COMMENTARY

A cat's cradle for policy

The OECD is developing a strategy for nations to measure and ultimately promote innovation. It requires knowledge of a complex system, say **Fred Gault** and **Susanne Huttner**.

As developing nations move rapidly towards industrialization, leaders of some of the strongest economies in the world have felt threatened by what they perceive as a potential regime shift. There are new economic players, such as Brazil, China and India; new ideas and attitudes towards intellectual property; and an increasingly skilled workforce no longer bound by geography. It's a do-or-die situation for the most powerful nations and they need targeted strategies for innovation if they are to maintain their position or move up the value chain. For this reason, the ministers of the 30 member nations of the Organization for Economic Co-operation and Development (OECD) called on the organization to develop an innovation strategy by 2010 (ref. 1).

Developing such a strategy poses a significant challenge because of the complex nature of innovation. Innovation is the creation of something new — a good or a service, a way to deliver goods or services, an organizational or management structure — or the capturing of new markets. Knowledge is an important ingredient of innovation. It crosses the boundaries of institutions, both public and private, and comes from many sources, not just from formal research and development (R&D) units. However, in a world of modularity and flexible platforms for technologies and practices, users are more able to improve and augment their systems, creating a web of knowledge that can change the behaviour of other users or of suppliers. This is a complex process, a system of innovation.

When the OECD was commissioned in the 1990s to develop strategies to promote good jobs, most plans could be centred on improving a single key indicator — employment — which was faltering worldwide during the recession of 1990–93 (ref. 2), and directed by governmental bodies and departments involved in labour. More than a decade on, the economy is changing rapidly and in complex ways. The intertwining of food and energy policies through biofuel production, for example, has pushed up food prices, which has implications for everyone, especially the poorest billion of the world's population. Climate change is having an impact on growing seasons, freshwater supply and disease. Rapid changes such as these call into question the predictive value of old correlations[3]. R&D, for example, is no longer seen as the only source of knowledge for economic progress, or as a proxy for innovation. It is one component of innovation, one thread in a tangled web, and the wrong pull can have unexpected results. Such uncertainties make understanding the dynamics of the innovation system a priority.

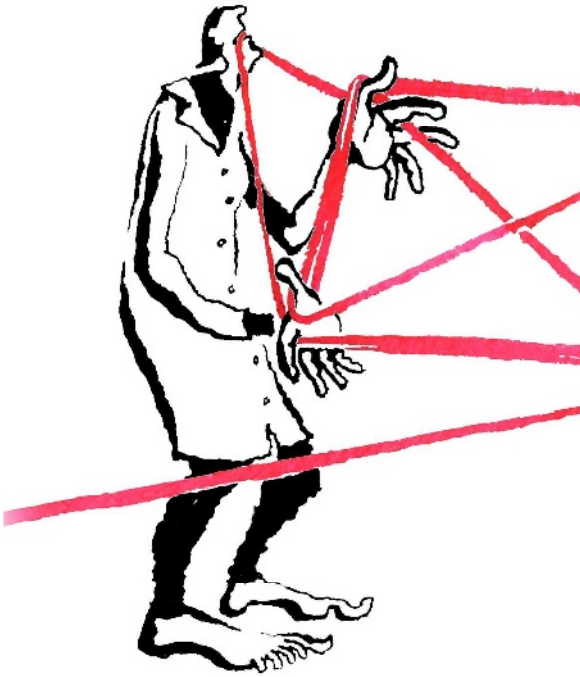
To make a difference now requires a 'whole government' approach, involving cabinet-level initiatives. The OECD is looking at workable ways of making this happen. Over the next year and a half, it will roll out its Innovation Strategy — designed to promote innovation, change behaviour and address global challenges.

The dynamic and complex nature of innovation requires a systems approach to analyse both it and the policies that influence it. All the actors — governments, businesses, institutions of education, foreign institutions and more — need to be included in the analysis, as do their activities — R&D, innovation, technology diffusion, commercialization of knowledge. The links between these actors and activities and their outcomes must also be accounted for, including all the feedback and feed-forward loops that engender the messy, nonlinear nature of innovation.

The whole system in context

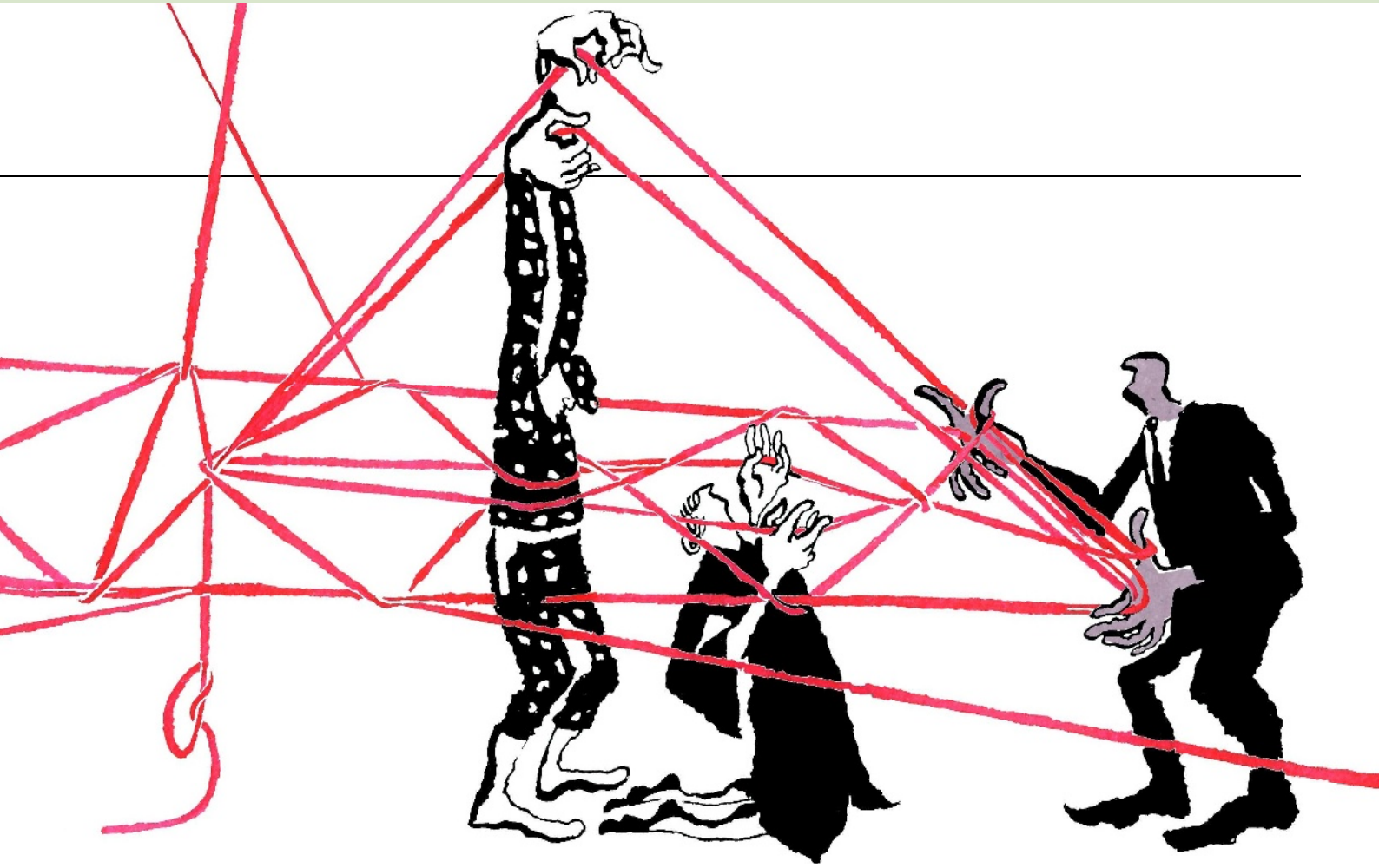
It is difficult for public policy to influence such a complex system. A whole-government approach requires coherent and comprehensive analysis of the system dynamics, and robust statistical measures that describe the actors and processes at work. Without these, policies that make sense on their own may, in combination, produce suboptimal outcomes. Take R&D subsidies. A simple science policy might expect high subsidies to enhance the flow of knowledge. But that benefit might be eroded by relatively high corporate taxes, a fiscal policy necessarily influenced by the subsidies. Pull one thread in the system and distant actors could be affected.

To deal with such complexities, all the main actors need to be aware of each other and understand their roles. The OECD has a reputation for creating a common language for the discussion of innovation, innovation policies and their consequences. This is developed through rigorous analysis and production of guidelines and standards for measuring and interpreting activities that contribute to innovation. Common language provides a basis for shared understanding, peer review and consensus building.



When member countries are able to accept and support guidelines and standards, the resulting publications and databases support a culture of life-long learning. Analysts use the materials and, when they apply what they have learned, they generate new knowledge that is fed back into the process of revision and improvement. Users in member countries share knowledge through peer review and strengthen common standards, actually changing behaviour.

The Frascati Manual[4] is a good example of how such a document can work. Developed and revised over the past 40 years, the manual defines how to measure the resources devoted to R&D, a relatively complicated process. Every OECD country, and many others, use this manual when they survey R&D investment. As a result, the OECD can publish expenditures on R&D and information on the human resources involved that are comparable internationally. The definitions within this document are the standard for understanding invest-



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ment in formal knowledge creation. A related document, the Oslo Manual[5] provides a statistical approach for collecting and interpreting information on innovation. It defines innovation and the activities that contribute to it.

A support role

Of course, the OECD is not alone in looking at innovation and related strategies. Almost all OECD countries and many international organizations are working in the area, too. The OECD's role is to support this work where it can, to function as a knowledge broker and to engage as wide a community as possible in support of the work on the Innovation Strategy. The expectation is that the Innovation Strategy will use concepts, definitions and language developed over the years and engage as many other organizations as possible in achieving the objectives set by ministers.

However, definitions are not the only important factor. Analysing innovation and meeting the expectation of ministers requires an understanding of the structures at play. The correlation between innovation and productivity is well established as a macro-economic finding but that does not explain what is going on where innovation happens. That requires understanding context-dependent structural issues and how institutions behave in response to these issues, and that is a focus of the Innovation Strategy.

The structural issues include framework conditions such as regulations, the education and health systems and the physical infrastructure. These factors determine the cost of jobs, the mobility of labour across jurisdictions, the ability to do certain activities and the regulation of markets. As the interactions of innovative firms, or public institutions engaged in innovation activities, are strongly influenced by the framework conditions, a simultaneous understanding is needed of both markets and governance.

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Although work on markets and governance might explain much of innovation in a closed and static economy, economies and societies are neither closed nor static. The nature of innovation is changing, so to understand it requires an appreciation of how global influences can change domestic behaviour. Furthermore, global conditions increasingly mean that issues such as climate change, energy, and food and freshwater supply need to be addressed, as does the social upheaval that increasingly accompanies them. Innovation is thus not just a preoccupation of OECD member countries, or those closely aligned with them. The poorest of the world's population have much to gain from innovation strategies in all countries, and developing countries must be an integral part of the Innovation Strategy and of the whole-government approach.

A consensus on a whole-government approach to innovation policy, and new statistical indicators to support the work, are to be the main outcomes of the Innovation Strategy. The real challenge, however, lies in whether governments will be able to take advantage of the indicators, the analysis and the policy advice to change behaviour and achieve innovation-led growth. ■

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1. www.oecd.org/mcm2007.
2. OECD. *Implementing the OECD Jobs Strategy: Assessing Performance and Policy* (OECD, 1999).
3. Marburger, J. *The Science of Science and Innovation Policy*, in *OECD Science, Technology and Innovation Indicators in a Changing World: Responding to Policy Needs* (OECD, 2007).
4. OECD. *Frascati Manual 2002: Proposed Standard Practice for Surveys on Research and Experimental Development* (OECD, 2002).
5. OECD/Eurostat *Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data* (OECD/Eurostat, 2005).

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