



Answers to questions on uncertainty in geography: Old lessons and new scenario tools

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In many domains, including geography, there can be the implicit assumption that improved data analysis and statistical modelling must lead to improved policymaking, and its perceived failure to do so can be disconcerting. Yet this assumption overlooks the problem that is ontological uncertainty, as discussed herein. Ontological uncertainty describes the rendering completely obsolete of our present knowledge by surprises in the form of currently unknown future events, and by cascading changes to beliefs, attitudes and behaviours made by diverse actors in response to – and in anticipation of others' responses to – new developments. The presentation discusses several sources of ontological uncertainty and what can be done to deal with it.

Answers to questions on uncertainty in geography:

Old lessons and new scenario tools





Common assumption: more and better data-analysis and statistical modelling must lead to better policymaking.



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...in reality, there can never be a straightforward relationship between the two.





Where does the 'myth' come from?

- 'Govt. emphasis on evidence-based policymaking and identifying 'what works' promotes the view that ideal knowledge is derived from quantitative modelling aimed at empirical testing and validation' (Sanderson, 2002: 6).
- Govt. policymaking essentially gives variance-based data-analysis and statistical modelling the 'gold standard' stamp of approval.
- Other types of evidence dismissed or downplayed as 'anecdotal' or lacking in rigour.
- e.g. 'what works' centres in the UK.





1. 'Absolute necessity'

- versus -

2. 'Absolute contingency'

Why might such emphasis on data-analysis and statistical modelling actually lead to worse policymaking? (1)

- 1) It places **heightened focus on the present**, thus increasing vulnerability to futures different from this focal present.
- 2) It makes **reality appear overly susceptible to extreme changes**, since most of the time they do NOT occur.

- Both (1 & 2) steer the prevailing ethos towards the **short term at the expense of** a more positive and transformational, **long-term and visionary perspective**
- **Progress requires acceptance** that we have, to a significant extent, **the ability to achieve desirable outcomes through planning**





Why might such emphasis on data-analysis and statistical modelling actually lead to worse policymaking? (2)

Overlooks the distinction between epistemological and ontological uncertainty:

- ‘Epistemological uncertainty’ describes the known and bounded inaccuracy of our knowledge about the world as now.
- ‘Ontological uncertainty’ describes the rendering completely obsolete of this present knowledge by surprises in the form of currently unknown future events, and by cascading changes to beliefs, attitudes and behaviours made by diverse actors in response to - and in anticipation of others’ responses to - new developments.





Focus on epistemological uncertainty results in emphasis on probability/variance -based techniques

‘Probability inevitably places focus only on known future possibilities, implies that the future can only vary within known bounds based on past variance, and that present circumstances are subject to only minor changes of known magnitude over time.’

!!! DANGER !!!

31st March, 2009, Commission of earthquake experts assess probability of large earthquake in L’Aquila:

‘A large earthquake along the lines of the 1703 event is improbable in the short term,” said Enzo Boschi a member of the Italian Serious Risks Commission, during the meeting. "But the possibility cannot definitively be excluded.’

L’Aquila quake: Italy scientists guilty of manslaughter

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‘scientists were ‘just too reassuring’’





Focus on epistemological uncertainty results in emphasis on probability/variance -based techniques

- Using probability ensures consideration of the future governed by the past and present
- Even subjective probability uses 'priors' which are defined ex-ante & updated as new info. revealed
- Entirely new possibilities more difficult to accommodate
- Probability assumes that events cannot occur of a type that fundamentally reframe the decision landscape, not merely by revising and updating the probabilities of known possibilities already residing on it, but by eliminating some possibilities and creating still others

Requirement for
'closure'





Focus on epistemological uncertainty results in emphasis on probability/variance -based techniques

- Probability's requirement to 'close' the future amounts, essentially, to an assumption that ontological uncertainty does not exist
- Tonn and Schaffhauser (1992) : uncertainty pervades spatial policy and interventions in geographic space in ways that transcend the classical concepts of probability theory, with their requirement for ex ante-created complete state spaces and stable decision landscapes, and their resulting inability to deal with what are presently unknowns





Ontological uncertainty:

- OK, stems from 'surprises' in form of 'unknown unknowns'
- But, ALSO, from cascading changes to people's beliefs, attitudes & behaviours, stemming from a new policy/development itself:
 - Lucas critique – policy analysed through econometric modelling can negate the outcome it was designed to achieve, and the modelling and empirical analysis used to conceive it
 - Reflexivity (Soros) – cognitive function versus manipulative function
 - Goodhart's law - a new indicator, once it has been created and deemed important, diverges in its relationship with empirical reality from then on because of the reflexivity it has induced
 - 'Iterative lagged asymmetric responses' (Simandan, 2010)
 - Crucial decisions (Shackle) which destroy and remake the decision landscape





Some examples of ontological uncertainty:



UK TAXPAYERS' BURN-A-£BILLION RENEWABLE ENERGY SCHEME

Renewable Heat Incentive

Was supposed to cost £25m, but cost £500m

Resulted in much MORE carbon release, not less

People heating sheds and barns that never before needed heating

- £400m investment in the new Liverpool2 container terminal & Brexit !!!





What do we need to do to deal better with ontological uncertainty?

- Stop placing data-analysis and statistical modelling on a pedestal
- Start mixing-and-matching qualitative and quantitative non-probabilistic scenario techniques:
 - 1) Qualitative techniques to frame the decision landscape in the first place and understand how it might change over time
 - 2) Hardcore quantitative scenario techniques to search decision-landscape robustly





An example: Robust Decision Making & Baconian scenario approach (1)

- RDM simulates many plausible futures & identifies strategies that are robust across a very wide range of them
- Uses a series of computational experiments that systematically explore the potential consequences of alternative sets of assumptions
- You identify parts of the decision landscape (state space) in which the results are particularly interesting because of the impact they would have





An example: Robust Decision Making & Baconian scenario approach (2)

- Yet, the decision space must still be defined ex ante.
- Indeed, any simulation-based approach requires a researcher to decide what (presently) exists and is important...and what to leave out.
- The breadth of the exploration RDM facilitates is therefore still dependent on the present framing of the focal system under study in its first stage.
- This is a problem central to the efficacy of ANY scenario exercise: how to frame the space of possibilities governing the futures to be given consideration





An example: Robust Decision Making & Baconian scenario approach (3)

- Runde and Feduzi's (2014) Baconian scenario approach assists in framing the future by systematically considering futures that presently appear extreme & attempting to prove their possibility
- The decision-maker expands the space of possibilities & gains an impression of its bounds by considering futures that might otherwise be overlooked.
- Counteracts the tendency to dismiss extreme futures tautologically on the basis they are presently extreme
- It is a method for framing the decision landscape, which can then be robustly searched using RDM





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