



Cost- benefit analysis of a research vessel

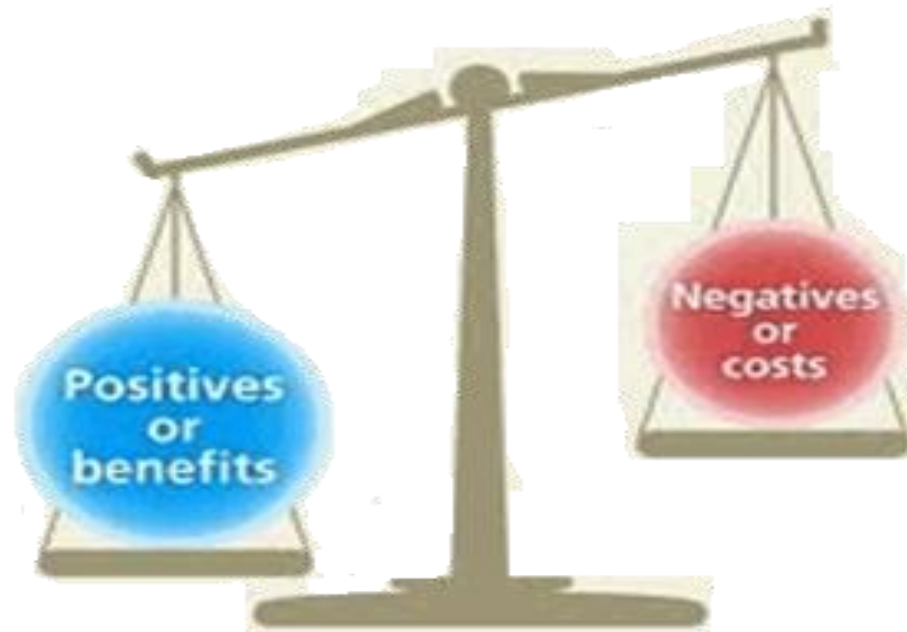
A first approach to sharing a methodology

Di Bitetto, D'Anselmi, Magnifico
National Research Council of Italy
paolodanselmi@gmail.com

June 11-12, 2014
Barcelona, CSIC-UTM (Spain)

2 what is cost-benefit analysis

... when evaluation items are not obvious



3 scope of this exercise (CNR operator point of view)

1_ improving effective use of a research vessel

2_ defending the budget of a research vessel
within the operator's organization, vis-à-vis other uses of funds
(CNR multidisciplinary organization)

3_ defending the budget of a research vessel
vis-à-vis funding agency and non-research uses of taxpayer monies
and showing awareness of costs vis-à-vis society at large

4 awareness of limits of such exercise

1_ benefits difficult and uncertain to measure
(inherent to scientific research: intangible,
hardly foreseeable, short / long time frame)

2_ not a magic wand / push button tool

3_ current incremental budgeting criterion not a
better one

4_ budgets are implicit cost-benefit analyses

5 preview of method

Following steps:

6_ costs

7_ benefits

8_ progressive steps of this exercise

9_ measuring a specific research campaign

10_ vessel/s performance

11_ organizational performance

6 Costs

1_ fixed: lease, crew, onboard existing scientific equipment, other

2_ variable: fuel, agency costs (mooring, port fees, pilot ship), food, other

3_ other research equipment

4_ technical and research personnel

5_ organizational, overhead (full costing)

7 Benefits

_ publications [discoveries / methodology / data ownership]
(publication count by ISI-output, IF, MECR, MOCR-outcome)

_ patents

_ education [PhD candidates / mentorship of trainees]

_ project revenues [attraction of funds / use of infrastructure
by research community / networking / chartering]

_ input to public policy (reports, project revenues) [avoidance
of environmental costs]

8 Progressive steps of this exercise

1_ elementary: individual research campaign

2_ vessel/s*year/s

3_ (benchmark)

9 calculation on a single campaign

COSTS

- _ (cost of vessel/day) * campaign-days
- _ share of yearly cost of personnel * campaign
- _ share of yearly cost of organization

BENEFITS

- _ benefit of citations (publications):
MOCR - mean observed citation rate
 - _ project revenues (when applicable)
- =====

Net total cost* / total MOCR

*monetized costs- monetized benefits

10 benchmark on a single campaign

Cost/MOCR point

- _ Campaign A a1
- _ Campaign B a2

If $a1 > a2$

Then Campaign A better than Campaign B

Answering question 1: effective use of vessel

11 example of vessel performance evaluation

SUM (MOCR) over all campaigns/year

Vs.

Yearly cost of research vessel

Answering question 1: effective use of vessel

12 example of organizational performance

cost/MOCR point

_ organization A a1

_ organization B a2

If $a1 > a2$

Then organization A better than organization B

Cost includes cost of vessel use

13 scope of this exercise

the very difficulties inherent to research make this exercise interesting
[benefits: intangible, not foreseeable, short / long time frame]

1_ improving effective use of a research vessel

2_ defending the budget of a research vessel
within the operator's organization, vis-à-vis other uses of funds

3_ defending the budget of a research vessel
vis-à-vis funding agency and non-research uses of taxpayer monies
and showing awareness of costs vis-à-vis society at large

14 bibliography

[on the use of marine research infrastructure]

UK Marine Science Coordination Committee, UK Marine Research Vessels: An assessment and proposals for improved coordination, 2013

[on scientometrics]

_ Bornmann, Lutz et al., Citation counts for research evaluation, 2008

_ Emrouznejad, Ali, Evaluation of research in efficiency and productivity, 2008;

_ Griliches Zvi, Issues in Assessing the Contribution of Research and Development to Productivity Growth, National Bureau, Volume Title: R&D and Productivity: The Econometric Evidence, January 1998;

_ Hirsch, J.E. An index to quantify an individual's scientific research output, 2005, Proceedings of the National Academy of Sciences of the USA;