6. Fostering creativity and innovation in cooperative federalism—the uncertainty and risk dimensions[1]

Mark Matthews[2]

Policy narratives in OECD nations are now starting to stress the importance of 'innovation' as a public sector objective. On one level, this reflects efforts to align thinking with a wider discourse on innovation, arguably in an effort not to be left out of the picture. For example, Geoff Mulgan[3] has argued persuasively that, contrary to some common assumptions, the public sector has a longer history of innovation than the private sector. Indeed, public sector innovation created the modern world—an operating environment in which private sector innovation per se has flourished.[4]

In this essay, I focus upon a particular objective of innovation in the public sector: the management of uncertainty and risk. In this context, following Knight (1921), 'risk' applies to cases in which a probability of occurrence can be assigned. Uncertainty refers to situations in which it is not possible to assign such probabilities. The critical distinction is that the ability to assign probabilities allows various other formal estimates related to risk and its consequences to be estimated.[5] I argue that governments place too great an emphasis on the 'management of risk' and not enough emphasis on the 'management of uncertainty'. A greater emphasis on the management of uncertainty, in turn, helps us to understand what public sector innovation is—and why it is so important.

This perspective applies a line of inquiry previously developed in relation to innovation in the private sector to the specific issues faced in the public sector.[6] In so doing, it also draws upon previous efforts to define a new 'realist' agenda for science and innovation policy that addresses the distinctive role of the public sector in providing the 'prescience and preparedness' for dealing with potentially damaging future events.[7] The essay also seeks to relate this treatment of the public sector innovation challenge to the issue of cooperative federalism. This is a particularly important issue when the uncertainties and risks governments must address cross jurisdictional boundaries—as many do.

The theoretical underpinning for this policy-oriented discussion is that there is much to be gained from exploring how our policy narratives can be informed by drawing upon the 'Austrian' tradition in economics associated with Von Hayek and others. For a flavour of this work, see Kirzner[8] and Littlechild[9] for

a discussion of markets as processes. One can extract some very useful insights from such thinking without necessarily subscribing to the full gamut of liberalist stances associated with that body of work. As I set out to show, certain insights in this 'subjectivist' tradition in economics are particularly useful for helping us to develop strategies for effective innovation in the public sector.

Somewhat paradoxically, reframing key aspects of the policy narrative along neo-Austrian lines in terms of the 'management of uncertainty' rather than the 'management of risk' does more to *re-enforce* the importance of the State than undermine it. The trick is to recognise that whilst most of the discussion on the management of uncertainty and risk in current policy narratives focuses on the management of *risk*, the management of *uncertainty* is in fact what governments spend more of their time actually grappling with. For instance, in 2007 the Australian Public Service Commission moved to highlight the challenge posed by 'wicked problems'—complex intractable challenges with uncertainty over causes and effects and also a likelihood of damaging unintended consequences arising from policy interventions, see Australian Public Service Commission (2007).[10] Indeed, vast swathes of public expenditure (notably funding for basic science) seek to translate uncertainty into risk. This is the essence of the process of 'discovery': delving into the unknown to make it less threatening and easier to live with—whether we are talking of diseases, near-Earth objects or climate change.

Framing public sector innovation objectives as a response to handling uncertainty and risk

A key difference between public sector innovation and private sector innovation is that market-based selection mechanisms play a different role in the innovation process. In the private sector, by definition, the litmus test for attempts at innovation is market success. Not all innovations prevail in the market, and indeed various other factors mean that the 'best' solutions might not become the dominant solutions. However, markets do enforce selection processes that tend to eliminate less-competitive solutions. Competing firms therefore do their best to second-guess what will prevail in the market, often applying rigorous structured decision-making processes (such as stage-gate methods) to weed out less-promising concepts and solutions.

However, in the final analysis, it is the market, and the social and cultural preferences that are reflected in markets, that will decide which innovations succeed and which do not. The academic and policy literature on how these processes work (and do not work) is well developed and full of useful insights. These insights work backwards from market processes into the research and development and demonstration stages that drive new product introduction. They also work forwards into how market processes drive the incremental

innovations that continue once new products have been introduced into the marketplace.

In a public sector context, the relationship between innovation and markets (as selection mechanisms) is significantly different. Governments deal with the uncertainties and risks that markets cannot handle. This requires innovations in what governments seek to do. But, crucially, governments cannot rely on market processes to play the critical 'weed-out' stage in the innovation process by eliminating solutions that do not align well with the preferences expressed in markets and encouraging those that do. Rather, governments need to try to mimic this aspect of the functionality of market-based selection processes without the recourse of relying on markets to actually carry out this selection process. This requires that the public sector draws heavily upon external and internal expertise to weigh-up complex risks, often using large amounts of evidence. When there is no market-based 'short cut' available, the sheer weight of evidence that might need to be assessed poses major challenges and raises important questions about whether 'hierarchies of evidence' are required to deal in a rational way with the sheer quantity and complexity of information available.[11]

The point here is similar to that made by Mary Kaldor in relation to trajectories in the advance of military technologies. 'Baroque' (overly complex) military technologies evolve because the only real test of superiority is a 'symmetrical' war in which weapon systems with comparable missions are pitted against each other. If there are no wars of that type—that is, no wars or only so-called 'asymmetrical' conflicts—then there is no 'market-like' test of technical superiority. Technologies evolve—but not necessarily in ways that make them 'fit for purpose'.[12]

As an illustration, consider what the recent government responses to the global financial crisis have entailed. Governments have been grappling with the need to act innovatively (over particularly tight time frames) in order to mitigate severe failings in how financial markets have been operating. Rather than simply seeking to miminise the risk of introducing an uncompetitive new product or service into the market (the far simpler challenge faced by a company), governments have been forced to address a far more severe challenge. If the innovative market interventions attempted by governments fail then the global economy could fail—dramatically. Rather than one or a few corporations failing, whole industries could go out of business with catastrophic social and national security impacts.

In short, the consequences of incorrectly judging what will and won't work when seeking to innovate are disproportionately greater for this type of public sector innovation than for private sector innovation.

Furthermore, when private sector innovation goes wrong—for example, a new drug that has unforeseen and terrible side effects—it is governments that bear

the responsibility by virtue of their regulatory roles. This is why, in comparison with the private sector, public sector decision-making processes can appear cumbersome, risk averse and time consuming. The unintended consequences of getting it wrong are far too severe to rely on the market to correct problems—as in the private sector. The far greater complexity of what governments do generates great uncertainty over *what* to do in response to challenges. The extraordinarily damaging potential associated with unintended consequences necessitates robust risk-averse decision making. I find it far more helpful to view the role that central economic ministries play in setting public intervention guidelines from this perspective rather than to critique them for being too risk averse by (incorrectly) viewing them from a less-demanding private sector risk-management perspective.

Given this, it is important to deploy a practice-oriented classification of public sector innovation that highlights this aspect of risk exposure in the public sector. Some aspects of public sector innovation are comparable with, indeed might be almost identical to, aspects of private sector innovation (examples are business processes improvements and many aspects of ICT—e-government—and so on). However, as the arguments above highlight, there are other aspects of public sector innovation, particularly those associated with policy innovation, for which governments must bear responsibilities that greatly outweigh those born by the private sector (national security, counter-terrorism, pandemic preparedness and the like).

As discussions of public sector innovation evolve, it could therefore be useful to draw a clear distinction between those aspects of public sector innovation that are comparable with what is found in the private sector and those aspects that are distinctive and far more severe in terms of the damaging consequences of getting things wrong. There is a tendency for the literature to focus more heavily on areas of public sector innovation that are similar to private sector innovation (often in terms of 'importing' concepts and practices from the private sector). There is less emphasis in this discourse on the most challenging types of public sector innovation—the areas in which the consequences of getting things wrong are far more severe than in the private sector. This is a shortcoming that it is essential for current policy narratives on public sector innovation to address.

In this context, it is not surprising that the uncritical acceptance of private sector norms and business processes can potentially wreak havoc in the public sector. Whilst it might suit some elements in the private sector to point to costly and cumbersome decision-making processes in the public sector (usually as a marketing-driven justification for emulating and eventually purchasing private sector products and services), it is dangerous for governments to react to such criticism defensively. Rather, the reaction should be to stress the sort of points

made above: governments handle the uncertainties and risks that markets can't cope with. Creativity and innovation in the public sector are by necessity more challenging and more critically important activities than private sector innovation—not, as some would have us believe, activities with a lamentable track record.[13]

By implication, senior officials in the public sector would be wise to articulate far more clearly than at present the nature and extent of the differences between public sector innovation and private sector innovation—especially in regard to the far more severe consequences of getting things wrong when attempting to innovate.

The prevailing emphasis in the literature on public sector innovation at present is on areas of commonality with private sector innovation. This results in part from efforts to import principles and practices from the private sector, with relatively little emphasis on grasping what makes the public sector innovation context significantly *different*.[14] The treatment of risk is symptomatic of this prevailing emphasis. There is far more discussion of the internal project management-type dimension to risk taking—that is, when and how to take risks in order to try something new—than of the external matter of the role that public sector innovation plays in managing the uncertainties and risks that markets either cannot cope with or (as recent experience in banking demonstrates) generate themselves.

Similarly, there is much discussion of the use of information and communication technology (ICT) in the public sector (e-government, customised service delivery, and so on) and of how innovation is required to produce more 'joined-up' government. The discussion of innovation cycles and processes also frames risk fairly tightly in relation to concepts of product and service development imported from the private sector.[15] Whilst such work is useful, it essentially amounts only to providing a first step toward developing a more comprehensive and appropriate framework for encouraging effective public sector innovation. Unless these internal considerations (how best to make decisions about public sector innovation) are related in practical ways to the wider external concerns of governments, the guidance available to public servants will be biased—and perhaps even dangerous. A 'realist' perspective on government's role in handling uncertainty and risk should help to bring these two aspects of the public sector innovation challenge together. In order to do this, the appropriate conceptual tools must be available and must be used effectively.

Choosing the best conceptual tools

One aspect of intellectual history that is relevant to understanding public sector innovation is the way in which the study of innovation in the private sector originated, in part, in a reaction against the difficulties faced by neo-classical

economics in explaining technological advance. If one assumes a world of perfect information and a state of equilibrium in which markets are operating in a stable manner then technological advances must be treated as externally originating deviations from these equilibrium conditions—processes of disruption to which the economic system must respond and adapt. The finding that long-run productivity growth had a large 'residual' element that could not be explained by increases in the standard factors of production (capital and labour, and so on) stimulated a large and productive line of investigation that eventually led to the 'innovation studies' work that currently informs thinking on public sector innovation. As innovation studies has evolved, it has moved away from economic theory and econometrics and toward more managerial approaches—with a particular (and useful) emphasis on documenting and understanding real practices in business.

Inevitably, this emphasis on how businesses *do* innovation in practice leads to a focus on how firms accumulate and exploit proprietary knowledge and capabilities, how they seek to exploit intangible assets that their competitors do not have. The emphasis is on *differences* between firms' capabilities—on how innovation drives markets in such a way that they are in continual evolution, rarely in states of equilibrium. It should be of little surprise that the management of uncertainty and risk features strongly in this perspective on innovation.

By evolving in this manner, work on innovation studies now has the (largely unrealised) potential to converge with another stream of thinking in economics known as 'Austrian' or subjectivist economics. This stream of thinking is distinguished from neo-classical economics in some fundamental ways—and ways that are highly relevant to understanding public sector innovation.

Rather than a world of quantitative uncertainty, the Austrian economic perspectives describe a human condition in which creativity is a necessary response to qualitative uncertainty (effectively ignorance) over what the future has in store—both good and bad. In some circumstances, there are no probabilities to assign to future states of the world, but rather the necessity to act *creatively* in order to generate parameters that can be assigned probabilities (and hence managed 'rationally'). The resulting competition is *inherently* a process of discovery and innovation. From this standpoint, markets are inherently *exploratory* and *innovative* collective endeavours that operate via selection.

If we think about markets in this more analytical way—as exploratory processes and selection mechanisms—then it is easier to understand their limitations and, hence, grasp why public sector innovation is so important in helping us to manage uncertainty. Markets can cope with risk (quantifiable likelihoods) but they cannot cope with uncertainty as easily.

This is why governments spend vast amounts of taxpayers' money on translating uncertainty into risk. Many scientific and technological inventions are driven

by the fundamental human desire to transform ignorance into uncertainty and risk. There are whole rafts of imaging technologies (x-ray, ultrasound and magnetic resonance imaging, microscopes, particle accelerators, telescopes, seismic analysis, magnetic anomaly analysis, and so on) that provide us with data that we would not otherwise have access to—that is, that translate ignorance into indications and likelihoods. Much scientific theory is concerned with translating ignorance into risk—that is, the analysis of complex data sets in order to generate patterns of risk—such as crop planting strategies in the face of unpredictable weather patterns. In short, investments in scientific instrumentation and pattern recognition are, collectively, investments in translating ignorance into risk. We are very rarely certain of what might happen, particularly in complex situations such as human health, but we collectively prefer to have more information than less information to guide our decision making.

Another dimension to science and innovation policy that is relevant to understanding innovation in the public sector relates to prescience and preparedness. In previous policy work, I have sought to highlight why it is important for governments to be more explicit than they are at present about how their spending on public science generates useful outcomes that need not require innovation or research commercialisation per se.[16]

In an uncertain and risky world, public science plays a critically important role in 'prescience': identifying risks and associated costs that we might have to face in the future (climate change being an excellent example). The widespread dissemination of this information to business and the general community could (eventually) help to change behaviours—and in turn changes what the future might actually have in store for us. The objectives for innovation are driven by this prescience—for instance, the rationale for investing in research and development on lower-emission technologies.

Consequently, the benefits generated by this type of outcome from public science tend to be reflected in less unfavourable futures than would otherwise be the case. As the *Stern Report* seeks to stress, the economic value of mitigating risks in this manner is massive. Preparedness reinvigorates the traditional concept of capability building by highlighting the uncertainty and risk dimensions.

When these ideas were submitted to the Productivity Commission as part of its 2006 Review of Public Support for Science and Innovation, the approach gained traction and the preparedness dimension featured strongly in their report.[17] This momentum was, however, lost in the subsequent Review of the National Innovation System in 2008, which sought to reinforce the link between innovation policy and industry policy rather than seeking to explore new avenues for articulating the benefits generated by public science.

The discovery-based perspective is also reflected in emerging views on how to conduct public policy innovation. Charles Sabel has sought to promulgate an 'experimentalist' approach to innovation in US public policy. This work, which draws upon innovation management experience in the automotive industry, stresses the ways in which, in an uncertain decision-making environment, managers in the public sector are better off explicitly adopting exploratory and experimental approaches in which goals and intended outcomes are fairly fluid, efforts are redirected as learning advances and overly hierarchical command and control systems are avoided.[18] Interestingly, as Ian Marsh[19] points out, contemporary commentaries on public sector reform tend to overlook this useful strand of work.

Implications for cooperative federalism

The proposed policy narrative seeks to articulate a far more explicit and proactive focus on managing uncertainty (rather than risk per se) as an objective for public sector innovation. The public sector needs to be innovative because it holds stewardship over the challenge of managing uncertainty.

I think it could be useful to think about the implications that such a policy narrative would have for federal–state relations in Australia. Federal and state/territory governments must cooperate in managing many major areas of uncertainty and risk. When this comes to budget negotiations, this can be contentious.

In this context, one of the more interesting public sector innovations that emerged from the Blair Government in the United Kingdom was the 'Invest to Save Budget' (ISB). This was initially a joint HM Treasury–Cabinet Office (subsequently just a Treasury) initiative aimed at providing 'venture capital for oiling the wheels of government'. The ISB set out to provide risk finance to allow innovative partnership-based projects to be piloted and demonstrated in order to make it easier for new and improved public services to be rolled out. By 2007, 487 partnerships had been funded at a total cost of £460 million.

The ISB has evolved through an explicitly 'experimentalist' process of learning-by-doing based upon a series of fairly robust independent and internal Treasury evaluations that have led to significant changes in how the ISB works.[20] There is now a far stronger emphasis on supporting local and community projects than at the launch of the ISB.

What makes the ISB interesting and significant is the notion that, in order to generate net budget savings, central economic ministries should be willing to sanction explicitly experimental partnership-based projects. The series of reviews and evaluations of the ISB has highlighted how difficult it is for project proponents to specify the risk taking they propose. Indeed, in the early phase of the ISB, most tended to outsource the risk-based benefit–cost estimates that

HM Treasury required them to provide—leading to 'boiler-plate' project appraisal submissions provided by management consulting and accounting firms. These problems would have been avoided if the ISB had opted for an uncertainty management rather than a risk management-based approach. Hence one lesson from the ISB experience is that it is much easier to implement experimentally based public sector innovation programs if they are framed in terms of managing uncertainty rather than just in terms of managing risk. Many partnerships sought funding in order to work out what the risks would be: they set out to translate ignorance into risk.

Another lesson from the ISB experience was that whilst HM Treasury took the view that a successful ISB project that demonstrated that a new approach was superior would lead to widespread adoption of the piloted approach, this tended not to be the case in practice. Simply providing the information that a new approach is better does not address the bureaucratic impediments to adopting innovations—particularly those requiring partnerships. Hence evaluators' recommendations that the innovative new concepts demonstrated by the ISB would still need active 'innovation adoption championing' by powerful people or teams found it hard to gain traction in a central economic ministry context. The assumption tended to be that information would flow freely and that rational decision making would lead to the adoption of innovative approaches.

The United Kingdom's experience might be pertinent to federal–state cooperation in Australia because it points the way towards a program that would explicitly fund uncertain and risky experimental projects targeting cross-jurisdictional concerns—especially those addressing major uncertainties in policy and service delivery.

In this context, the 2008 Review of the National Innovation System proposed that:

> Experimentation in innovative policy and administration should be a major theme of the current refashioning of federal relations. States and Territories should be able to bid for federal funds to pioneer innovative approaches and to have their innovations properly and independently evaluated. This could be taken up within the COAG National Partnership Rewards payments currently being negotiated.[21]

Perhaps it would be preferable for this sort of experimentation to be approached as ISB-type partnership-based projects crossing federal–state jurisdictions, involving mutual interests in addressing the major uncertainties and risks that the state governments and the Federal Government need to address (such as what climate change might have in store). This would help to generate consensus and would avoid the contentious situation in which states/territories bid for federal funds as the solution to their problems. An 'Innovative Australian

Federation' scheme of this type could require a minimum of two states and one federal partner—thus seeking to mitigate the other problem in cooperative federalism: interstate rivalry.

Conclusions

If we are to avoid making serious mistakes in articulating how best to achieve creativity and innovation in the public sector then it is essential to make clear why the innovation imperative for government is significantly different from that in the private sector. We should avoid approaching public sector innovation as a form of downgraded private sector innovation game that overlooks critical differences between the two sectors. Instead, we should define a robust account of the distinctive and vitally important nature of public sector innovation and actively promote this narrative. A focus on the ways in which governments must handle the uncertainties and risks that markets cannot cope with provides a key element in this evolving policy narrative.

This perspective could help those who work in the public sector to better articulate why innovation in policy and service delivery (and particularly the former) involves balancing the costs and consequences of not attempting to innovate with the costs and consequences of *misjudged* attempts to innovate. Too little public sector innovation is a problem. However, innovation for innovation's sake, in an attempt to emulate private sector norms without due regard for what makes the public sector *different* with regard to the unintended consequences of risk taking, can also be a problem.

It would therefore help if public sector and private sector innovators had access to a better-developed framework for relating risks and uncertainties to *both* 'rewards' (upside considerations) and 'punishments' (downside considerations)—rather than simply framing things in terms of a simplistic risk–reward relationship.

There are important trade-offs between the rewards and the punishments faced when seeking to achieve private sector innovation. Innovation exploits the risk–reward relationship, whilst failures to innovate can be punished through business failure (though as consumer preferences for older vintages of technology over newer vintages, such as handmade bespoke clothing, illustrate, this is by no means inevitable).

In the public sector, these trade-offs still exist but, thanks to the nature and extent of the unintended consequences, there is arguably far more emphasis on the punishments that arise through misjudged attempts to innovate (particularly via the ballot box and through litigation).

There is also the inter-generational equity issue to consider. The private sector applies relatively high discount rates when valuing possible future states of the world—that is, it avoids worrying about the very long term. It is the prerogative

of governments to concern themselves with being fairer to future generations (balancing the needs of current generations against the needs of generations to come). These low discount-rate objectives can amplify the consequences of misjudged attempts to innovate. It is also inherent in governments' role that they must deal with the long-term consequences of damaging failures in private sector innovation (such as chemically induced birth defects inherited by future generations). Either way, the public sector must handle the punishments created by misjudged innovations and the damaging unintended consequences of past innovations.

This means that governments require superior methods for evaluating uncertainties and risks—the consequences of slavishly emulating private sector practices are far too severe. Now that innovation is becoming an explicit part of the public sector reform agenda perhaps the time has come for the public sector to define the nature and extent of its distinctive and vital role in the evolution of modern innovative societies better than it does at present. We can start by ceasing to talk about the 'management of risk' quite so much and start to spend a lot more time talking about the 'management of uncertainty'.[22]

In a cooperative federalism context, who bears primary responsibility for managing risk is something that can be wrangled over endlessly. The challenge of managing uncertainty is different: it encourages a more collective approach based upon mutual interest and less scope for 'passing the buck', or, as Keynes[23] observed, 'The social object of skilled investment should be to defeat the dark forces of time and ignorance which envelop our future'.

ENDNOTES

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[2] I would like to thank Dave Marsh, John Wanna, Bradley Smith and Grahame Cook for useful comments, and Bev Biglia and John Butcher for proofreading and editorial contributions. Thanks are also due to SQW Consulting in the United Kingdom and Geoff White in particular, for stimulating and supporting exploratory thinking on the role of risk and uncertainty in public sector settings several years ago. Thanks also to the Federation of Australian Scientific and Technological Societies (FASTS) for funding the science and innovation policy work on uncertainty and risk that is reflected in this paper and also to The Australian National University's new Centre for Policy Innovation for more recent support for this line of research.

[3] Mulgan, Geoff 2007, *Ready or not?: taking innovation in the public sector seriously*, National Endowment for Science, Technology and the Arts (NESTA) Provocation 03, April.

[4] Many key aspects of the physical, legal, financial, scientific and cultural infrastructures that have enabled private sector innovation to flourish and grow in prominence rely on, and stem from, public sector innovations—for example, patent protection regimes, dual-use export controls, ways of organising public science, and so on.

[5] Knight, Frank (1921), *Risk, Uncertainty and Profit*. H Mifflin: Boston.

[6] See Hartmann, G. and Myers, M. 2001, 'Technical risk, product specifications, and market risk', in L. Branscomb and P. Aursweld (eds), *Taking Technical Risks: How innovators, executives, and investors manage high-tech risks*, MIT Press, Cambridge, Mass. pp. 30–43; and also a detailed case study in Matthews, Mark and Frater, Robert 2007, 'Capacity building and risk management in commercialisation: lessons from the Radiata experience', *Innovation: Management, policy & practice*, vol. 9, no. 2, pp. 170–80.

[7] Matthews, Mark 2006, *Managing uncertainty and risk in science, innovation and preparedness: why public policy should pay more attention to financial and geopolitical considerations*, Discussion paper commissioned by the Federation of Australian Scientific and Technological Societies, Howard Partners, August, Canberra.

Kirzner, Isreal 1973, *Competition and Entrepreneurship*, University of Chicago Press, Chicago; Kirzner, Isreal 1979, *Perception, Opportunity and Profit*, University of Chicago Press, Chicago.

[9] Littlechild, Stephen 1989, 'Three types of market process', in Richard Langlois (ed.), *Economics and a Process: Essays in the new institutional economics*, Cambridge University Press, Cambridge.

[10] Australian Public Service Commission (2007), *Tackling Wicked Problems: A Public Policy Perspective*. Australian Public Service Commission: Canberra.

[11] Leigh, Andrew 2009, 'What evidence should social policymakers use?', *Economic Roundup*, 2009, no. 1, pp. 27–43.

[12] Kaldor, Mary 1983, *The Baroque Arsenal*, Abacus Books, London.

[13] As a recent call for papers in one journal intending to devote a special issue to public sector innovation framed the issues: 'its innovation record is often weak and its innovation processes are regularly dysfunctional' ('Call for papers', *Innovation: Management, policy & practice*, <http://www.innovation-enterprise.com/archives/vol/12/issue/1/call/>). What might appear to be weak and dysfunctional in comparison with private sector norms could in fact be entirely appropriate to decision making on innovation in which the unintended consequences will far exceed simply the failure of one company.

[14] For an example of work exhibiting this weakness, see Bessant, John 2005, 'Enabling continuous and discontinuous innovation: learning from the private sector', *Public Money & Management*, vol. 25, pp. 35–42.

[15] See Mulgan, Geoff and Albury, David 2003, *Innovation in the Public Sector*, Strategy Unit, Cabinet Office, London; and Albury, David 2005, 'Fostering innovation in public services', *Public Money & Management*, vol. 25, pp. 51–6.

[16] See Matthews, *Managing uncertainty and risk in science, innovation and preparedness*.

[17] See Productivity Commission 2007, *Public Support for Science and Innovation*, Productivity Commission Research Report, March, Australian Government.

[18] See Sabel, Charles 1994, 'Learning by monitoring: the institutions of economic development', in Neil Smelser and Richard Swedberg (eds), *Handbook of Economic Sociology*, Princeton University Press and Russell Sage Foundation, Princeton, pp. 137–65; Sabel, Charles 2006, *Beyond Principal-Agent Governance: Experimentalist organisation, learning and accountability*, Columbia Law School, New York; Sabel, Charles and Zeitlin, Jonathan 2003, Active welfare, experimental governance, pragmatic constitutionalism: the new transformation of Europe, Paper presented at the International Conference of the Hellenic Presidency of the European Union, The Modernisation of the European Social Model and EU Policies and Instruments, Ioannina, Greece, May.

[19] Marsh, Ian 2009, *Pragmatist and Neo-Classical Policy Paradigms in Public Services: Which is the better template for program design*, Australian Innovation Research Centre, Hobart, viewed 6 March 2009, <http://www.airc.net.au/extras/935.926.ExperimentalistPolicyDesign.pdf>

[20] See SQW Ltd 2002, *Programme Evaluation of the Invest to Save Budget*, Report to HM Treasury, SQW Ltd, London; National Audit Office 2002, *The Invest to Save Budget*, Report by the Comptroller and Auditor-General, HC 50 Session 2002–2003, 22 November; HM Treasury 2007, *A Review of the Invest to Save Budget: An innovation fund for public services*, HM Treasury, London.

[21] Cutler and Company 2008, *Venturous Australia: Building strength in innovation*, Review of the National Innovation System commissioned by the Minister for Innovation, Industry, Science and Research, Cutler and Company Pty Ltd, North Melbourne, Victoria, <
http://www.innovation.gov.au/innovationreview/Pages/home.aspx
http:/true/truewww.innovation.gov.au/trueinnovationreview/truePages/truehome.aspx >, Recommendation 10.5.

[22] For a useful treatment of some of these issues, see Strategy Unit 2002, *Risk: Improving government's capability to handle risk and uncertainty*, Cabinet Office Strategy Unit Report, London.

[23] As cited in O'Driscoll, Gerald P. and Rizzo, M. J. 1985, *The Economics of Time and Ignorance*, Basil Blackwell, Oxford, p. 1.

Part 2. Reflections on policy and politics