Visualisations as facilitators of engagement between approaches

Multiplying methods in research evaluation

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S&T indicators as tools in deliberation

• ‘Conventional’ use of indicators (‘Science Arbiter’--Pielke)
  ▪ Purely analytical character (i.e. free of normative assumptions)
  ▪ Seeking convergence (partial converging indicators, Martin and Irvine, 1983)
  ▪ Aimed at justifying ‘best-choices’ (e.g. excellence)
    → Unitary and prescriptive advice

• ‘Opening up’ indicators (‘Honest broker’ --Pielke)
  ▪ Aimed at locating the actors in their context and dynamics
    → Not predictive, or explanatory, but exploratory
  ▪ Construction of indicators is based on choice of perspectives
    → Make explicit the possible choices on what matters
  ▪ Supporting ‘complex’ debate
    → Making science policy more ‘socially robust’

Visualisation as a means to convey ‘quantitative insights’ to diverse stakeholders
Toward ’multiplying methods in research evaluation’

Visualisation as a means to exchange ‘quantitative insights’ with different audiences – ‘interface methods’
On the use of visualisation to convey complex data
Embrace variation (Schneider, today)
Socially robust knowledge

Highlight multiple dimensions

Dimensions of European Innovation Scoreboard

Critique to composite indicators by Grupp and Schubert (2010)

Use of spider diagrams allows comparing like with like

Whereas composite indicators conceal the origin of potential dimensions
Provide contrasting views of same property (‘excellence’)

Could be done interactively.

Rafols et al. (2012)
Visualising assumptions, choices

The University Leiden ranking (2011-12)

• Different measures of performance
  • Mean Citations per fields, Top 10%,
• Under different conditions (fractional, language)
• Include stability interval (bootstrapping)

Select indicators

Dimension of scientific performance: Impact
Rank universities based on: PP(top 10%) □ Show stability intervals

Select method of calculation

☑ Normalize for university size
☑ Assign collaborative publications fractionally to universities
☑ Leave out non-English language publications

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<th>Rank</th>
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<th>Country</th>
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<th>PP_{top 10% stability interval}</th>
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Maps allow exploration of ‘directions’ in trajectories.

What are the “options” in rice research?

Ciarli and Rafols (2017)
Maps allow exploration of directions’ in trajectories
Maps allow to present contrasting view, without normatives assumptions.

However – problems of overcomplexity, multiple possible representation, uncertainty is revealed in the making...

Rice research US

Rice research in India

Ciarli and Rafols (2017)
Inclusion of temporal dynamics

*Figure 2:* The Cognitive Career of a Researcher who Moved to the Innovation BEC without Delay

Gläser and Laudel (2015)
Visualisations as ‘interface methods’

Methods that facilitate engagement with various contexts.

‘emerging methods that we – as social and cultural researchers – can’t exactly call our own, but which resonate sufficiently with our interests and familiar approaches to offer a productive site of empirical engagement with wider research contexts, practices, and apparatuses.’ (Marres & Gerlitz, 2007)

Examples:
• Gläser and Laudel (2015): Use of maps to discuss scientific trajectories in
• Stirling (2003): Use of interactive graphs for deliberation on prioritisation of technology (Agro) – MCM used in various techs

Humility: insights from one method are partial.
  Triangulation. Interpretation.
Strategies for opening up indicators

• From prescriptive indicators to pluralising quantitative evidence
  ▪ Deliberation on indicators and “indicators” for informing deliberation processes (Barré)

• Incorporating relevant invisible dimensions
  ▪ Activities and outcomes so far marginalised

• Presenting contrasting perspectives
  ▪ At least TWO, in order to allow choices

• Simultaneous visualisation of multiple dimensions / options
  ▪ Maps, networks Allowing the user take its own perspective

• Exploration of multiple realisations of same concepts
  ▪ Avoiding misplaced concreteness

• Interactivity for checking conditions
  ▪ Allowing the user give its own weigh to criteria / factors
  ▪ Allowing the user manipulate visuals
Conventional Policy Dynamics

‘lock-in’ to policy favoured by incumbent power structures

GOVERNANCE COMMITMENTS
simple ‘unitary’ prescriptions

GUIDANCE / NARRATIVE
expert judgements /
‘evidence base’
“best / optimal /legitimate”

SOCIAL APPRAISAL

narrow scope of attention
S&T indicators
risk assessment
cost-benefit analysis
also: restricted options, knowledges, uncertainties in participation
incomplete knowledges

Stirling (2010)
**Breadth, Plurality and Diversity**

**MULTIPLE TRAJECTORIES**
- Dynamic portfolios pursuing diverse trajectories

**SOCIAL APPRAISAL**
- Multiple: methods, criteria, options, frames, uncertainties, contexts, properties, perspectives

**GOVERNANCE COMMITMENTS**
- ‘Opening up’ with plural conditional outputs to policymaking

**broad-based processes of ‘precautionary appraisal’**

**viable options under:**
- Conditions, dissonant views, sensitivities, scenarios, maps, equilibria, pathways, discourses

Stirling (2010)