

DINNER/DISCUSSION SUMMARY

How should the government promote innovation in the UK economy?

Held at The Royal Society on 5th June, 2007

We are grateful to the Engineering and Physical Sciences Research Council, the Innovation Team, Office of Science Innovation, DTI, QinetiQ, the Science and Technology Facilities Council and the South East England Development Agency (SEEDA) for supporting this event.

- Chair:** **The Earl of Selborne KBE FRS**
Chairman, The Foundation for Science and Technology
- Speakers:** **Jonathan Kestenbaum**
Chief Executive, National Endowment for Science, Technology and the Arts (NESTA)
- Anne Glover CBE**
Member, Technology Strategy Board (TSB) and CEO, Amadeus Capital Partners
- Peter Warry FREng**
Chair, Science and Technology Facilities Council
- Professor Rod Coombs**
Vice-President, Innovation and Economic Development, The University of Manchester

JONATHAN KESTENBAUM said that the role of Government is to foster the conditions under which innovation thrives. Over 50% of economic growth derives from innovation. He outlined five habits of innovative societies. The first essential is a national galvanising purpose, such as President Kennedy created in his speech of 25 May 1961, which committed the USA to put a man on the moon within 10 years and unleashed thousands of small high technology companies, whose research activities 35 years later have at least as much impact as tax cuts. The story of Finland in the mid 1990s, turning around 60% debt and 15% unemployment, and Estonia's transformation from bankruptcy and pollution to 7% growth, with a reputation as the most competitive EU state, show the power of innovation at the heart of national purpose. In comparison, the UK seems complacent. The second essential is a culture of enterprise; ingenuity, curiosity and problem solving. He questioned how deeply this is rooted in UK companies, public authorities, schools, and universities and how widely it spreads. The fear of failure is a signal of a deeper malaise; a lack of willingness to adopt new ideas and take risks. The third essential is a capacity for collaboration. The mistakes which led to the Bay of Pigs, regarded as the worst foreign policy mistake in recent US history, resulted from homogeneity of background and ideas among advisers and decision makers. The success of MIT demonstrates the benefits of extreme collaboration. NESTA is backing a joint incubator with Imperial College and the Royal College of Art, bringing together engineering and art to create innovative problem solving. The fourth essential is multiple sources of capital. Public finance can have a catalytic impact when joined up with private money. The final essential is the role of science as the engine of innovation. The importance of science policy as a critical component of innovation policy is now recognised, but there is a question whether the present machinery of government supports the necessary interaction between skills, tax, labour and higher education policies.

ANNE GLOVER said that the new independent Technology Strategy Board (TSB) represents an important change in the way Government views technology. It has £350 million to facilitate business influence on the three-year £10 billion Government science spending programme. The funding includes

£90 million in government support for collaborative R&D; £10 million for new Innovation Platforms on network security and transport; support for 22 knowledge transfer networks and for knowledge transfer partnerships, joining up business and universities at individual level. The aim is to use this funding to catalyse change in the much bigger budgets of government departments and businesses - procurement by government departments is worth £150 billion a year alone. Venture capitalists recognise the value of customer feedback and support - worth ten times as much as investment capital. The scale of the opportunity for UK business is illustrated by clean and renewable technology, now the third largest category for US venture capital investment, exceeded only by biotechnology and software, and carrying political and consumer support. While the European venture capital market has improved and the UK has a strong share, it is still much weaker than the US, which can demonstrate outstanding successes, such as Google, unmatched in Europe. A higher level of ambition is needed. Research commissioned by the London Stock Exchange suggests that a single policy change, to remove stamp duty from share transactions, could result in GDP growth of $\frac{1}{4}$ - $\frac{3}{4}$ % , lower the cost of capital by 10 to 12%, drive equity prices up by 7.25% and increase tax revenues by £4 billion. Such improvements would pull through into the capital markets and increase the availability of support for spin outs and other innovation.

PETER WARRY said that the Research Councils' PSA target and Royal Charters call for them to improve knowledge transfer performance of the research base and the overall innovation performance and competitiveness of the UK economy. The Councils' knowledge transfer functions are well recognised, with the supply of highly trained people perhaps the most important. Business wants the Councils to set relevant science priorities, with a balance between curiosity driven research and programmes relevant to national goals. In response to the recommendations of the Economic Impact Group, a Research Council Chief Executive will take cross cutting responsibility for leadership on knowledge transfer, seeking to harmonise the multiplicity of schemes and to diffuse best practice. Chairs will give a higher profile to economic impact and the Councils will aim to develop strategic research pro-

grammes in dialogue with economic stakeholders, and promote two-way secondments between research and business communities, while continuing to give responsive mode research its proper value. Progress will be measured by bi-annual user satisfaction surveys. The agenda for the new Science and Technology Facilities Council will reflect these priorities. It is likely to include, in addition to delivery of strategic infrastructure to the other Councils, a more adventurous high impact portfolio; more leadership on international projects, aiming to mould them in line with UK objectives and to secure two new facilities in the UK. The objective is to make Harwell and Daresbury research parks self sustaining, by offering solutions for industry; this will require more critical mass at Daresbury. The Council will work in partnership with the TSB. The issues include determining whether industry wants the Council to deliver access to research and development, or solutions to problems; the level of priority to give to the economic agenda, which at present accounts for 55% of the Council's portfolio, and the best way to attract private investment into the research campuses, adding value to the role of universities in knowledge transfer.

PROFESSOR ROD COOMBS noted that the concept of a national system of innovation, prevalent in the 1990s, had much to commend it, but led to the mistaken belief that innovation is a national characteristic, stronger in some nations than others, and a focus on how Britain could become more innovative. If instead, the problem is seen as how to define the place of the UK in a globally distributed innovation system, the short termism for which the City was criticised in the 1990s is seen as a rational response to what was then a limited market into which the products of UK research and development could be exploited. That market is now fully international, with regional hotspots – small nodes notable for their excellent global connections. Manchester is an example, with its strong universities and intercontinental transport connections. The role of government is to create the conditions for participation in the global market and to attract globally mobile innovation activities and networks. Science and innovation policies are necessary but not sufficient. Government can influence the framework conditions through supply side measures such as support for the science base, trained people, and regulatory structures supporting stable intellectual property rights. There is a case for a change in competition policy, to enable some highly innovative firms to dominate the market for longer periods. Regulation can also influence demand, setting stretch targets for manufacturers and so creating incentives to innovate. There is a role for discerning UK customers, and action is overdue to enable public procurement to be used to reduce uncertainty in demand. The new TSB technology platforms combine supply and demand, as regulation requires a new level of performance and investment in technology spurs industry to meet the challenge. Universities are a key part of the science base, and the framework conditions for innovation; they are not adequately funded by government, and so are developing new revenue streams, including foreign students and distance learning. The main economic impact of the Research Councils is through entry to world science; the balance between basic and applied science is a distraction. Industry engagement is a culture issue and there are a variety of tools for getting universities more connected. Manchester is focusing on strengths and forging strategic alliances with big industrial partners; changing promotion criteria so that knowledge transfer carries equal weight with research and teaching; offering academics 85% of net licensing revenue, and developing proof of concept funds to fill gaps in the market for finance. On points of detail, the Frascati definitions for the R&D tax credit do not help science based innovation; there is a need for a grace period on patents; and there should be a tax credit to support innovation audits for small and medium enterprises.

In the discussion, speakers highlighted the problem of demand, particularly in relation to the physical sciences, where it was suggested that the relevant companies tend to be service

orientated and have limited ambition. The key policy objective should be to foster the take up of innovative products by early adopter companies. It was also suggested that there is a UK funding gap for innovation and product development, i.e. the stage between research and clinical trials: The requirement to find private funding to match public investment is often a deal breaker. US procurement arrangements are more favourable, include an innovation fund and allow for failure

It was suggested that, while young researchers are keen to innovate, the pressures on them are to publish papers and play safe. And there are very few universities who have experienced researchers in mid career who can understand the needs of business partners. The Research Councils are taking initiatives to fill this gap; these were welcomed, as long as they do not squeeze out funding for blue skies research.

There was support for the need to reconfigure intellectual property regulation to reflect the international context, recognising that the key universities are global institutions. Their distance learning activities are part of this.

The role of capital was often misunderstood. There is a need for different types of capital at different stages of the development process. Public funding does not necessarily equate to patient capital; often there are imperatives for early returns, and premature closure of activities poorly set up and not given time to mature. UK public funding too often suffers the tyranny of multiple objectives. The value of tax credits was questioned.

It was hoped that, looking forward to forthcoming changes in government, research and understanding of innovation would be positioned closer to the policy community.

Joe Durning

The presentations are on the Foundation website – useful web links are:

Amadeus Capital Partners:

www.amadeuscapital.com

Engineering and Physical Sciences Research Council:

www.epsrc.ac.uk

The Foundation for Science and Technology

www.foundation.org.uk

NESTA:

www.nesta.org.uk

NESTA Policy Briefings:

www.nesta.org.uk/informing/policy_and_research/policy_briefings/index.aspx

NESTA - The Innovation Gap, research report from 2006:

www.nesta.org.uk/informing/policy_and_research/highlights/innovation_gap_report.aspx

Office of Science Innovation, DTI:

www.dti.gov/science

QinetiQ:

www.qinetiq.com

RCUK:

www.rcuk.ac.uk

Rutherford Appleton Laboratory:

www.cclrc.ac.uk

Science and Technology Facilities Council:

www.scitech.ac.uk

South East England Development Agency:

www.seeda.co.uk

HM Treasury – Science:

www.hm-treasury.gov.uk

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A workshop was held in the afternoon before the dinner discussion – key points from the debate were:

JONATHAN KESTENBAUM paid tribute to the role of Lord Sainsbury, and the DTI in securing the government's ten year record on science spending. The key role for Government is to stimulate the conditions under which innovation can build on the momentum generated by the spend. His presentation in the evening would aim to shift the debate away from the false dichotomy between great science on the one hand and dissemination/absorption on the other, by proposing that successful innovation should be seen as the product of a system or an ecology in which skills, finance, regulatory culture supported the adoption/absorption of top class science by users and consumers. He would point to the importance of collaboration across disciplines, with reference to MIT, and to the role of government as procurer, using funding to promote interdiscipline. Responding to Lord Sainsbury's definition of a national system for innovation, he would ask whether the current machinery of government reflected the necessary complex and messy connections within the system.

PETER WARRY had chaired the Research Councils Economic Impact Group, which highlighted the need for them to provide leadership, engaging universities, regional development agencies and above all the potential user communities. As Chair of the Science and Technology Facilities Council, which brought together the Particle Physics and Astronomy Research Council and Council for the Central Laboratories of the Research Councils, he now has to deliver the agenda drawn up by the group, ensuring that the Council delivers significant economic impact as well as world class science, highly trained people, public engagement and effective organisation of resources. He would set out his views on the issues this raised for the new Council, at an early stage in their development.

The discussion included the following points, in addition to those explored further in the evening's debate.

NESTA research has explored innovation in non typical sectors, such as construction, where a new type of innovation policy, light on research, but involving universities, brings together government regulatory standards, procurement decisions and promotion of best practice.

In the aviation industry, extension of emissions trading would have an impact on practice; the flat rate airport duty does not. There has been little serious innovation at the lower end of the market, and the environmental debate has yet to have an impact. Development of Airbus involved fruitful collaborative research and development, but environmental targets are at present mainly self imposed, leading to incremental improvements; there is a need for more pressure from end users.

The pressures on universities to make use of their intellectual property, using a business model, reinforced by performance measures and the need to generate income, have worked against early publication and free exchange of ideas, which are the real drivers of innovation. Policy has overemphasised supply side measures, drawing on an outdated linear model. Innovation is better seen as an open market, in which business will buy knowledge, but does not care where it comes from. Experience in the financial sector underlines the thirst for knowledge, and the speed of change. Government's focus should be on removing barriers, improving infrastructure, and providing regulatory frameworks. Successful measures also include the two way exchange of people and highly paid intermediary posts with experienced people who can set up deals.

Government has a clear role in supporting world class science, which is the gateway to the knowledge created elsewhere in the world. There is now a shared understanding of the di-

mensions and drivers of innovation and its potential economic contribution. The right role for government in fostering collaboration and networks is less clear, though Regional Development Agencies are well placed to promote the agenda. Government can promote innovation by identifying problems and asking business and universities to work together to solve them; this has happened in Valencia. There is scope to use NHS purchasing power more proactively, to counter growing competition in the pharmaceuticals market from Russia and China, which offer lower costs and improving quality and reliability. The UK Biobank Project, will be an important resource, offering longitudinal information on 500,000 individuals.

There is still a need for more smart money in London, but this is a generational issue; the necessary flows of people between the science and investment communities are beginning to happen, and the impact of policy can be seen in the behaviour of the Research Councils.