

Innovation Leadership Summit

Brisbane 26th October, 2006

The purpose of this forum was to focus on recent thinking about innovation by leading international researchers, and to consider the implications for Australian innovation policy. Three international thought leaders provided discussion starters: Alan Hughes, David Gann and Stan Metcalfe. Participants in the forum and discussion represented a broad cross section of people with a stake in innovation policy.

Some Highlights

- *Alan Hughes' use of the Pacific Islanders' Cargo Cult as a metaphor for the danger of reifying overseas innovation policy models. The disconnect between the myths and the realities of the US' productivity performance highlights the importance of sober policy analysis.*
- *David Gann's description of how ARUP, the London engineering firm, responded to the design failure of their "Wobbly Bridge", by promoting open discussion of what could be learned. Everyone should have an interest in how to deal with uncertainty and learning from failure.*
- *Stan Metcalfe's call for more serious attention to innovation in the services sector. This is a serious challenge for Australia where our trade in services performance is poor, and shrinking (as a share of GDP).*
- *Recognition that innovation and economic change necessarily implies structural change in the economy. And structural change implies the need for policy change and adjustment.*
- *The importance of innovation technologies as a new class of infrastructure.*
- *Remembering that innovation revolves around the core question of how we create wealth from knowledge. And "only individuals know", Stan Metcalfe reminded us.*

Some conclusions, and points of agreement

There was broad consensus at the gathering around a number of key, foundational propositions and priorities. These provide a platform and a starting point for our continuing dialogue about a 'next generation' innovation policy framework.

- There is a need to look at how small and large firms interact as part of a distributed innovation system that must be integrated and networked to function effectively;
- Sector-specific - or *sector-sensitive* - policies are required to allow for the different competitive dynamics between sectors;
- There is the need for strong political, policy and business leadership to commit to and invest in creating value and improved competitiveness through innovation;
- Public awareness of the importance of innovation is critical: there needs to be a broadly based community of people promoting the innovation agenda;
- The interdependencies between services and manufacturing are complex but crucial. Government innovation policies need to move beyond just the 'manufacturing' model;

- Recognise the key role of government as an innovation-demanding customer, especially in areas such as health and education where government plays a leading role;
- Develop a better balance between policies for innovation creation and policies for innovation diffusion;
- The need for a shift in focus from promoting new firm entry to one of supporting new firm survival and promoting growth;
- Promote and support new technological and organisational infrastructure for innovation, including 'innovation technologies';
- Develop and strengthen new skills and capabilities around innovation, including brokering and networking skills and capabilities;
- Increase tolerance for experimentation and failure, recognizing that uncertainty of outcomes is an inherent feature of innovation and competition. Innovation always produces skewed returns, and governments should find ways to take ownership of some of the risk of innovation. Public procurement policies assisting small firm growth is one such policy;
- The role of universities needs to be better understood and the different kinds of contributions by different kinds of university more clearly recognised. They can be important contributors to national centres of scientific excellence, and are valuable sources of radical innovations. Their role in supporting innovation extends well beyond current policies for 'commercialisation'. Although these are important, so are their education, publishing, problem-solving and public space roles. There needs to be balance and focus in the funding of science-led long-term research, e.g. in health and life sciences, energy and environment, and shorter-term applied research and technology transfer (e.g. public/private venturing and collaborative research with industry);
- There is need for investment in the new technological and organisational infrastructure that facilitates connectivity and new skills and capabilities are needed to use this infrastructure for competitive advantage;
- There is a need for greater research into and understanding of the role of intellectual property rights in open innovation models; and
- A call to build upon successes (such as in agriculture, mining and project management).

Professor Alan Hughes, Cambridge University

Professor Alan Hughes reminded us of the prevailing conventional wisdom which says:

- Raise R&D. Technology oriented R&D targets are currently set by virtually all OECD economies and the EU;
- Promote university spin-offs and licensing;
- Link university funding to levels of commercialisation;
- Encourage entrepreneurial start-ups in high-technology producing sectors through:
 - promoting private venture capital markets; and
 - providing tax subsidies to reduce risk for investors.

He suggested that these policy presumptions are often linked to the purported success of a 'US' model of superior productivity and GDP growth based on:

- High-tech producing sectors as key drivers (ICT, biotechnology etc.);
- New firm entry, especially spin-offs and new firm formation from commercialising off a science base;
- Universities being key drivers of growth and productivity; and
- Private sector venture capital funding for new firm start-ups and spin-offs based on greater US private sector willingness to take risks.

Professor Hughes argues that all of these assumptions are overstated or incorrect.

He provided evidence on US productivity growth, showing that differences in services productivity growth accounts for most of the difference in national productivity performance between the USA, the UK and Europe over the past decade. He argued that the increase in service sector productivity is related to the use of IT, new business models and some forms of deregulation.

The policy consequences of this are to question the single-minded focus on 'high-tech' producing industries, and to emphasise the importance of the diffusion of IT and new technology platforms in 'using' sectors and especially into firms with the managerial capacity to innovate through developing new business models, services and business connections.

Professor Hughes then examined the relative importance of start-ups versus established firms. He showed that spin-offs from universities are a very small proportion of all start-ups, and that the returns from them are highly skewed. Only a very small proportion of university spin-offs actually make significant returns. His data shows that established firms are mainly responsible for the productivity improvements in the US.

Those start-up firms that do succeed in growing often need to make the transition from 'soft' to 'hard' businesses. Here US government procurement plays a very important role. Professor Hughes described the role of the Small Business Innovation Research (SBIR) program in the US. This scheme puts 2 to 3 times more funding into early stage start-ups than the US venture capital industry¹.

The policy consequence of this analysis is the need to address *barriers to growth* and not just the encouragement of start-ups. There is a need to look at what factors help determine firm survival and the role of public procurement in helping emerging firms to transition to sustainable growth. There is also a need to clarify the role and purpose of universities.

Surveys examining the sources of innovation in firms show they are much more reliant on customers and suppliers than universities. Although universities are important sources of

¹ US National Science Board data shows private equity funding of early stage ventures has declined steadily over the past decade.

more radical innovations, their role in supporting innovation more generally is overstated. Universities' role is multi-faceted encompassing educating the next generation of knowledge workers, adding to the stock of useful knowledge, problem solving, and providing a public space for network building, open dialogue and debate.

The policy consequence is that a much richer analysis of the role of the university in encouraging innovation is required. All universities are not the same, and policies designed for maximizing their impact on innovation and knowledge exchange must encourage diversity. Professor Hughes strongly questioned undertaking a UK-style Research Assessment Exercise in Australia if its design forced all institutions into a 'one size fits all' evaluation process.

Professor David Gann, Imperial College London

Professor David Gann, from Imperial College, talked about the new connections needed in the innovation process. He pointed out that government decision makers actually need to understand the innovation process within firms. He highlighted the changes that have occurred in innovation: from the single inventor model of the 19th century, through the corporate R&D model of the 20th century, to the contemporary distributed or 'open innovation' model which requires many more connections and interactions. He described how the innovation process nowadays needs extensive interactions within the firm, and externally with researchers, lead users, collaborators and partners, and suppliers. David Gann presented three case studies to develop his messages.

Using the case of Terminal 5 at Heathrow - Europe's largest engineering project - Gann argued that innovation does not just come from the laboratory. Many of the new technologies at T5 were developed through problem-solving collaborations by engineers. The most important lesson from T5 was that the client decided to 'own' the risk of the project not being completed on time, within budget and to high quality. This reduced the adversarial nature of project-management, creating collaborative team-working which fostered a much better environment for technological innovation than traditional approaches. There are lessons in this for public procurement.

Another case study is the engineering company, Arup, and how it manages its network of innovators. Gann described the systems Arup uses to connect people within and outside of the firm, and explained how his research group is using sophisticated Social Network Analysis tools to track connections between staff to assist innovation management.

Professor Gann also discussed the changing innovation strategy of P&G, one of the world's largest consumer products companies. P&G is strongly science-based, owning nearly 30,000 patents. It has shifted its strategy from self-reliance in R&D to a policy of connect and develop (C&D) to source innovations externally. It uses virtual product development teams and technologies and has been involved in the creation of a number of intermediary organizations, such as Innocentive and Nine Sigma.

The technologies that are underpinning these new forms of connection are described as 'innovation technology': a new kind of technological infrastructure for the connections needed in the contemporary innovation process.

The policy consequences of Professor Gann's analysis include the need to develop the technological and organizational infrastructure to facilitate and build upon the connectivity required for innovation. There is a need to think about how to build awareness of the new innovation technologies, such as e-Science or rapid prototyping, with demonstration sites. There is a need to develop organisational infrastructure and skills, such as brokers and brokering.

Professor Stan Metcalfe, University of Manchester

Professor Stan Metcalfe focussed on innovation in services. He provided data showing the composition of demand in the UK and the strong industrial demand for services, especially knowledge-intensive and business services. He highlighted the changes in value added between 1992 and 2004, with significant increases in business, computer and consulting services, and decline in many areas of manufacturing. Data was provided on the skills profiles of various sectors, with business, educational and financial services having the largest proportion of high skills. Evidence was presented from the European Union innovation survey showing little difference between the percentages of services and industrial firms developing innovations, and the extent to which they were successful. Services firms are significantly more likely to introduce organizational innovations than manufacturing firms, though less likely to introduce process innovations. He used case studies from the health sector to illustrate the extraordinary increase in productivity resulting from innovation.

Professor Metcalfe reminded us that all economies are knowledge economies, and the most important question is what kind of knowledge economy are we now dealing with? He argued that a knowledge economy is an experimental system, and the issue is how open is it to challenge and innovation? The corollary of this is that mistakes will be made. There is substantial uncertainty – not simply risk that can be measured – so there needs to be tolerance of failure and the construction of redundancy in the system.

There are significant differences between services and manufacturing innovation: they are less tangible and easy to measure, there often has to be co-location with clients. There are many challenges to emerge from services innovation, not least the implications of the structural changes that are occurring.

The policy consequence of this line of thinking is to question the relevance of innovation policies developed for manufacturing firms. What is the significance of R&D credits for innovative firms that do no formal R&D? Prof. Metcalfe said that he knows of few examples internationally where policy-makers have made the transition from the 'manufacturing view'. Policy makers and businesspeople need to understand the inter-relationships and dependencies between services and manufacturing. Manufacturing remains important as it contributes so much to productivity and trade from a relatively small base, and services are often linked to manufactured products. The two sectors are mutually dependent. One policy implication is that neither sector can prosper without the other.

There was open discussion on these presentations, and there were short interventions from the CEOs of the Australian Business Foundation, the Australian Institute for Commercialization and UniQuest, and from representatives of the Department of Industry, Tourism and Resources and the Department of Communications, Information Technology and the Arts. Some of the useful points raised included:

- The role of government in promoting collaborations, providing platform facilities, and in reducing risk, especially for smaller players.
- The importance of the diffusion of knowledge and innovation across sectors and vertical markets.
- The development of structures to create networks of innovators.
- Greater attention to increasing the absorptive capacity of SMEs.
- Increasing the currency of market and customer driven innovation.