The Innovation Challenge

Summary

- Government procurement must play a bigger role in stimulating innovation and business R&D. A tiny proportion of government procurement invested in an ARPA-like way would radically enhance the UK's competitive ability to innovate.
- The Technology Strategy Board must be adequately funded to drive wealth creation from innovation across all sectors.
- Traditional metrics do not capture the true breadth of innovation in companies – new metrics should be developed.

Background

1. A workshop was held at the University Arms Hotel, Cambridge from 14th to 16th September, 2006 to debate the implementation of the policy on innovation (partly set out in *Science and Innovation Investment Framework 2004-2014: Next Steps DTI document*[1]*).* The meeting followed on from a similar workshop held in Cambridge in 2005 on the 2.5% challenge.

2. The participants were from the Royal Society, government departments, research councils, HEFCE, industry (including several members of the DTI, Technology Strategy Board), venture capital companies, universities and other organisations. Three overseas representatives attended from Lund University in Sweden, Philips Electronics, and the US Department of Defense. A participant's list is attached at Annex I.

3. Presentations to promote debate in each of the sessions were made by:

Sir Keith O'Nions FRS	Director General Science and Innovation, Office of Science and Innovation, DTI
Professor David Eastwood	Chief Executive, Higher Education Funding Council for England
Allan Larsson	Chairman, Lund University
Sebastian Conran	Director, Conran and Partners
Anthony Lilley	Chief Executive, Magic Lantern Productions
Dr Alan Begg	Chief Executive, Automotive Academy
David Gould	Deputy Chief Executive, Defence Procurement Agency, MoD
Bill Schneider	DSB, DOD, US
David Fyfe	Chief Executive, Cambridge Display Technologies
Stephen Heal	Business Development Director, Tesco
Rick Harwig	Chief Technology Officer, Philips

[1] www.hm-treasury.gov.uk/budget/budget_06/assoc_docs/bud_bud06_adscience.cfm

4. The meeting considered eight questions;

   (a) What are the challenges faced by government and business in innovation?
   (b) How can government stimulate innovation?
   (c) What role does geography play in innovation?
   (d) How do the creative industries innovate?
   (e) Does the UK have the skills to support innovation?
   (f) Can government use procurement to stimulate innovation in small, medium and large enterprises?
   (g) How do growing companies support the innovation process?
   (h) Do multi-national companies innovate in a different way from small companies?

Conclusions and Recommendations

5. The UK sector balance is very different from other countries. International comparators should be treated with caution; new metrics for innovation should be developed.

6. UK science output per pound spent is high. Government should support new knowledge transfer/exchange mechanisms to capitalise on this advantage and attract increased inward investment.

7. Government procurement – currently around £120 billion must be used more effectively to stimulate innovation. A tiny proportion of government procurement invested in an ARPA-like way would radically improve UK economic performance.

8. Innovation may be limited by skills shortages particularly amongst technicians. Further Education is not working well; FE is not delivering what business needs and may not have the right skills in the teaching staff. A NAO study or a Select Committee Inquiry could stimulate policy debate about this rarely discussed activity.

9. New training methods for technicians such as modified computer games are very successfully finding their place in industry. More could be done to innovate in development of novel training tools.

10. The mix of graduate skills is changing as students opt more often not to study the physical sciences – this could be lead to a significant skill shortage for industry in the future.

11. Universities are receiving increased support for innovation – the Higher Education Innovation Fund (HEIF) will make grants of £240 million over the next two years. The debate around the comprehensive spending review will set the level of spending by universities and Research Councils on knowledge transfer – support for knowledge transfer processes and innovation should be an important part of this debate.

12. There is no one size fits all approach to universities. Universities should tailor their position in the market to fit in with their strengths and the needs of the

end users whether that is for well-trained graduates or research students or knowledge transfer. There should be less emphasis on limited metrics such as number of spin out companies or IP licences.

13. Clusters of businesses and universities do stimulate higher levels of innovation and knowledge transfer. Lund University, the University of Copenhagen and the University of Malmö have created a powerful innovation machine – the new bridge connecting Sweden and Denmark has enabled much closer co-operation between research teams and companies to take place. Adam Smith's focus on land, labour and capital as rival goods could be replaced by utility function that maximises the exploitation of knowledge and technology.

14. Clusters can be expanded from city to region, region to national, national to international or geographic cutting across international boundaries. Allan Larrson would like to explore ways for Sweden to partner with the UK.

15. The creative industries are not pulling ideas or technology from universities but internally innovating. The pace of change in the service sectors is very rapid requiring constant innovation; there are general lessons to be passed to other sectors. Sebastian Conran from Conran and Partners, a design house, and Anthony Lilley, Magic Lantern, a media company, shared a common vision of innovation set in a human context. They constantly asked "what did customers want and how could companies meet these needs?" Creativity was not a linear process – structured brainstorming was more likely to be successful than a step by step approach. Traditional metrics such as R&D spend divided by sales may not capture the level of innovation spend in the services sectors.

16. Defence procurement is managed over an exceptionally long time scale – a new nuclear capability would take 40 years to deliver. However, the pace of change for technology is accelerating often making defence products designed ten years ago but delivered today obsolete. A new process for procurement is under development to insert innovation through the product life cycle. This requires a revolution to contracting principles and supplier relationships.

17. Defence capability requirements have changed – in the cold war era the strengths and weaknesses of the enemy were understood. The threats today are much more diverse. More innovation is required in threat response and detection.

18. The US Defence Advanced Research Procurement Agency (DARPA) has worked well in engaging SMEs and others in developing innovative solutions to defence requirements.

19. The Technology Strategy Board must include all sectors of the economy and must be adequately funded to drive wealth creation from innovation across all sectors.

20. As manufacturing moves to SE Asia defence capability could be compromised.

21. A case study of Cambridge Display Technologies showed how long it can take to take a new technology to market. Limited capital for start up came from the UK but CDT had to look Japanese and US investors to grow and develop good ideas into products. The founders of the company were wise to spend time and money protecting the patents globally.

22. Service companies such as Tesco do not protect their IPR in the way technology companies do but work hard to innovate faster than the competition. Innovation in Tesco is driven by customer needs and every part of the company is expected to be thinking about innovation – good ideas flow back to the centre from staff and customers rather than a top down approach. Research, innovation and development is not centralised in a single department in Tesco – rather different teams develop, test and implement ideas.

23. Companies whose competitive advantage is driven by technical innovation such as Philips can only survive by innovating in a radically new way. Rather than a secretive research laboratory working behind closed doors, Philips has moved to an open innovation model engaging business partners and researchers in universities in the search for product innovation.

24. The process of innovation could be the theme for a one-day meeting to be held in 2007.

Dr Dougal Goodman

10th October, 2006

ANNEX I

Participants

Alan Begg*	Automotive Academy
David Bott*	EotR Solutions
Colin Brown*	IMechE
Dolores Byrne	QinetiQ
Catherine Coates*	EPSRC
Sebastian Conran	Conran & Partners
Tim Cook	Isis Innovation
David Eastwood	Higher Education Council for England
David Fyfe	Cambridge Display Technologies
Steve Garwood	Rolls-Royce
Dougal Goodman*	The Foundation for Science and Technology
David Gould	Defence Procurement Agency
Philip Greenish	The Royal Academy of Engineering
Mike Gregory	University of Cambridge
Rick Harwig	Philips
David Harris	Innovation Team, OSI, DTI
Stephen Heal	Tesco Stores Ltd

Chris Henshall	York University
Nathan Hill	Qi3
Henry Hutchinson	CCLRC
Julia King	Imperial College London
Allan Larsson	Lund University
Anthony Lilley	Magic Lantern
Hazel Moore	FirstCapital
John Neilson	OSI, DTI
Sir Keith O'Nions	OSI, DTI
The Lord Rees	The Royal Society (part-time)
Peter Saraga*	HEFCE
William Schneider	US Department of Defense
Bruce Smith	Rainbow Seed Fund
Rama Thirunamachandran	HEFCE
Faith Wainwright	Arup
John Wood*	CCLRC

*Co-organiser

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