

# **Innovation and the Management of Uncertainty and Risk**

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# Starting point

- Innovation is far broader than research exploitation
- Research has broader aims than innovation
- We don't have an effective policy narrative for articulating *non-innovation* outcome classes
- This gap distorts our policy framework
  - Unhelpful pressures on public research
  - Unrealistic expectations on what innovation policy must deliver (innovation is not the only outcome class)
  - Under-developed understanding of the inter-relationships between innovation policy and research policy
- Useful to move beyond the “things can only get better” & innovation policy = industry policy ethos to S&I thinking
  - Dealing with the downsides to modernity
  - Addressing core concerns in the general community

# Why uncertainty & risk matter

- The management of uncertainty and risk is a critical challenge for government
  - Governments handle the uncertainties and risks that markets can't cope with
  - Markets can deal with risk (within limits)
  - Governments and collective business/philanthropic research funds work that translates ignorance *into* the risks that markets can handle
- Widely recognised that innovating requires uncertainty and risk to be managed effectively
- Managing uncertainty and risk is also a key factor in *non-innovation* research outcomes
- The rest of the world views Australia as a world leader in risk-related thinking (a view expressed in Brussels) - *our natural circumstances are strongly risk-aware*
  - Productivity growth in the primary industries is a risk management game: searching for lower likelihoods of failure
  - Droughts/floods, bushfires are risks we need to manage well

# Political Context to the 2006 Review

- Collapse of the old social contract between science and society (1945 to  $\approx$  1980)
- Backing Australia's Ability (BAA)
  - Linear model presuppositions (“we need more Cochlears”)
  - Government's evaluation of BAA
- Emerging dissatisfaction with the linear model (science to commercialisation)
- Productivity Commission – claims made by the HE sector no longer had traction

# Major lessons from programme evaluation & review

- Business tends to seek *options* from collaboration with the research base – not necessarily direct paths to commercialisation
  - Possessing viable options protects net worth in the face of uncertainties and risks (CSIRO is doing important work here)
  - Value of such options (even to business) not recognised, e.g. in the CRC guidelines
- Large corporations seek to gain corporate intelligence from collaboration with the research base – “early warning” of potential disruptive advances
- “Patent blocking” etc – critical competitive games in innovation that do not necessarily lead to innovation
- Implication: would help to have a complementary outcome class to “innovation” – avoid distorted programme design

# Response

- The Federation of Australian Scientific and Technological Societies funded a study to articulate the role of uncertainty and risk in innovation and non-innovation research outcomes
- Rather than approaching innovation simply as the search for commercial outcomes, we sought to expand the understanding of innovation by giving a proper place to how it helps us to manage *uncertainty and risk* from a broader public policy perspective

# Used principles from subjectivist economics (von Hayek & Co)

- Epistemological antidote to the neo-classical economics that dominates government economic thinking *in Australia*
  - Subjective rather than objective knowledge & degraded perfect information environments
- Markets viewed as exploratory/discovery *processes* (not reified as “things”)
- The “dark forces of time and ignorance” dominate the human condition
- Makes sense to apply subjectivism to public policy (hence impact of the “new institutional economics”)
  - Other central economic ministries more engaged with science and innovation policy than the Australian Treasury – some lessons learned
- Innovation framed as attempts to move from uncertainty (ignorance) to risk
  - We have a natural cognitive preference against ignorance!
- Scientific and technological progress turn ignorance/uncertainty into risk

# Prescience & Preparedness in a nutshell...

By identifying, simulating and disseminating information on unwanted aspects of what the future may have in store for us we can change our behaviours *now* and therefore try to reduce the likelihood and severity of unwanted futures

This can be very valuable...

Similar to “net present value” calculations in economics and finance: rolling up the future into valuations today as distinct to the “more jam tomorrow” emphasis in conventional innovation policy

Mitigates risks to the value of both corporate and national balance sheets – re-enforced by the new “risk-aware” international financial reporting standards

# Preparedness & Innovation

- Prescience from public research helps to drive corporate technology strategies – identifies opportunities and risks
- Translating prescience into preparedness options tends to require innovation – but may only involve (valuable) movements toward innovation and IP “ploys”
- Financial markets focus on prescience & preparedness related games – possessing preparedness options helps to protect & enhance the net worth/shareholder value
- Where prescience-driven innovation occur fairness to future generations can be a major outcome (e.g. climate change/low emission energy efforts)
- Human capital underpins preparedness and innovation

# The Productivity Commission Response

- Accepted the argument
  - Changed their definition of innovation to explicitly take account of preparedness: defined as “an enhanced capacity for dealing with future uncertainties”
- Recommended that evaluation of the innovation programs included preparedness outcomes
- Argued that the pursuit of commercialisation for financial gain by universities should not be to the detriment of maximising the broader returns from university research

# The strategy imperative

- Australian weaknesses in business innovation have a significant *strategy deficit* dimension
- Size: senior management in smaller companies inevitably focused on troubleshooting & the short term
- Lack of awareness of global strategic intentions – need better competitive intelligence
- Problem of viewing “innovation” as diffusion to Australia!
- Increasing “R&D” per se is NOT the solution to the strategy deficit
- Prescience & preparedness are central to competitive strategy...

# Policy Implications

- The main implications of this argument for policy makers are that:
  - the concepts of *prescience*, *preparedness* and *innovation* should be treated as distinct but complementary outcome classes
  - programme appraisal and evaluation time-frames relating to spending on *prescience*, *preparedness* and *innovation* need to address inter-generational equity concerns – not just short term ‘return on investment’ parameters
  - the yield on support for *prescience*, *preparedness* and *innovation* can be manifested in
    - reduced downward adjustments to the value of balance sheets in the face of future risks to the value of these balance sheets
    - Lower margins of error in estimating net worth = more efficient market processes

# Initial observations in the light of the Green Paper

- Backtrack from 2006 PC Review's argument for a more holistic approach?
  - Research policy as a whole now firmly conflated with innovation policy
- Risk that *not* recognising prescience & preparedness as a distinct complementary outcome class will perpetuate programme and policy instrument design flaws
  - Not recognising the value of possessing options and IP “plays” irrespective of whether they actually lead to innovation
  - Not recognising the value of prescience from public research in good competitive intelligence/strategy formulation
- The Government's White Paper could respond by *strengthening* the nexus between industry policy and innovation policy by addressing the need for *prescience*, *preparedness* and *innovation* to be framed as distinct but complementary outcome classes
- Plays to our externally perceived strengths as a ‘risk-aware’ economy – lets move beyond simply following UK policy thinking!