (commitment to the direction, not the individual paths)



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**1979** Larry Phillips used a computer model to help a Board of Directors arrive at a decision that they had been considering for 11 months. Sensitivity analyses on the computer enabled them to agree the way forward in two hours, and he realised that a 'good enough' model is all that is required to arrive at agreement. **He introduced the concept of a 'requisite' model.**



### Requisite decision model

Requisite Decision Models  
'sufficient in form and content to resolve the issues of concern'

model results → ⊗ ← gut feel

↓

revisions, changes

↓

insights, new intuitions, higher-level perspectives

↓

shared understanding


↓

sense of common purpose



↓

commitment to action

Inspired by



Elliot Jaques, 1988  
*Requisite Organization*

Phillips, L. D. (1984). A theory of requisite decision models. *Acta Psychologica*, 56, 29-48

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## The decision conference environment

### Two basic principles

- Everyone to be in **direct eye contact**...  
... with everyone else.
- All displays (whiteboards, flip charts, projector displays) clearly visible by everyone.



✓





✗




Evaluating alternative IT public policies (2003)



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BNDES

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### MULTICRITERIA APPROACH FOR STRATEGIC TOWN PLANNING

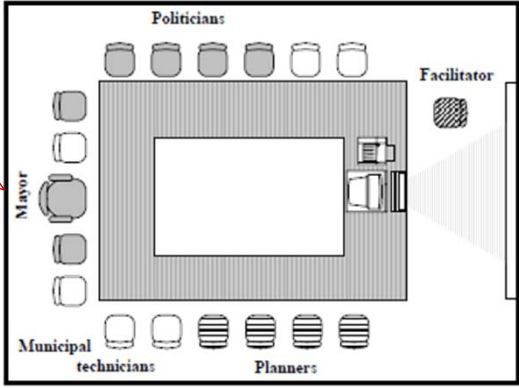
*The Case of Barcelos* 1994





**... wrong rectangular ...**

the layout of the meeting room. (Note that the arrangement of the environment can have a profound influence on the effectiveness of group working – cf. Hickling, 1990, Phillips and Phillips, 1993).

Note also the Mayor's armchair !!!



Room layout does matter

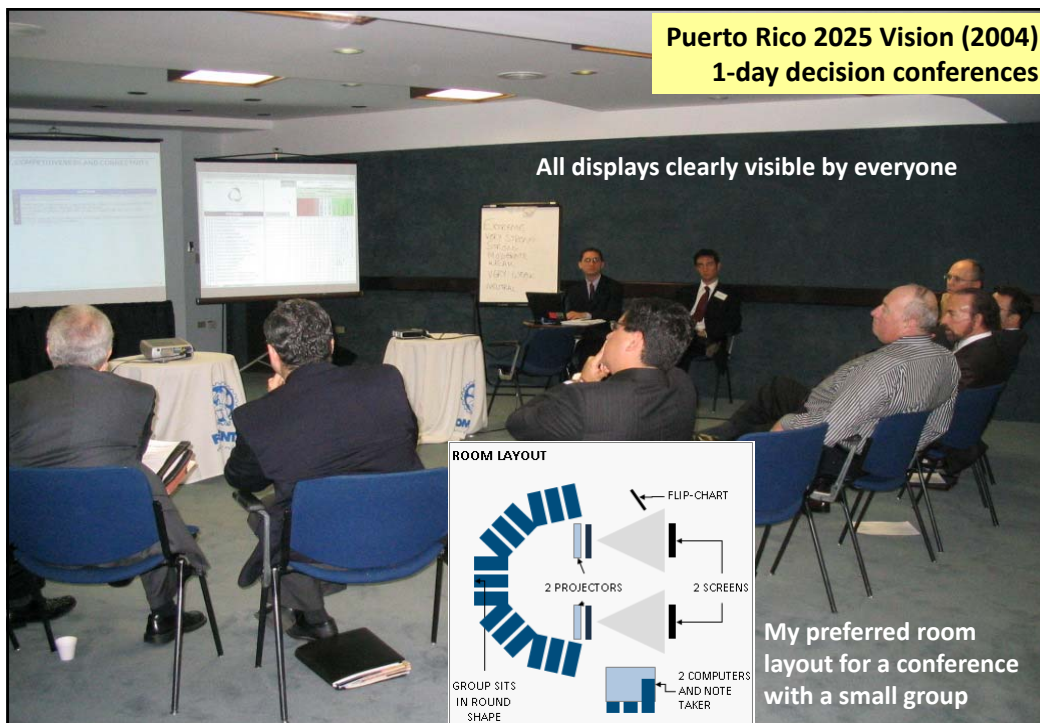
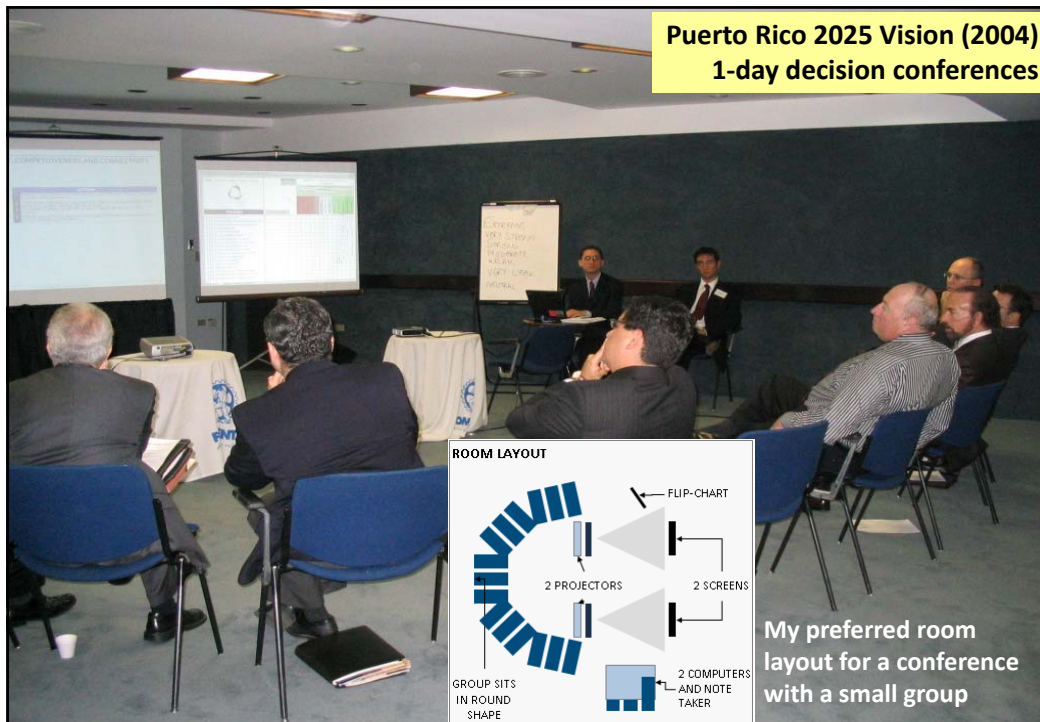



**Puerto Rico 2025 Vision (2004)**  
Decision conferences to prioritise strategies


Everyone in direct eye contact with everyone else



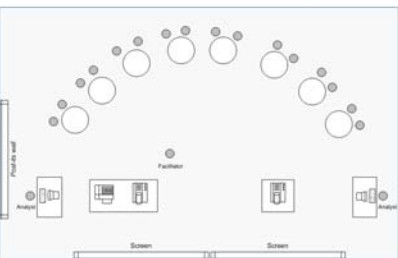





**Puerto Rico 2025 Vision (2004)**  
**2-day strategic decision conference**



Cabaret layout



My preferred room layout for a conference with a large group



## The participants in a decision conference

**Basic principle**

- key players representing the diversity of perspectives on the issues

Experts; representatives of the Society



Puerto Rico

Politicians; Senior Officers



Recife

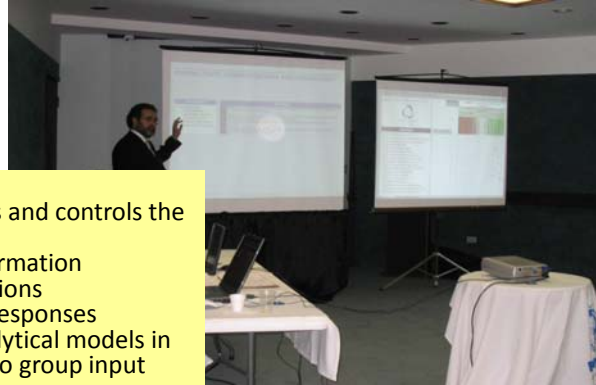





## The facilitator of a decision conference

### Basic principles

- The facilitator of a decision conference is an impartial specialist in group processes and decision analysis...
- ... which main role is to contribute to process, not content...
- ... observing and understanding the group life and intervening to help the group maintain a task orientation...



### The facilitator

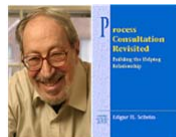
- moderates and controls the sessions
- elicits information
- asks questions
- channels responses
- builds analytical models in response to group input



## The facilitator of a decision conference

### Basic principles

- The facilitator of a decision conference is an impartial specialist in group processes and decision analysis...
- ... which main role is to contribute to process, not content...
- ... observing and understanding the group life and intervening to help the group maintain a task orientation...
- ... guided by the 10 principles of process consultation



Edgar Schein, 1999  
*Process Consultation Revisited:  
Building the Helping Relationship*

1. Always try to be helpful.
2. Always stay in touch with the current reality.
3. Access your ignorance.
4. Everything you do is an intervention
5. **It is the client who owns the problem and the solution.**
6. Go with the flow.
7. Timing is crucial.
8. Be constructively opportunistic with confrontative interventions.
9. Everything is data; errors are inevitable—learn from them.
10. When in doubt, share the problem.



**Other members in a facilitation team**

**A second team member**

- interacts with a computer
- implements in real time the models developed by the group leader

**The third team member**

- acts as a conference recorder
- documents all major decisions
- provides an audit trail of rationale for the session

**Additional desirable soft skills of facilitators include**

- the ability to think quickly
- self confidence
- ...

**The social process**

**Basic principle**

- Careful design of the social process

	Culture
	Education
	Health
	Public safety
	Utilities
	Transport
	Land Use and Environment
	Competitiveness, Productivity and Connectivity
	Opportunities and Income
	Innovation and Enterprise

Education      Innovation and Enterprise


## The social process

**Basic principle**

- Careful design of the social process

```

    graph TD
      A(Brief senior execs) --> B(Kick-off Meeting)
      B --> C(Team Meetings)
      C --> D[Review by senior managers for realism and consistency]
      D --> E(Merge Meeting  
assess trade-offs  
explore portfolios)
  
```



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## The social process

**Basic principle**

- Careful design of the social process

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    graph TD
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explore portfolios)
      E --> F(Evaluate & Digest,  
Recommend)
  
```



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**ALIANZA PARA EL DESARROLLO DE PUERTO RICO**

2005

## The social process

**Basic principle** 2005

- Careful design of the social process

```

graph TD
    A([Brief senior execs]) --> B([Kick-off Meeting])
    B --> C([Team Meetings])
    C --> D[Review by senior managers for realism and consistency]
    D --> E([Merge Meeting  
assess trade-offs  
explore portfolios])
    E --> F([Evaluate & Digest,  
Recommend])
  
```

sectores. En un amplio proceso participativo que se llevó a cabo el año pasado establecimos una agenda común. Recién estamos comenzando el proceso de fomentar su implantación. Las cinco áreas prioritarias

More than 150 participants in the decision conferencing process of creating a Vision for Puerto Rico 2025

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2005

## The technical component: Which method to use?

**Basic principle**

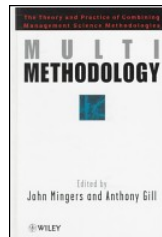
- Enrich your facilitation toolbox with a variety of techniques...
- ... but, avoid those you are not sure about their theoretical robustness...
- ...and be sure you know well how to use them...
- ... and when they can be used...
- ... i.e., if their working conditions fit with the specific application context,
- And, if more than one method fits in, use the simplest one.
- When mixing methods, be sure they are theoretically compatible



## Mixing methods

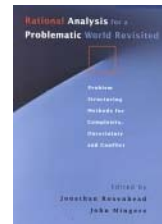
### Basic principle

- When mixing methods, be sure they are theoretically compatible



Mingers, J., Gill, A. (eds.) (1997)  
*Multimethodology: The Theory and Practice of Combining Management Science Methodologies*,  
 John Wiley & Sons, Chichester

### In Structuring: Enhancement of MCDA with Problem Structuring Methods



Rosenhead J, Mingers J (eds.) (2001)  
*Rational Analysis for a Problematic World Revisited: Problem Structuring Methods for Complexity, Uncertainty and Conflict, 2nd ed.*,  
 John Wiley & Sons, Chichester



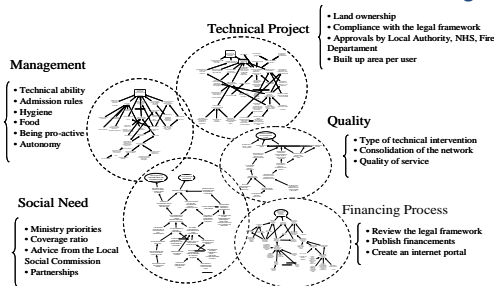
## Enhancement of MCDA with Problem Structuring Methods



oval maps



Cognitive maps



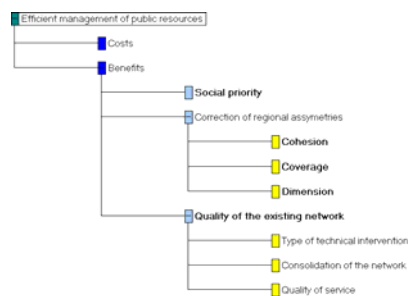
### Prioritisation of public investments in social infrastructure multicriteria value analysis and decision conferencing: 3

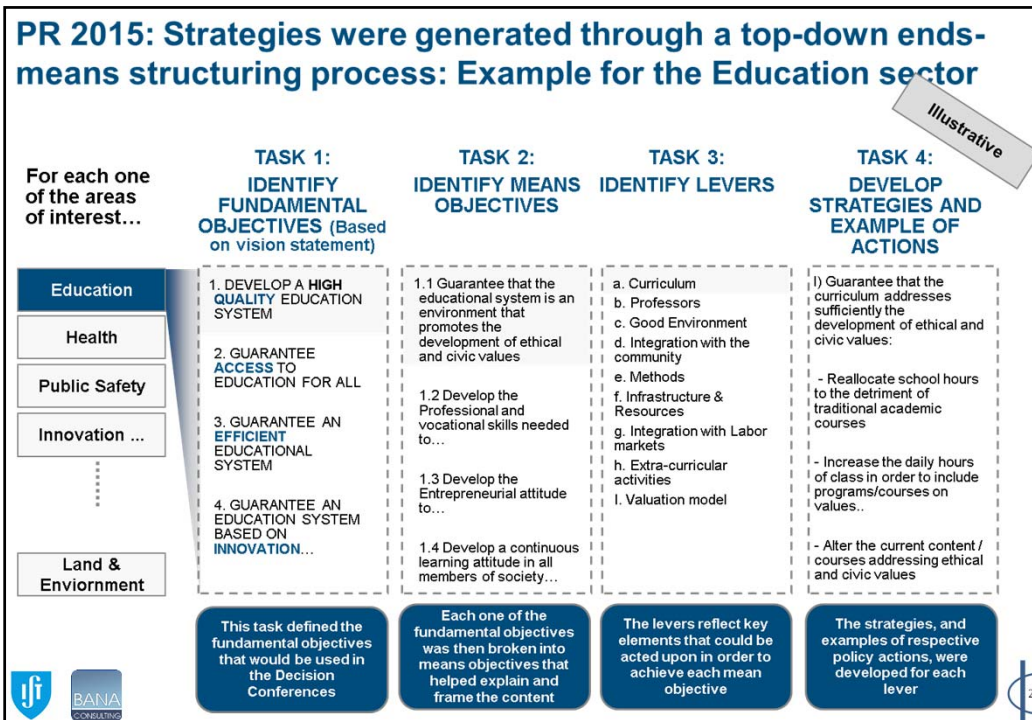
Carlos A. Bana e Costa<sup>1,2</sup>, Tânia G. Fernandes<sup>3</sup>, Paulo V. D. Correia<sup>1</sup>

International Transactions in Operational Research  
 Volume 13, Issue 4, pages 279-297, July 2006



Value tree





### My practice:

#### Two screens are used

1. to input (objective) data
2. to elicit value judgements

- Input data and value judgments are used to develop analytical models in the decision conference
- Value Judgments are elicited using well-documented group processes





**MACBETH DSS**

Input data screen

Input judgements screen

**My practice:  
Use of MACBETH**



<http://www.m-macbeth.com/>

Use also of:

- group consensus techniques
- nominal group techniques (often)
- Delphi techniques (rarely)



**MACBETH voting**






**MEASURING  
ATTRACTIVENESS BY A  
CATEGORY  
BASED  
EVALUATION  
TECHNIQUE**

**Joint research since 1991**



**MACBETH – An Interactive Path Towards the Construction of Cardinal Value Functions**

CARLOS A. BANA E COSTA\* and JEAN-CLAUDE VANSNICK†

*Int. Trans. Opl Res.* Vol. 1, No. 4, pp.489–500, 1994  
Elsevier Science Ltd. Copyright © 1994 IFORS

[www.m-macbeth.com](http://www.m-macbeth.com)

**On the mathematical foundations of MACBETH**



**2005**



**1999**

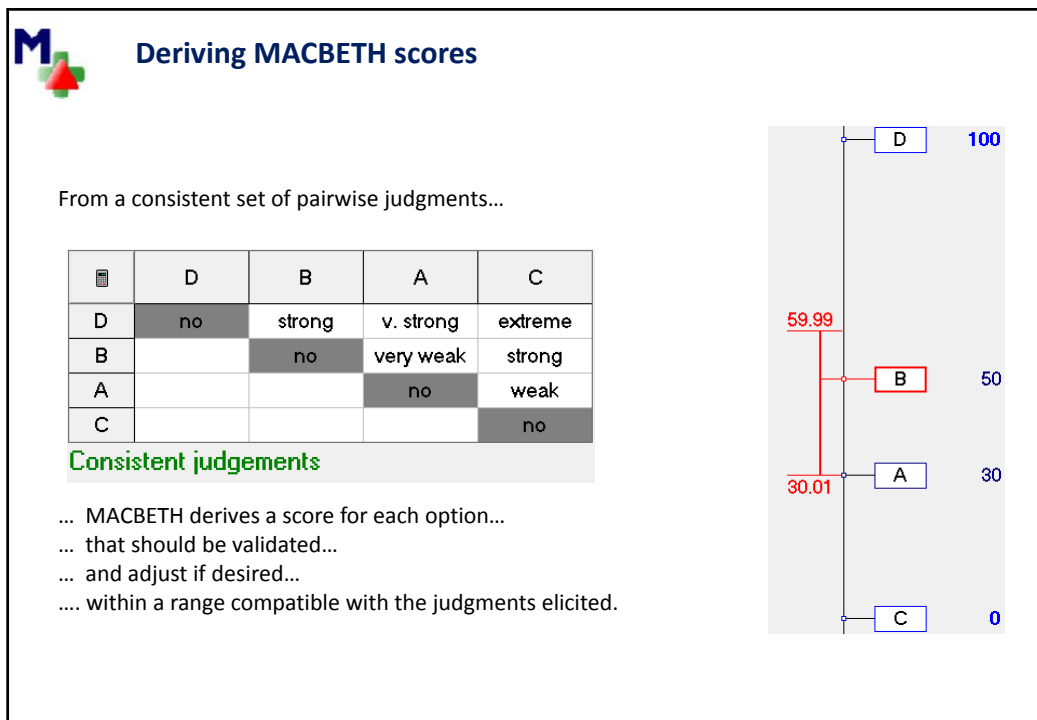
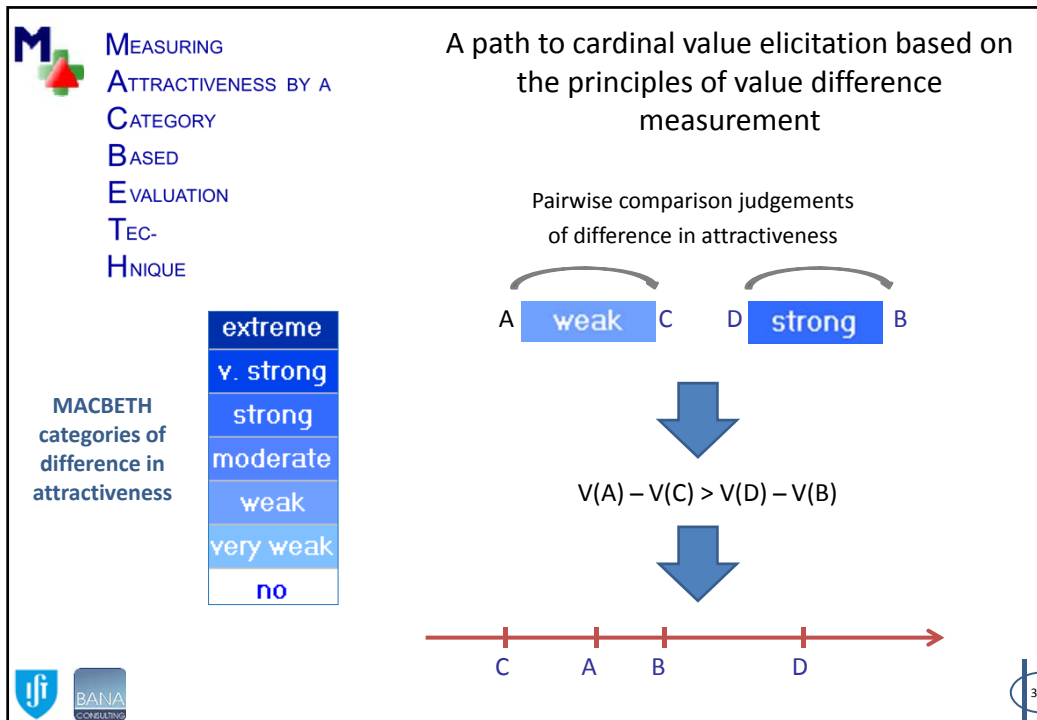



**MACBETH**

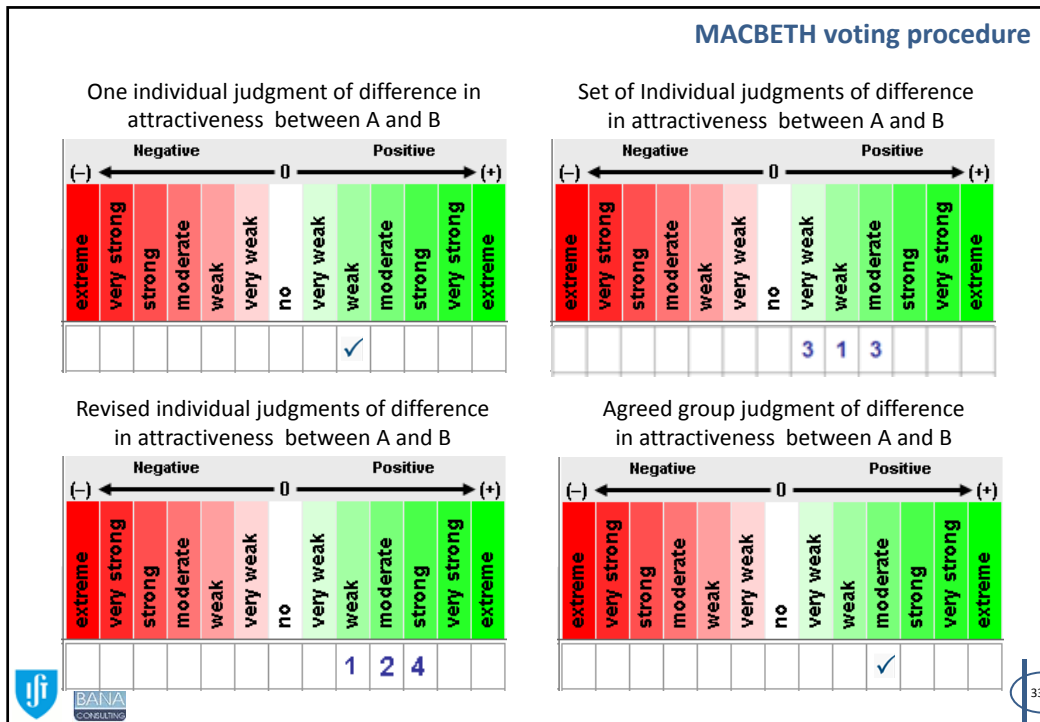
CARLOS A. BANA E COSTA, JEAN-MARIE DE CORTE, JEAN-CLAUDE VANSNICK

International Journal of Information Technology & Decision Making Vol. 11, No. 02, pp. 359-387

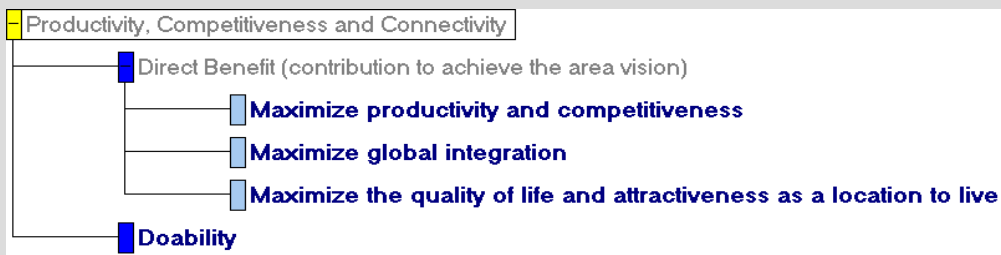












**PR 2025: In each of the 10 areas, MACBETH voting procedure was used to evaluate the strategies in terms of their contribution to improve the status quo (SQ) on each fundamental objective and also their doability. Example:**



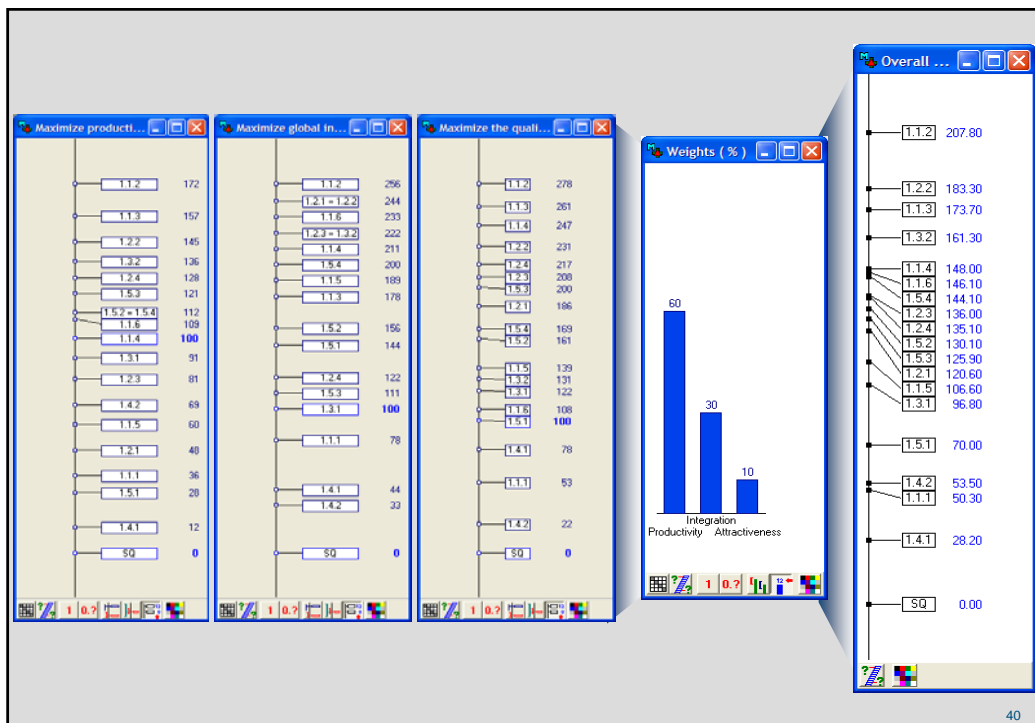
AREA: Productivity, Competitiveness & Connectivity		OBJETIVE 1: Maximize Productivity and Competitiveness																				
 <p><b>Strategies</b></p>		<p>The contribution of the strategy to achieve the objective is...</p> <p>Negative Contribution ← 0 → Positive Contribution</p>																				
		<p>Extreme (-) Very Strong (-) Strong (-) Moderate (-) Weak (-) Very weak (-) NEUTRAL Very weak (+) Weak (+) Moderate (+) Strong (+) Very Strong (+) Extreme (+)</p>																				
		<p>Ranking</p>																				
1.1.1	Decrease cost of labor																					
1.1.2	Increase human productivity through education																					
1.1.3	Increase human productivity through tech.																					
1.1.4	Attract global talent																					
1.1.5	Deepen people linkages																					
1.1.6	Provide multilingual abilities																					
1.2.1	Improve infrastructure for goods																					
1.2.2	Improve infrastructure for information																					
1.2.3	Improve infrastructure for people																					
1.2.4	Increase efficiency of local utilities																					
1.3.1	Decrease financial cost of government																					
1.3.2	Decrease regulatory burden																					
1.4.1	Decrease protections																					
1.4.2	Rationaliza unproductive subsidies																					
1.5.1	Repositioning Puerto Rico																					
1.5.2	Overhaul system for national strategy																					
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		<p>Ranking</p>																							
1.1.1	Decrease cost of labor																								
1.1.2	Increase human productivity through education																				1	1	4	1	
1.1.3	Increase human productivity through tech.																						7	7	
1.1.4	Attract global talent																						2	5	
1.1.5	Deepen people linkages																						1	4	2
1.1.6	Provide multilingual abilities																						5	2	
1.2.1	Improve infrastructure for goods																						6	1	
1.2.2	Improve infrastructure for information																							7	
1.2.3	Improve infrastructure for people																						5	2	
1.2.4	Increase efficiency of local utilities																							7	
1.3.1	Decrease financial cost of government																						3	3	
1.3.2	Decrease regulatory burden																							1	6
1.4.1	Decrease protections																						3	4	
1.4.2	Rationaliza unproductive subsidies																							5	2
1.5.1	Repositioning Puerto Rico																						3	3	1
1.5.2	Overhaul system for national strategy																						1	6	
1.5.3	Overhaul system for investment promotion																								7
1.5.4	Overhaul system for export promotion																							1	5


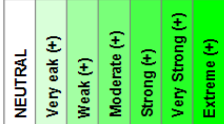
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		Extreme (-)	Very Strong (-)	Strong (-)	Moderate (-)	Weak (-)	Very weak (-)	NEUTRAL	Very weak (+)	Weak (+)	Moderate (+)	Strong (+)	Very Strong (+)	Extreme (+)	
Ranking															
1.1.2	Increase human productivity through education													7	
1.1.3	Increase human productivity through tech.													7	
1.2.2	Improve infrastructure for information													7	
1.2.4	Increase efficiency of local utilities													7	
1.5.3	Overhaul system for investment promotion													7	
1.3.2	Decrease regulatory burden												1	6	
1.5.2	Overhaul system for national strategy											1		6	
1.5.4	Overhaul system for export promotion												1	5	
1.1.4	Attract global talent											2		5	
1.3.1	Decrease financial cost of government											3		3	
1.1.6	Provide multilingual abilities												5	2	
1.2.3	Improve infrastructure for people												5	2	
1.4.2	Rationaliza unproductive subsidies												5	2	
1.1.5	Deepen people linkages											1	4	2	
1.2.1	Improve infrastructure for goods												6	1	
1.1.1	Decrease cost of labor											1	1	4	1
1.5.1	Repositioning Puerto Rico												3	3	1
1.4.1	Decrease protections											3	4		

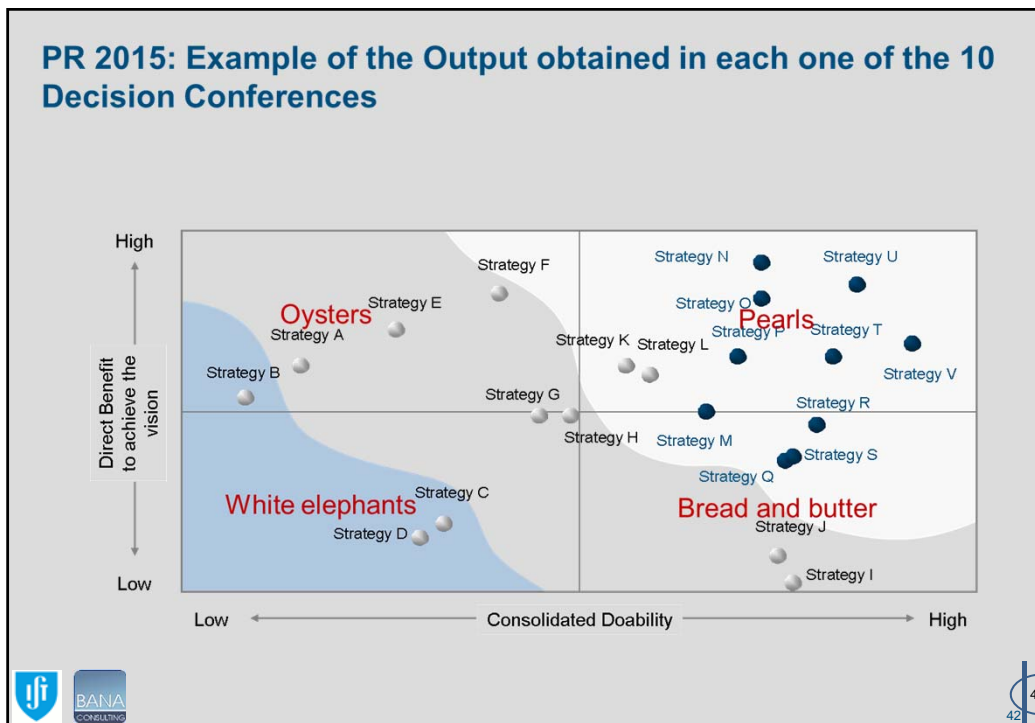
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Ranking															
1.1.2	Increase human productivity through education	Extreme												7	
1.1.3	Increase human productivity through tech.	Extreme												7	
1.2.2	Improve infrastructure for information	Extreme												7	
1.2.4	Increase efficiency of local utilities	Extreme												7	
1.5.3	Overhaul system for investment promotion	Extreme												7	
1.3.2	Decrease regulatory burden	Extreme											1	6	
1.5.2	Overhaul system for national strategy	Extreme										1		6	
1.5.4	Overhaul system for export promotion	Extreme											1	5	
1.1.4	Attract global talent	V. Strong-Extreme										2		5	
1.3.1	Decrease financial cost of government	V. Strong										3		3	
1.1.6	Provide multilingual abilities	V. Strong											5	2	
1.2.3	Improve infrastructure for people	V. Strong											5	2	
1.4.2	Rationaliza unproductive subsidies	V. Strong											5	2	
1.1.5	Deepen people linkages	V. Strong										1	4	2	
1.2.1	Improve infrastructure for goods	V. Strong											6	1	
1.1.1	Decrease cost of labor	V. Strong										1	1	4	1
1.5.1	Repositioning Puerto Rico	V. Strong											3	3	1
1.4.1	Decrease protections	Moderate-Strong										3	4		

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				Negative Contribution (-)					Positive Contribution (+)									
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1.1.2	Increase human productivity through education	Extreme	Strong													7		
1.1.3	Increase human productivity through tech.	Extreme	Moderate													7		
1.2.2	Improve infrastructure for information	Extreme	Weak-Moderate													7		
1.2.4	Increase efficiency of local utilities	Extreme	Weak													7		
1.5.3	Overhaul system for investment promotion	Extreme	Weak													7		
1.3.2	Decrease regulatory burden	Extreme	Weak												1	6		
1.5.2	Overhaul system for national strategy	Extreme	No												1	6		
1.5.4	Overhaul system for export promotion	Extreme	V. Weak												1	5		
1.1.4	Attract global talent	V. Strong-Extreme	Weak-Moderate												2	5		
1.3.1	Decrease financial cost of government	V. Strong	Weak												3	3		
1.1.6	Provide multilingual abilities	V. Strong	Moderate												5	2		
1.2.3	Improve infrastructure for people	V. Strong	Moderate												5	2		
1.4.2	Rationaliza unproductive subsidies	V. Strong	Weak												5	2		
1.1.5	Deepen people linkages	V. Strong	Moderate-Strong												1	4	2	
1.2.1	Improve infrastructure for goods	V. Strong	Moderate													6	1	
1.1.1	Decrease cost of labor	V. Strong	Weak												1	1	4	1
1.5.1	Repositioning Puerto Rico	V. Strong	Strong												3	3	1	
1.4.1	Decrease protections	Moderate-Strong													3	4		





AREA: Productivity, Competitiveness & Connectivity		Doability of the strategy considering political, institutional, financial and technical dimensions									
 <b>Strategies</b>											
		Ranking									
1.5.4	Overhaul system for export promotion	V. Strong									7
1.2.2	Improve infrastructure for information	V. Strong							1	6	
1.1.3	Increase human productivity through tech.	Strong-V.Strong						3	4		
1.5.1	Reposition/Rebrand	Strong-V.Strong						4	3		
1.1.2	Increase human productivity through education	Strong						7			
1.5.3	Overhaul system for investment promotion	Strong						7			
1.2.1	Improve infrastructure for goods	Moderate-Strong				3	3	1			
1.1.5	Deepen people linkages	Moderate-Strong				2	5				
1.5.2	Overhaul system for national strategy	Moderate			2	2	3				
1.1.4	Attract global talent	Moderate			5	2					
1.1.6	Provide multilingual abilities	Moderate			7						
1.3.2	Decrease regulatory burden	Moderate			7						
1.4.2	Decrease subsidies	Moderate			1	6					
1.2.3	Improve infrastructure for people	Moderate			2	5					
1.2.4	Increase efficiency of local utilities	Weak-Moderate			4	3					
1.1.1	Decrease cost of labor	Weak			5	2					
1.4.1	Decrease protections	Weak			7						
1.3.1	Decrease financial cost of government	V.Weak-Weak	3	4							



### My practice: MACBETH voting



- Individual MACBETH judgements are elicited
- Group judgements are agreed upon discussion

*A Socio-technical Approach for Group Decision Support in Public Strategic Planning: The Pernambuco PPA Case*

Bana e Costa, C.A., Lourenço, J.C., Oliveira, M.D., Bana e Costa, J.C. *GDN*, 2013



Objective 1		Contribution towards achieving the objective (individual judgements)										Group judgements				
To promote the social inclusion and protection of people and families		Negative (←) 0 Positive (→)										Difference to Status Quo Difference to next				
Code	Programmes Name	very strong	strong	moderate	weak	very weak	no	very weak	weak	moderate	strong	very strong	extreme			
1.3	Social productive insertion										3	6		very strong - extreme	strong	
6.2	Universal accessibility										1	5	3	very strong - extreme	moderate - strong	
(1+8)1	Center for Defence of Life										1	7	1	very strong	weak	
4.1	Legal, Judicial and out-of-court Service										1	7	1	very strong	strong	
6.1	Guarantee of rights for people with disabilities										3	5	1	strong - very strong	no	
1.5	Management of the social assistance system										4	5		strong - very strong	no	
1.1	Pernambuco caring for the street population										5	4		strong - very strong	no	
4.2	New DPPE										5	4		strong - very strong	no	
1.2	Food on the Table										3	6		strong - very strong	no	
8.1	Consumer rights										4	5		strong - very strong	strong	
3.2	Development of SEDSDH staff										1	5	3	strong - very strong	very weak	
7.1	Work to re-socialise										3	2	4	strong	no	
8.2	State policy for human rights										2	7		strong	moderate	
5.1	Institutional Accommodation (FUNDAC)										2	6	1	strong	very weak	
7.3	Partnerships to re-socialise										2	6	1	strong	weak	
7.5	Re-socialisation: The great challenge										2	6	1	strong	no	
5.2	Socio-educative										4	4	1	strong	no	
1.4	Social mobilisation and control										5	4		strong	strong	
2.1	IPEM and Society										8	1		moderate	weak	
7.4	Transparency to re-socialise										3	6		weak - moderate	very weak	
3.1	Administrative modernisation of SEDSDH										3	5	1	weak - moderate	very weak	
3.4	Communication management at SEDSDH										1	2	6	weak - moderate	weak - moderate	
2.2	IPEM + Services										3	5	1	weak - moderate	very weak	
3.3	Infra-structure adequacy										5	4		weak - moderate	weak	
7.2	Safe Prison										2	3	1	3	very weak - weak	very weak - weak
90	Status Quo													no		

### My practice: MACBETH voting

Bana e Costa, C.A., Angulo-Meza, L., Oliveira, M.D. (2013), *O método MACBETH e aplicação no Brasil*, *Engvista*, 15, 1 (3-27)

- Individual MACBETH judgements are elicited
- Group judgements are agreed upon discussion
- Value scores are derived with the MACBETH DSS



Criterion 1			Individual judgements of degree to which the action lowers emissions										Group judgements						
Contribution to lower emissions			Negative (←) 0 Positive (→)										Difference to Status Quo Difference to next						
Code	Actions Name	Score Ref.	very strong	strong	moderate	weak	very weak	no	very weak	weak	moderate	strong	very strong	extreme					
op 1	Use fiscal instruments and eliminate subsidies to grow fossil	125										2	2	8	very strong	no			
op 2	Significantly reduce deforestation	125										2	8	4	very strong	no			
op 18	Incorporate monetary value of eco-system services	125										1	2	9	2	very strong	no		
op 19	Reform GDP indicator	125										1	2	3	7	3	very strong	very weak	
op 4	Promote reforestation	100										4	7	1	5	strong - very strong	no		
op 6	Promote project-based financing mechanisms	100										2	8	8	strong - very strong	no			
op 10	International agreement on urban development	100										4	2	5	strong - very strong	no			
op 15	Create a low-carbon Brazil	100				1						1	2	2	5	4	strong - very strong	no	
op 20	Develop an effective rules-based approach with enforcement	100						2				1	2	4	5	strong - very strong	no		
op 22	Massive public investment by international bodies - New Green	100										1	2	2	5	3	strong - very strong	no	
op 23	Promote low carbon agriculture and ecosystem management	100										6	9		strong - very strong	no			
op 25	Individual per capita emission target worldwide	100										4	4	5	7	strong - very strong	no		
op 27	Facilitate public and private sector investment towards	100										3	1	8	1	strong - very strong	very weak		
op 3	Promote REDD+	75										7	8		moderate - strong	no			
op 5	Promote cap-and-trade	75				1						3	7	5	moderate - strong	no			
op 7	International norms and standards for energy efficiency	75										1	5	9	2	moderate - strong	no		
op 9	Build mechanism for international technology transfer	75									1	4	4	5	moderate - strong	no			
op 11	Buy down the cost of low-carbon technologies	75										1	2	3	8	moderate - strong	no		
op 12	Shift the focus of finance to resilient development	75										1	7	2	3	2	moderate - strong	no	
op 16	Promote women's rights and health/reproductive rights	75										2	1	4	4	4	moderate - strong	no	
op 17	Education around sustainability	75										2	6	5	1	2	moderate - strong	no	
op 21	Internationally coordinated campaign around behavioral	75										1	1	4	5	2	1	moderate - strong	no
op 24	Reduce emissions from aviation and maritime transportation	75										1	1	1	9	3	3	moderate - strong	no
op 26	Include climate change in the national and agenda of G20	75										2	3	4	8	3	moderate - strong	no	
op 13	Global gadget on town square	50										1	2	3	4	2	1	weak - moderate	very weak
op 14	Create unified metrics and/or baselines related to mitigation	50										3	3	1	6	3	1	weak - moderate	no
op 28	Include climate change in the mission and agenda of existing	50										1	2	7	2	1	2	weak - moderate	no
90	Status quo	0																no	weak - moderate
op 8	Shift the focus away from CO2 emissions reduction	-100										1	2	6	3	1		(-) strong	strong

**M** Using fixed references

From a consistent set of pairwise judgments...

	Strategy C	Benchmark 2	Strategy B	Strategy A	SQ	Current scale	
Strategy C	no	weak-mod	moderate	strong	v. strong	143	extreme
Benchmark 2		no	very weak	strong	strong	100	v. strong
Strategy B			no	moderate	moderate	71	strong
Strategy A				no	very weak	14	moderate
SQ					no	0	weak
							very weak
							no

Consistent judgements

... MACBETH derives a score for each option...  
 ... that should be validated...  
 ... and adjust if desired...  
 ... within a range compatible with the judgments elicited.

### Basic principles

- Enrich your facilitation toolbox with several technically equivalent methods
- Try to figure out evaluators' levels of numeracy and verbal fluency

### The technical component: Which value elicitation method to use?

8.º JUÍZO CÍVEL DA COMARCA DE LISBOA

Proc. n.º 1212/2002  
Conclusão em: 10/11/2008

A fls. 189 vem o Executado apresentar um requerimento intitulado de «oposição à penhora», em que alega ter sido ordenada a penhora de 1/6 do vencimento que auferir, sendo que atentas as despesas correntes que apresenta ter, o deixa numa situação de grave carência económica.

Conclui, pedindo a isenção de penhora.

Notificado o exequente, vem este requerer a manutenção da penhora.

Foi ordenado a elaboração de um relatório sócio económico do executado, o qual se mostra junto a fls. 213.

Apreciando.

O Tribunal deve ponderar entre o interesse do exequente em ver o seu direito assegurado, e o do executado em cumprir o pagamento da quantia a que se encontra vinculado, interesse esse que tem de ser proporcional.

Pese embora os factos relatados pelo executado, e sendo certo que não competindo ao Tribunal restringi-lo de refazer a sua vida como entender, também não pode o Tribunal prejudicar os compromissos anteriormente por aquele assumidos.

Assim, determina o Tribunal proceder à redução da penhora do vencimento do executado para 1/5 do vencimento.

Notifique.




Lisboa, 2008-12-12.

## Numeracy and fluency influence preference for value elicitation technique

- People differ substantially in numeracy – Ability to use appropriate numerical principles
- Many people are “innumerate”

*Judge accepted argument that spousal maintenance was too high and “reduced” it from 1/6 to 1/5 of husband salary!*

- Not a measure of intelligence (Frederick, 2003)...

### Basic principles

- Enrich your facilitation toolbox with several technically equivalent methods
- Try to figure out evaluators’ levels of numeracy and verbal fluency




## The technical component: Which value elicitation method to use?

**Value judgments in words (‘strong difference’) are not psychologically equivalent to value judgments in numbers (‘40’)**

Fasolo, B., Bana e Costa, C.A. (forthcoming)  
Tailoring value elicitation to decision makers’ numeracy and fluency: expressing value judgments in numbers or words”

We conducted a behavioral experiment (80 students at the LSE) to examine the extent to which decision makers’ numeracy (ability to use appropriate numerical principles) and verbal fluency (ability to express oneself in words) impact their perception and preferences for two different value-elicitation techniques:

- one numerical (MACBETH)
- one non-numerical (direct rating)



## Results

- Eliciting values numerically or non-numerically, although technically equivalent, are not psychologically equivalent for DM with different numeracy and fluency.
- Numeric direct rating technique is easier and more satisfying for more numerate DM
- Non-numeric MACBETH technique is easier and more satisfying for more fluent DM
- **Neither technique was absolutely preferred — half of the participants favored the numerical and half the non-numerical technique.**

## Conclusions

- **These two techniques are complementary tools in a decision analyst's toolbox** (as a matter of fact both Hiview and MACBETH DSS allow to use either technique).
- Choice of technique could be made at the point of facilitation depending on the assessed numeracy and fluency of one's clients.
- Information concerning preference for expressing value judgments numerically or non-numerically can be gathered from the analyst's past experience with the client or can emerge during the first interaction with a client.



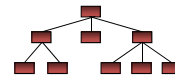
## Socio-technical practice: Common critical mistakes

### Basic principle

- Avoid common critical mistakes

#### In Structuring :

- An indicator is not a criterion; consequence is not value
- Means are not ends; causes are not effects.
- Redundancy of criteria gives rise to non-requisite models.
- Scarce performance data does not implies they should not be included in the model.



#### In Evaluation:

- Performance is not value.
- Subjectivity is not the same as arbitrariness.
- **Weighting criteria based only on the psychological notion of importance is the most common critical mistake.**
- Rankings are not measures of differences in value:  
To judge A better than B says nothing about how much A is better than B.
- Summing up ordinal scores gives rise to meaningless overall scores.



#### In Prioritizing projects and portfolio analysis:

- Summing up interval scores gives rise to meaningless portfolio selection.



## Consequence is not value: Shapes of a value curve

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EMAUMCG Collaboration

What is the difference in attractiveness between:  
"having 1 relapses each year"  
and  
"having 2 relapses each year" ?

Consistent judgements

Illustrative

Illustrative

Outcomes

<=-2	1,0 e -1	>=2
9	44	16
13%	64%	23%

## Avoid the most common critical mistake in building a model of values

Ralph L. Keeney, 1992  
(page 147)

### The Most Common Critical Mistake

There is one mistake that is very commonly made in prioritizing objectives. Unfortunately, this mistake is sometimes the basis for poor decisionmaking. It is always a basis for poor information. As an illustration,

### Avoid the most common critical mistake (...) in selecting a portfolio of options

DECISION ANALYSIS  
Vol. 6, No. 4, December 2009, pp. 256-262  
ISSN 1545-8490 | eISSN 1545-8504 | 09 | 0604 | 0256

doi 10.1287/deca.1090.0158  
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### On the Choice of Baselines in Multiattribute Portfolio Analysis: A Cautionary Note

Robert T. Clemen, James E. Smith

## Qualitative swing weighting with MACBETH

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Question number: 1      [Previous](#)   [Next](#)   [Pause](#)   [Quit](#)

Which of the following improvements is the most desirable?

<input type="radio"/> 0 relapses in the next 5 years ↑ 5 relapses in the next 5 years Number of relapses	<input type="radio"/> 8 years ↑ 5 years Time to disease progression	<input type="radio"/> 0 people in the next 10 years ↑ 50 in 1000 MS patients in the next 10 years Number of deaths due to liver failure	<input type="radio"/> 0 people in the next 10 years ↑ 50 in 1000 MS patients in the next 10 years Number of deaths or severe disabilities due to PML	<input type="radio"/> 0 people in the next 10 years ↑ 50 in 1000 MS patients in the next 10 years Number of deaths due to leukemia
--	---	---	--	--

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Question number: 1

Previous Next Pause Quit

Which of the following improvements is the most desirable?

0 relapses in the next 5 years

↑

5 relapses in the next 5 years

Number of relapses

8 years

↑

5 years

Time to disease progression

0 people in the next 10 years

↑

50 in 1000 MS patients in the next 10 years

Number of deaths due to liver failure

0 people in the next 10 years

↑

50 in 1000 MS patients in the next 10 years


Number of deaths or severe disabilities due to PML

0 people in the next 10 years

↑

50 in 1000 MS patients in the next 10 years

Number of deaths due to leukemia



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Question number: 2

Previous Next Pause Quit

How desirable is this improvement ?

0 relapses in the next 5 years

↑

5 relapses in the next 5 years

Number of relapses

8 years

↑

5 years

Time to disease progression

0 people in the next 10 years

↑

50 in 1000 MS patients in the next 10 years

Number of deaths due to liver failure

0 people in the next 10 years

↑

50 in 1000 MS patients in the next 10 years

Number of deaths or severe disabilities due to PML


0 people in the next 10 years

↑

50 in 1000 MS patients in the next 10 years

Number of deaths due to leukemia

- extreme
- very strong
- strong
- moderate
- weak
- Very weak
- no



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Question number: 2

Previous Next Pause Quit

How desirable is this improvement?

0 relapses in the next 5 years  
 5 relapses in the next 5 years  
 Number of relapses

5 years  
 8 years  
 5 years  
 Time to disease progression

0 people in the next 10 years  
 50 in 1000 MS patients in the next 10 years  
 Number of deaths due to liver failure

0 people in the next 10 years  
 50 in 1000 MS patients in the next 10 years  
 Number of deaths or severe disabilities due to PML

0 people in the next 10 years  
 50 in 1000 MS patients in the next 10 years  
 Number of deaths due to leukemia

- extreme
- very strong
- strong
- moderate
- weak
- Very weak
- no

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Question number: 3

Previous Next Pause Quit

Which of the following improvements is the most desirable?

0 relapses in the next 5 years  
 5 relapses in the next 5 years  
 Number of relapses

5 years  
 8 years  
 5 years  
 Time to disease progression

0 people in the next 10 years  
 50 in 1000 MS patients in the next 10 years  
 Number of deaths due to liver failure

0 people in the next 10 years  
 50 in 1000 MS patients in the next 10 years  
 Number of deaths or severe disabilities due to PML

0 people in the next 10 years  
 50 in 1000 MS patients in the next 10 years  
 Number of deaths due to leukemia

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Question number: 3

Previous Next Pause Quit

Which of the following improvements is the most desirable?

0 relapses in the next 5 years  
 5 relapses in the next 5 years  
 Number of relapses

8 years  
 5 years  
 Time to disease progression

0 people in the next 10 years  
 50 in 1000 MS patients in the next 10 years  
 Number of relapses, hospitalizations, and deaths

0 people in the next 10 years  
 50 in 1000 MS patients in the next 10 years  
 Number of deaths or severe disabilities due to PML

0 people in the next 10 years  
 50 in 1000 MS patients in the next 10 years  
 Number of deaths due to leukemia

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Question number: 4

Previous Next Pause Quit

How desirable is this improvement?

0 relapses in the next 5 years  
 5 relapses in the next 5 years  
 Number of relapses

8 years  
 5 years  
 Time to disease progression

0 people in the next 10 years  
 50 in 1000 MS patients in the next 10 years  
 Number of relapses, hospitalizations, and deaths

0 people in the next 10 years  
 50 in 1000 MS patients in the next 10 years  
 Number of deaths or severe disabilities due to PML

0 people in the next 10 years  
 50 in 1000 MS patients in the next 10 years  
 Number of deaths due to leukemia

How desirable is this improvement?

- extreme
- very strong
- strong
- moderate
- weak
- Very weak
- no

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Question number: 4

Previous Next Pause Quit

How desirable is this improvement?

0 relapses in the next 5 years

5 relapses in the next 5 years

8 years

5 years

0 people in the next 10 years

50 in 1000 MS patients in the next 10 years

0 people in the next 10 years

50 in 1000 MS patients in the next 10 years

0 people in the next 10 years

50 in 1000 MS patients in the next 10 years

0 people in the next 10 years

50 in 1000 MS patients in the next 10 years

Number of deaths due to leukemia

extreme  
 very strong  
 strong  
 moderate  
 weak  
 Very weak  
 no

50 in 1000 MS patients in the next 10 years

Number of deaths due to leukemia

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Question number: 5

Previous Next Pause Quit

How much more desirable is the improvement on the left when compared to the one on the right?

0 people in the next 10 years

Very Strong

50 in 1000 MS patients in the next 10 years

Number of deaths due to liver failure

0 people in the next 10 years

Very Strong

50 in 1000 MS patients in the next 10 years

Number of deaths due to leukemia

extreme  
 very strong  
 strong  
 moderate  
 weak  
 Very weak  
 no

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Question number: 5

Previous Next Pause Quit

How much more desirable is the improvement on the left when compared to the one on the right?

0 people in the next 10 years

↑

Very Strong

↓

50 in 1000 MS patients in the next 10 years

Number of deaths due to liver failure

- extreme
- very strong
- strong
- moderate
- weak
- Very weak
- no

0 people in the next 10 years


↑

Very Strong

↓

50 in 1000 MS patients in the next 10 years

Number of deaths due to leukemia



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Question number: 6

Previous Next Pause Quit

Which of the following improvements is the most desirable?

0 relapses in the next 5 years

↑

5 relapses in the next 5 years

Number of relapses

8 years

↑

5 years

Time to disease progression

0 people in the next 10 years

↑

50 in 1000 MS patients in the next 10 years

Number of relapses due to liver failure

0 people in the next 10 years

↑

50 in 1000 MS patients in the next 10 years


Number of deaths or severe disabilities due to PML

0 people in the next 10 years

↑

50 in 1000 MS patients in the next 10 years

Number of deaths due to PML



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Question number: 6

Previous Next Pause Quit

Which of the following improvements is the most desirable?

Number of relapses

Time to disease progression

Number of people in the next 10 years

Number of deaths or severe disabilities due to PML

Number of people in the next 10 years

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Question number: 7

Previous Next Pause Quit

How desirable is this improvement?

extreme

very strong

strong

moderate

weak

Very weak

no

Number of relapses

Time to disease progression

Number of people in the next 10 years

Number of deaths or severe disabilities due to PML

Number of people in the next 10 years

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Question number: 7

Previous Next Pause Quit

How desirable is this improvement?

0 relapses in the next 5 years

↑

- extreme
- very strong
- strong
- moderate
- weak
- Very weak
- no

↓

5 relapses in the next 5 years

Number of relapses

8 years

↑

↓

5 years

0 people in the next 10 years

↑

↓

50 in 1000 MS patients in the next 10 years

0 people in the next 10 years

↑

↓


50 in 1000 MS patients in the next 10 years

0 people in the next 10 years

↑

↓

50 in 1000 MS patients in the next 10 years



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Question number: 8

Previous Next Pause Quit

How much more desirable is the improvement on the left when compared to the one on the right?

0 people in the next 10 years

↑

Very Strong

↓

50 in 1000 MS patients in the next 10 years

Number of deaths due to liver failure

- extreme
- very strong
- strong
- moderate
- weak
- Very weak

0 relapses in the next 5 years


↑

Strong

↓

5 relapses in the next 5 years

Number of relapses





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Question number: 8

Previous Next Pause Quit

How much more desirable is the improvement on the left when compared to the one on the right?

0 people in the next 10 years

↑

Very Strong

↓

50 in 1000 MS patients in the next 10 years

Number of deaths due to leukemia

- extreme
- very strong
- strong
- moderate
- weak
- Very weak

0 relapses in the next 5 years


↑

Strong

↓

5 relapses in the next 5 years

Number of relapses



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Question number: 9

Previous Next Pause Quit

Which of the following improvements is the most desirable?

0 relapses in the next 5 years

↑

5 relapses in the next 3 years

Number of relapses

8 years

↑

5 years

Time to disease progression

0 people in the next 10 years

↑

50 in 1000 MS patients in the next 10 years

Number of relapses due to PML

0 people in the next 10 years

↑

50 in 1000 MS patients in the next 10 years


Number of deaths or severe disabilities due to PML

0 people in the next 10 years

↑

50 in 1000 MS patients in the next 10 years

Number of deaths due to PML



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Question number: 9

Previous Next Pause Quit

Which of the following improvements is the most desirable?

0 relapses in the next 5 years  
 5 relapses in the next 5 years  
 Number of relapses

8 years  
 5 years  
 Time to disease progression

0 people in the next 10 years  
 50 in 1000 MS patients in the next 10 years  
 Number of relapses due to relapses

0 people in the next 10 years  
 50 in 1000 MS patients in the next 10 years  
 Number of deaths or severe disabilities due to PML

0 people in the next 10 years  
 50 in 1000 MS patients in the next 10 years  
 Number of deaths or severe disabilities due to PML

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The VALUE Study - Value and Utilities in European Patients

Question number: 10

Previous Next Pause Quit

How desirable is this improvement?

0 relapses in the next 5 years  
 5 relapses in the next 5 years  
 Number of relapses

8 years  
 5 years  
 Time to disease progression

0 people in the next 10 years  
 50 in 1000 MS patients in the next 10 years  
 Number of relapses due to relapses

0 people in the next 10 years  
 50 in 1000 MS patients in the next 10 years  
 Number of deaths or severe disabilities due to PML

0 people in the next 10 years  
 50 in 1000 MS patients in the next 10 years  
 Number of deaths or severe disabilities due to PML

extreme  
 very strong  
 strong  
 moderate  
 weak  
 Very weak  
 no

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The VALUE Study - Value and Utilities in European Patients

Question number: 10

Previous Next Pause Quit

How desirable is this improvement ?

0 relapses in the next 5 years

5 relapses in the next 5 years

8 years

5 years

Time to disease progression

0 people in the next 10 years

50 in 1000 MS patients in the next 10 years

0 people in the next 10 years

50 in 1000 MS patients in the next 10 years

0 people in the next 10 years

50 in 1000 MS patients in the next 10 years

extreme  
 very strong  
 strong  
 moderate  
 weak  
 Very weak  
 no

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Question number: 11

Previous Next Pause Quit

How much more desirable is the improvement on the left when compared to the one on the right?

0 relapses in the next 5 years

5 relapses in the next 5 years

Strong

Number of relapses

8 years

5 years

Weak

Time to disease progression

extreme  
 very strong  
 strong  
 moderate  
 weak  
 Very weak

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The VALUE Study - Value and Utilities in European Patients

Question number: 11

Previous Next Pause Quit

How much more desirable is the improvement on the left when compared to the one on the right?

0 relapses in the next 5 years

↑

Strong

↓

5 relapses in the next 5 years

Number of relapses

extreme

very strong

strong

moderate

weak

Very weak

8 years


↑

Weak

↓

5 years

Time to disease progression



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The VALUE Study - Value and Utilities in European Patients

Question number: 12

Previous Next Pause Quit

How desirable is this improvement ?

0 relapses in the next 5 years

↑

↓

5 relapses in the next 5 years

Number of relapses

8 years

↑

↓

5 years

Time to disease progression

0 people in the next 10 years

↑

↓

50 in 1000 MS patients in the next 10 years

Number of relapses due to PML

0 people in the next 10 years

↑

extreme

very strong

strong

moderate

weak

Very weak

no

↓

50 in 1000 MS patients in the next 10 years

Number of deaths or severe disabilities due to PML


0 people in the next 10 years

↑

↓

50 in 1000 MS patients in the next 10 years

Number of relapses due to PML



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Question number: 12

Previous Next Pause Quit

How desirable is this improvement ?

0 relapses in the next 5 years

5 relapses in the next 5 years

8 years

5 years

0 people in the next 10 years

50 in 1000 MS patients in the next 10 years

0 people in the next 10 years

50 in 1000 MS patients in the next 10 years

0 people in the next 10 years

50 in 1000 MS patients in the next 10 years

0 people in the next 10 years

50 in 1000 MS patients in the next 10 years

Number of deaths or severe disabilities due to PML

Number of deaths or severe disabilities due to PML

Number of deaths or severe disabilities due to PML

Number of deaths or severe disabilities due to PML

Number of deaths or severe disabilities due to PML

extreme  
 very strong  
 strong  
 moderate  
 weak  
 Very weak  
 no

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Question number: 13

Previous Next Pause Quit

How much more desirable is the improvement on the left when compared to the one on the right?

8 years

5 years

Time to disease progression

0 people in the next 10 years

50 in 1000 MS patients in the next 10 years

Number of deaths or severe disabilities due to PML

extreme  
 very strong  
 strong  
 moderate  
 weak  
 Very weak  
 no

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Question number: 13

Previous Next Pause Quit

How much more desirable is the improvement on the left when compared to the one on the right?

8 years

↑

Weak

↓

5 years

Time to disease progression

extreme

very strong

strong

moderate

weak

Very weak

no

0 people in the next 10 years

↑

Weak

↓

50 in 1000 MS patients in the next 10 years

Number of deaths or severe disabilities due to PML

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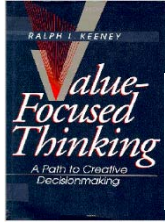
The VALUE Study - Value and Utilities in European Patients

Effects of new medications for Multiple Sclerosis

- Number of relapses
- Time to disease progression
- Number of deaths due to liver failure
- Number of deaths or severe disabilities due to PML
- Number of deaths due to leukemia

	[Deaths liver failure]	[Deaths leukemia]	[Relapses]	[Progression]	[Deaths PML]	[all lower]	Current scale
[Deaths liver failure]	no	very weak	positive	positive	positive	v. strong	34.62
[Deaths leukemia]		no	moderate	positive	positive	v. strong	30.77
[Relapses]			no	moderate	positive	strong	19.23
[Progression]				no	no	weak	7.69
[Deaths PML]				no	no	weak	7.69
[all lower]						no	0.00

Consistent judgements




Ralph L. Keeney, 1992  
(page 147)

### Avoid the most common critical mistake in building a model of values

#### **The Most Common Critical Mistake**

There is one mistake that is very commonly made in prioritizing objectives. Unfortunately, this mistake is sometimes the basis for poor decisionmaking. It is always a basis for poor information. As an illustration,

DECISION ANALYSIS  
Vol. 6, No. 4, December 2009, pp. 256-262  
ISSN 1545-8490 | EISSN 1545-8504 | 09 | 0604 | 0256






doi:10.1287/deca.1090.0158  
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### Avoid the most common critical mistake in selecting a portfolio of options

#### On the Choice of Baselines in Multiattribute Portfolio Analysis: A Cautionary Note

Robert T. Clemen, James E. Smith

### Selecting a portfolio of projects: The baseline paradox



- A common procedure is to set 0 as the score of the least attractive project

	Lives saved	Scientific impact	Costs (£'000s)
a	6,000	Excellent	200
b	4,000	Good	100
c	4,000	Good	100
d	3,000	Poor	100


➔

	$V_{\text{lives}}$	$V_{\text{science}}$	Costs (£'000s)
a	1	1	200
b	1/3	1/2	100
c	1/3	1/2	100
d	0	0	100

- Choose portfolio {a} which gives greatest  $V_{\text{lives}} + V_{\text{science}}$  for £200,000

Adapted from Alec Morton (2010)



Now add a new project

	Lives saved	Scientific impact	Costs (£'000s)
a	6,000	Excellent	200
b	4,000	Good	100
c	4,000	Good	100
d	3,000	Poor	100
e	1,000	Poor	100

	$V_{\text{lives}}$	$V_{\text{science}}$	Costs (£'000s)
a	1	1	200
b	3/5	1/2	100
c	3/5	1/2	100
d	2/5	0	100
e	0	0	100

- Now the portfolio which gives greatest  $V_{\text{lives}} + V_{\text{science}}$  for £200,000 is {b,c}
- This is an example of **rank reversal**

A. Morton, On the choice of baselines in portfolio decision analysis.  
LSEOR 10.128, tech. rep., Management Science Group, Department  
of Management, London School of Economics, 2010

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## Straightforward models and visual aiding tools engage stakeholders in decisions

*Learning report:*  
**Looking for value in hard times**  
How a new approach to priority setting can help improve patient care while making savings  
August 2012

Identify Innovate Demonstrate Encourage

Poor value for money

High costs

Low population health gain (value)

Good value for money

Low costs

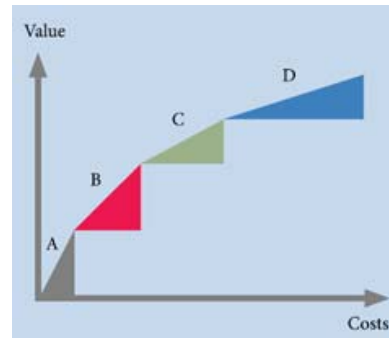
High population health gain (value)

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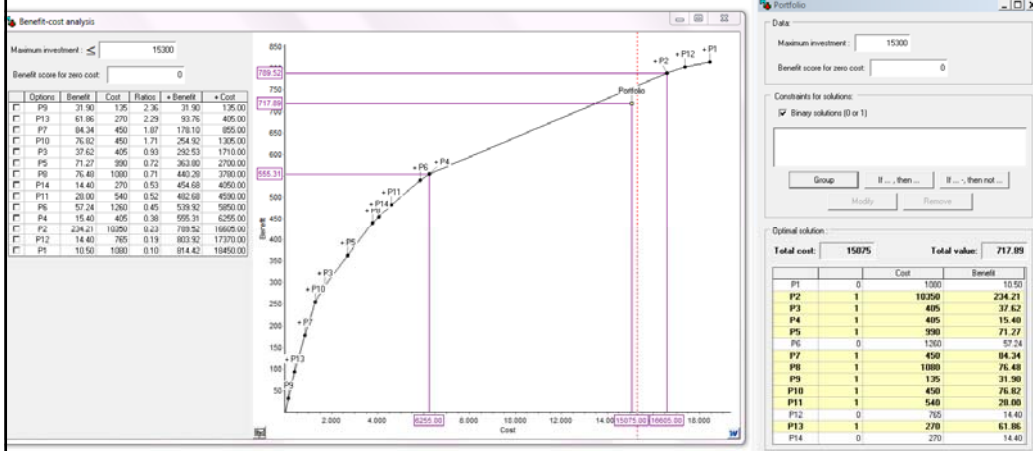
### A success story by Terry Bresnick: Prioritization process at US Marine Corps

“In door for close to 40 years”



85

### Resource allocation to community care programmes in the Northern Lisbon Group of Health Care Centres: Prioritisation vs “optimization”



Program 6 replaced by Program 2



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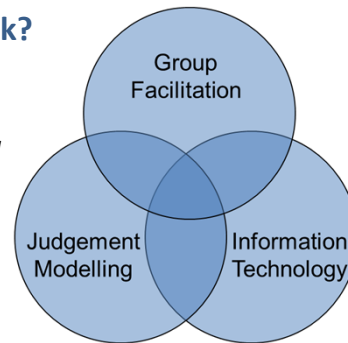
## Do decision conferences work?

### Research:

- Participants from 48 decision conferences rated them as preferable to ordinary meetings (Chun, 1992).
- Of 26 decision conferences studied, those rated more beneficial were smaller, hosted by organisations more open to change, and more decisions were agreed (McCartt & Rohrbaugh, 1995).

### Why do they work?

- Three conditions for group to outperform its members→  
Regan-Cirincione, P. (1994). *Organizational Behavior and Human Decision Processes* **58**: 246-70.
- Process gains in group allow 'many heads to be better than one'
- Social *and* technical



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## The value of decision conferences

- Better communication across 'silos'
- Shared understanding of strategic goals
- Development of an 'idea-generating' culture
- Commitment to the way forward
- Improved team-working
- Better appreciation of uncertainty
- Smarter, defensible decisions



*Learning from each other:  
A key for  
good decision-aiding quality  
good decision quality  
and  
good relationship  
good friendship*

*Good quality of life*



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