

## What next?

ABM has come of age. It may still be a “work in progress”, but powerful platforms now exist to apply ABM – in combination with more traditional analytical methods – to policy evaluation and policy-making.

To drive the adoption of ABM by policy-makers there needs to be:

- a programme of pilots to evaluate where ABM models can be applied in real-world policy contexts, for example ex-ante studies of future Framework Programme policies;
- more collaborative research involving empirical studies, network analysis and ABM for cross-fertilisation between disciplines.

Further cooperation, partnerships and pilots between leading research groups, the European Commission and other policy-makers could help add ABM to the innovation policy-making toolbox.

ABM is the missing link that could add considerable value to Europe's existing wealth of knowledge about innovation processes and networks.

## Find out more

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# Understanding European Innovation

Agent-based modelling: a powerful new approach for policy-makers

A new simulation technique now allows policy-makers to model the behaviour of European innovation networks. Policies can be tested in advance to find the best ways to improve innovation activity.



# What is ABM?

*Rush hour on a Friday, the traffic is stationary. Will you be home for dinner?*

Even if the road is clear ahead, you can't predict how the traffic will move because drivers all behave slightly differently. You are stuck in the middle of a complex problem.

A relatively new technique called agent-based modelling (ABM) might be able to help you out. First developed in the 1990s, ABM simulates what happens when a collection of different actors (agents) – perhaps drivers, workmen and pedestrians – interact with each other in ways too complex to describe with conventional maths.

Rules that define the behaviour of each agent (e.g. each driver on the road, each pedestrian on the street) and their reactions to other agents are programmed into a computer along with some starting conditions. The computer then simulates how each agent behaves over time.

Run the simulation many times and you start to get a picture of trends across the community. Change certain starting conditions or agent parameters and you'll get an idea of what influence these factors have on the patterns that tend to emerge.

It is like a whole virtual society being run on a computer – and you get to peer in, see what is going on and why.

Two EU-funded projects – SEIN and NEMO – have developed an ABM platform to model the dynamics of collaborative research and innovation networks. The agents – universities, research organisations, firms such as multinational corporations and SMEs – are subject to the rules of various funding schemes such as the Framework Programmes. The model has been used to assess how policies and network structures can best create, transfer and distribute knowledge for generating innovation.

Project partners include:

- The Innovation Research Unit (IRU) at University College Dublin, Ireland;
- The Centre for Research on Innovation and Services (FZID) at the University of Hohenheim, Germany;
- The Centre for Research in Social Simulation (CRESS) at the University of Surrey, United Kingdom.

It is impossible – and unethical – to experiment with policy-making, but ABM lets policy-makers test their ideas and initiatives in advance. They can identify possible outcomes and unexpected effects, and tweak policies until they have the best chance of achieving their desired effect in a variety of different, real world contexts.

European policy-makers have identified innovation as one of the most important policy targets for dealing with the pressing challenges of the future. Using conceptual models based on robust empirical studies, ABM could be the “jewel in the crown” for innovation policy- and decision-makers. This new approach could help them to launch effective initiatives or amend policies to stimulate innovation and ensure the EU's long-term sustainable economic growth.

Society in your computer –  
ABM for policy-makers