

MOTIIVE Experiences using Simulation Software to Assess SDI Cost-Benefit

Roger Longhorn

Director, Info-Dynamics Research Associates Ltd

ral@alum.mit.edu

*"There are three kinds of lies:
lies, damned lies - and statistics."*

Benjamin Disraeli (1804-1881)

*"There are three kinds of lies:
lies, damned lies - and Cost-Benefit Analyses."*

Longhorn (2006)

The Presentation

- **MOTIIVE** - Marine Overlays on Topography - an INSPIRE "implementing rules" project funded under FP6 GMES-SPACE budget line
- WP7 objectives ref CBA - and relevance to INSPIRE
- Issues discovered in first few months
- What type of "CBA"?
- Usefulness of Return on Investment (ROI) or other cost-benefit 'success' metrics

What Does the Marine Geospatial Community Need in Regard to CBA?

- Who needs a CBA - target audience(s)?
- CBA for what? Project? Programme? SDI?
- Project-focused CBA methodologies and metrics (NPV, ROI, EV, VMM, etc.) - Which do you use? Why? Where? When? How? Cost to perform study? Acceptable to funding body?
- Case Studies v. Business Cases v. CBA studies? All three?
- Impact analyses? Risk assessments? Combinations?
- What do members of the marine geospatial community use?

INSPIRE CBA/ROI Workshop

- 12-13 January 2006 - DG JRC, Ispra
- 25 participants with CBA expertise
- USA (FGDC & GITA), Canada (GeoConnections), Europe (various), EC
- It may not be - and probably is not - possible to use a standard CBA methodology, with a single success criteria/metric, to assess the cost-benefit for an entire information infrastructure.
- So what to use? Where? When? And why?

Some Findings and Opinions

- Traditional CBA methodologies and metrics are best suited to **project** justifications - not "infrastructures", which are complex, multi-faceted, multi-disciplinary, multi-technology.
- The more complex is the target of the study, the greater are the number of **assumptions** made in performing the analysis.
- Therefore, the less 'believable' the result is (or may be) by funding agencies.

What is the CBA to focus on?

- Do we focus the CBA (even for a project) on the interoperability issues, versus all project inputs and outputs, many unconnected with 'interoperability'?
 - NASA-funded "Geospatial Interoperability ROI Study"
- Is the CBA used to justify the requested budget for a project generally - or to justify potentially higher costs (and perhaps greater future benefits) due to introducing 'interoperability technology' to the project?
- How does the budgeting cycle itself affect methodology selection, e.g. annual v. multi-year budgets?

CBA Methodologies Investigated (NASA)

- NASA ROI Study (Booz Allen Hamilton), 2004 - project-based CBA - using "Value Measuring Methodology" (GeoVMM) - focused on added costs and benefits of introducing interoperability technology to existing/new projects. Results were 'normalized'.
- Introducing interoperability technology was more expensive, in early stages - but had greater long-term benefits - ROI was 27% on a like-for-like comparison between two similar, real projects.
- Break-even not reached until year 3 at earliest.

CBA Methodologies Investigated (TNM)

- Using a computational simulation model implemented in NB-Sim - an economic model developed by experts and agreed with stakeholders to investigate alternatives (3) with NPV as the metric. (costly)
- Used by USGS for The National Map (TNM) Reengineering Program. (TNM success?)
- US federal government requires that all new programmes submit an "Exhibit 300 - Capital Asset Plan and Business Case" - 14 year break-even point.

MOTIIVE CBA - Assumptions

- SDI is about **access to data** and **interoperability** of data and/or services
- Participants must first understand the cost-benefit implications of introducing **interoperability technology** to their data management tasks - and institutions.
- This means that they must understand what interoperability is all about, technically & politically = access and re-usability issues (SDI)

MOTIIVE CBA - Barriers (1)

- Many marine/coastal geospatial stakeholders (a very diverse group) fail to understand where they fit into the wider SDI initiative(s), either nationally or regionally (INSPIRE)
- This makes it difficult to engage stakeholders at an appropriate level of seniority or experience to develop acceptable models for TNM approach.
- Most marine community members opt for project based CBA, if any, and only if required.

MOTIIVE CBA - Barriers (2)

- The moment 'standards' are mentioned, eyes begin to glaze over and interest wanders!
- Assembling the required experts and diverse groups of stakeholders is onerous and expensive.
- Unless the system for which the CBA is being conducted opens up totally new capabilities, then the benefits to users are incremental, compared to *status quo* (which they already know) and typically relate to cost savings.

MOTIIVE CBA - Barriers (3)

- Whose 'expert' opinion(s) do you use in setting the various parameters in whatever C-B analysis methodology you adopt? (e.g. risk factors, weighting factors for value of benefits, etc.)
- Who sets the parameters and cost-benefit categories (25 typically to as many as 50 or more) to which the chosen methodology is applied, especially from a diverse community of stakeholders?

MOTIIVE CBA - Questions (1)

- How do you separate 'geospatial infrastructure' cost-benefit from generic IT c-b?
- How do you separate interoperability technology cost-benefit from generic IT c-b?
- Can you disaggregate cost-benefit of geospatial interoperability, even for a specific project, from wider initiatives, from other e-government interoperability initiatives (and their expected cost-benefits)?

MOTIIVE CBA - Questions (2)

- Do you include the cost of the policy-making activity itself, plus follow-on implementation, enforcement and monitoring? (forget the technology side here)
- Is the "scenario - simulation" approach more acceptable or applicable compared to a traditional, project-based C:B methodology? (GITA is publishing tested templates for the latter in 2006)
- **Who pays?**

Approach that the MOTIIVE is using ...

- Investigate specific case studies from the marine/coastal community for projects that will have an important, identifiable impact on different sectors of government, business or society as a whole.
- Identify and collect 'traditional' CBA studies for major projects underpinning the coastal/marine SDI implementation process, using methods and metrics acceptable to funding agencies, which in some cases are required by law to follow a specific methodology.

... and finally...

- We are attempting to map the “value factors and benefits” categories proven to be of use in the NASA GeoVMM-based study to similar parameters acceptable to the marine/coastal user community. This takes time!
- Investigating and adopting more innovative cost-benefit analysis approaches, such as the financial modelling and simulations used in exploring cost-benefit for USA's The National Map programme, is problematic and would incur costs far beyond the funding available in the MOTIIVE budget for this workpackage (only 1 of 8).

Conclusion

- Implementing an acceptable "CBA Methodology" is NEVER going to be as easy as simply developing some cost-benefit data collection templates and then providing an automated procedure, process or programme to reveal some magical 'success factor' metric.
- CBAs, regardless of what type, involve highly interactive, often expensive operations, requiring wide stakeholder input and experienced 'mentors' to help complete the analysis - if it is to be worth doing at all.

Thank you for your attention.

Roger Longhorn

MOTIIVE Project Steering Committee Leader
Leader, WP7, Cost-Benefit Analysis

ral@alum.mit.edu

www.motiive.net & www.marineXML.net