

Policy Modelling, Open Collaboration and The Future of eGovernance

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1 Defining a Research Area

The call for papers specifies five closely related research fields. In this contribution, I will address two in particular but at least two of the remaining three cannot be seen as independent of the first two. The focus of this contribution is on the specified research fields “Collaborative Policy Modelling, Visualization and Simulation” and “Social Networks, Citizens Engagement and Inclusion”.

The conventional role of modelling in policy formation and analysis has been predicated on the presumption that the implications of the models are likely to be *true* in the sense that they correctly forecast the impacts of a specified policy. Such models are typically theory-driven – the most obvious example being the whole class of econometric models.

There are two problems with this approach. The first is that econometric models in particular but social models more generally do not systematically and correctly forecast social volatility such as turning points in macroeconomic trade cycles or financial markets or episodes of social protest and unrest or the breakdown of prevailing institutional arrangements. I know of no counterexample to the assertion that there has never been a correct model-based forecast of any such episodes and I have been actively seeking such counterexamples for some 20 years. The second problem is that models systematically fail to forecast correctly the social impacts of policy initiatives and implementations. Again, I know of no counterexample to the assertion that there has never been such a correct forecast in the weak sense of predicting correctly the timing and direction of change of accepted indicators of the policy impacts. Evidently, there is no sound scientific basis for relying on formal models of any type to forecast the social consequences of any stimulus including stimuli resulting from policy actions.

There is, of course, no justification for claiming that the failure of these models to achieve what is claimed for them is due to their being designed and implemented to cohere with some prior social theory. All we can claim with justice is that reliance on prior social theories has not led to the development of predictively accurate models for policy purposes.

If policy models are not to be theory-driven, then it is hard to imagine alternatives other than basing the models on either introspection, prejudice and arbitrary, fanciful speculation or on observation and evidence collected independently of the models. Reliance on introspection, prejudice and speculation can

be dismissed by appeal to the norms of good science. At least in the natural sciences, appeals to careful observation and independent evidence are seen as hallmarks of good science.

One obvious source of evidence is the engagement of stakeholders in the process of model design and validation. A successful means of engaging stakeholders in this way has been to elicit their opinions, their expertise and their expectations and in order to capture them as logic-like rules which determine the behaviour of software agents in multi-agent-based simulation models.³ I have argued frequently (*e.g.* 2002, 2005), that social (and especially policy) models cannot be validated or invalidated by assessment of their predictive value. On that criterion, no social models will be validated. By implementing agent-based social simulation models where the agent behaviour is determined by rules couched in the same linguistic terms (though in a highly formalised structure) as the terms used by the stakeholders, the modeller can rely on the stakeholders to evaluate the rules and the behaviour of the agents. The question is not whether the rules and behaviour are in some objective sense correct but rather whether they are plausible. Further model validation can be undertaken by applying the model to past events in order to determine whether the macro-level numerical outputs cohere with known social statistical series.

There is then the question of determining the best means of knowledge elicitation. One effective means is by engaging relevant stakeholders in role playing games and scenario generation sessions. An objective of the OCOPOMO (Open Collaboration and POLicy MOdelling) Project⁴ is to integrate narrative scenario analysis with formal scenarios produced by agent-based social simulation models. With appropriate ICT, this integration provides an opportunity to recast the fundamental nature of public policy processes to allow any stakeholders who sufficiently motivated to engage in the policy design process.

The integration of narrative scenario generation and agent-based policy simulation modelling necessarily changes the relationships between policy makers and policy modellers. It also ensures that building open collaboration into the policy process is not just putting some social networking software on top of existing practices and procedures. In the first place, modellers are no longer serving the role of external contractors who provide policy impact forecasts to government officials and politicians. Instead, the modellers become facilitators whose role is to help the stakeholders to restate verbal, and therefore inherently imprecise, statements and implicit assumptions that arise in narrative scenarios as precise statements of conditions and the consequences of actions in those conditions. These precise statements, formalised as *if-then* rules, are used to determine the behaviour of software agents representing the various stakeholders.

Because the models are not theory driven, there is no necessary presumption that any one model captures the true dynamics of the social processes related to policies. Each model is intended to capture a point of view of some stakeholders.

³ Some useful examples are by Barreteau, Le Page and D'Aquino, 2003; Barthelemy, 2006; Alam, Meyer, *et al.* 2007

⁴ <http://ocopomo.org>

Where there are conflicting views, there can be several models – each model capturing the views, assumptions and expectations of different stakeholders. The differences and, possibly, the sources of conflict are likely to become clear as a result of the precision inherent in the formal simulation models. We cannot yet say whether this precision will support a clarity of expression that helps stakeholders to resolve their conflicts or, at least, usefully to understand one another’s positions or, alternatively, crystallise the conflict and prevent resolution based on an acceptable ambiguity of language. Perhaps in some conditions, the precision will be helpful and in others it will be injurious. What is more pertinent to the present issues is whether ICT developments can influence the outcomes in a beneficial manner.

Taking the two specified research areas from the call for papers, there are six named interests:

1. Collaborative Policy Modelling
2. Visualization
3. Simulation
4. Social Networks
5. Citizens Engagement
6. Inclusion

Items 2 and 5 in the above list are essentially ICT issues whilst the remaining four items are social analysis issues that depend on the ICT. The relationship between agent-based policy simulation modelling and scenario development described above implies that collaborative policy modelling necessarily entails simulation (item 3) as well as scenario development. An important feature of agent-based social simulation in general is that it captures social interaction amongst the agents. In some models, social networks emerge and in others they are imposed. These networks are key to the emergence of macro level phenomena such as unpredictable episodes of social volatility that cannot be captured with, for example, conventional economic or political-science models. Such volatility is a matter of considerable importance to the evaluation and consequences of social policies.

There is no doubt that visualisation (item 2) is a key element in enabling stakeholders who are not expert modellers to understand both the design and outputs from the policy models and how they relate to narrative scenarios. There is, however, a wider ICT research question relating to citizens’ engagement and inclusion. We know that social networking software has had a considerable impact on the ways in which people relate to one another and to whom individuals relate in various ways. Even so, our understanding of the impact of social networking software is by no means complete. To develop and/or apply social networking software to policy development and analysis will doubtless raise new issues concerning, *inter alia*, the impact of precision on relationships amongst stakeholders. Research into the social impact features of ICT applied to policy modelling with (but even without) scenario generation is of the first order of importance for the development of eGovernance.

With this background, we turn now to the specific questions raised in the call for papers.

2 Addressing the Specific Roadmapping Questions

What is the state of the art?

There is a good basis in information technology and computer science. Doubtless, there will be enormous improvements in efficiency, software (including model) development environments and social networking platforms that we can no more imagine now than we could have imagined Facebook or Twitter five years ago. Scenario generation processes are now well developed but these are usually couched in vague qualitative terms and impose prior constraints on the scenarios to be developed.⁵ However, combining such methods with policy modelling and widening the participation in the process by means of social networking technology is a plausible objective. It is also the aim of the OCOPOMO Project, the success of which will be a useful indicator of the value of this whole approach.

Why is research in the proposed field important in relation to ICT for Governance and Policy Modelling?

Technical changes are always a response to problems — either something that we want to, but cannot, achieve or some resource (including intellectual resources) produced as a by-product of an activity that is essentially free to use (intellectual property) or involves costly disposal (more relevant to industrial engineering).⁶ The selection of the problem is therefore crucial to the direction of technical development. Defining the problem area around participation and exploration of issues rather than contracting-out the modelling for purposes of forecasting is probably necessary for effective use of modelling in a policy process but especially in a participatory policy process. The integration of scenario generation and policy modelling in this way certainly requires the application of ICT.

Which are the necessary research activities to be carried out? Which scientific gaps are they addressing?

Because we cannot yet know the consequences of integrating ICT with scenario-generation and policy modelling together with the complication of ICT-enabled open collaboration, it will be important to explore the effects of ICT for governance and policy modelling in an incremental and flexible way. That is, the research in this area will be extending the foundations of this approach to policy analysis. That in itself makes the research important. However, it also carries a

⁵ Probably the most elaborate set of constraints has been developed by the Intergovernmental Panel on Climate Change for climate change scenarios. See Nakicenovic and Swart (2000)

⁶ The history of technology is clear in this regard. See Rosenberg(1976) or Chandler (1962) for the same point from two different historical perspectives.

heavy responsibility for the researchers. The methods and the ethical issues will need to be explored with great care. The very novelty of the exercise denies us the ability to foresee the scientific gaps. Initial reliance on existing social-networking technology (Web 2.0 and, prospectively, 3.0) will provide a sound point of departure. Inadequacies will doubtless be identified in the course of developing the approach to governance and policy modelling and those inadequacies will define further research questions in the usual scientific way.

Taking into account the complexity of the topic, which multidisciplinary aspects in this research field are essential for the support of novel governance practices?

Any development along the lines described here will obviously require expertise from both computer scientists and social scientists. There is, within the European research community, a focused group of social and computer scientists who have been collaborating and engaging with one another for many years. Indeed, this group is probably without parallel in any of the regions of the world where agent-based social and computer science are practiced. In general, the sort of social scientists that would be required would have a background in qualitative research but without the baggage of post-modernist or any other philosophical-cum-theoretical commitment. Social modellers with an interest in complexity, emergence and similar issues would also be core contributors. We should require openness to the notion of allowing the stakeholders, rather than the modellers or other social scientists, to constrain the model design and scenario development. This is not obviously compatible with several of the mainstream social science disciplines (e.g. economics, political science, sociology). The belief that formal theoretical or, more generally, formal foundations are required for good computer science is hardly unknown. However, the sort of research described here requires a thoroughgoing, bottom-up approach driven by evidence and practical experience. This pragmatic approach to both social and computer science has a strong and effective following in Europe and is one of the great successes of the successive Framework Programmes.

What applications could be envisaged by 2020, based on the research activities described? Which is the anticipated benefit of the proposed research field?

My hope would be for applications that support the combined development of narrative and formal modelling analyses dominated by decision-makers and supported by technically expert modellers and knowledge elicitation specialists. The functionality of these applications would certainly support narratives developed with social networking technology that would enable participants to engage flexibly with both narrative scenarios and corresponding formal simulation models. Sensitive and careful development of the technology and the protocols for its application promise better and more thoughtful policy design together with an ability to learn how to respond to unexpected consequences by exploiting surprising opportunities and avoiding or mitigating untoward outcomes.

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