Economic and Social Research Council

University Research & The Economy: What are the opportunities for UK Universities in the drive for innovation & growth?

Professor Paul Boyle, CEO, ESRC

SHAPING SOCIETY

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Innovation

"Innovation, the introduction of new or improved products, processes or methods – has been shown to be the key driver of economic growth in advanced economies.... science, research and innovation are vital to this country's future economic growth."

David Willetts

Research Excellence

- The UK research base is of high quality and the most productive in the world

"The UK's share of the world's top 1% of most highly cited papers, which indicates its share of the highest quality published research was 13.8% in 2010, 2nd only to the US"

The International Comparative Performance of the UK Research Base 2011

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Research Excellence

- Publications per head of population – about 50% higher than the European Union (EU) average and 16% higher than the United States
- 11.9% share of total world citations (compared with around 1% of the world's population)
- 5th in the world for the number of PhDs produced per unit of higher education R&D spending
- UK researchers consistently win a high share of the world's major scientific prizes

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Productive Economy

"Science and technology is the backbone for productivity and innovation…" *Steve Ballmer, CEO Microsoft*

- **Food security**: UK research has helped increase wheat production by £75 million per annum. The impact on world production is estimated to be as much as £4.6 billion per annum
- **Government:** Game theory research resulted in £22.4 billion revenue to Government from 3G licence sales, equivalent to 2.5 percent GNP, or enough to build 400 new hospitals
- **Spin outs:** Arising from an RCUK funded PhD at the University of Edinburgh, Multichannel Transient ElectroMagnetics is Scotland's largest academic spin out and was sold for over £170 million

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Healthy Society

"…Sustained investment in UK research is needed to allow us to continue to tap in to some of the brightest and most innovative thinking in the world."

Dr Tony Wood, VP, Head of Worldwide Medicinal Chemistry, Pfizer

- **Cardiac and mental health:** Every pound spent on research in these areas results in health benefits and inward investment worth 39 pence to the UK each and every year thereafter
- **Happier, healthier UK:** Research on happiness and wellbeing has influenced policy innovations such as the New Deal Programme, the Working Families Tax Credit Scheme and the European Union's employment policy
- **Influenza:** Long term investment provides the necessary agility to respond including contributing to the urgent development of a vaccine for use in the UK in autumn 2009 for the H1N1 pandemi

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Sustainable World

"In preparing to manage the severe risks of climate change, the world needs the very best researchers to work on the crucial challenges. RCUK is generating first-rate and innovative research which will provide vital guidance for both policy and society's response."

Lord Stern of Brentford

- **Energy spin outs:** Ceres Power, formed after ten years of research on materials and devices, is now an AIM listed company employing 70 staff, working with British Gas to develop a fuel cell microchip product for the UK market
- **Lighting:** New LED technology will cut carbon emissions by 23 million tonnes and slash household lighting bills by 25 percent
- **Environment:** UK research discovered the hole in the ozone layer, crucial evidence for a ban on CFCs and subsequent closing of the ozone hole, with an estimated benefit to the UK economy of up to £42 million

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Excellence with Impact

- Our vision is for *excellence with impact*; the UK to be as renowned for the impact of its research as it is for its excellence

- This means continuing to invest in the best research, people and infrastructure; whilst aiming to enhance the impact of that funding on society

Excellence with Impact

RCUK describe impact as ….

The demonstrable contribution that excellent research makes to society and the economy by:

- Fostering global economic performance, and specifically the economic competitiveness of the UK
- Increasing the effectiveness of public services and policy
- Enhancing quality of life, health and creative output

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Collaboration

- 21% of PhD projects have formal collaboration arrangements with business and industry partners
- The strong reputation for quality and relevance of UK academics has resulted in over £2 billion of collaborative funding from UK business and industry since 2006
- In the last three years, almost £1 billion of inward investment can be directly linked to RCUK efforts to attract international funding into UK research

Engaging with Key Stakeholders

- Alignment with HEFCE and other FCs
- Dialogue with HEI's on strategic issues
- Adding value through TSB partnerships
  - Strategic priorities for collaboration
  - Working together on TICs
- Strategic relationships with government departments and the third sector
- Collective partnerships with key business sectors

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Working with business

RCUK works with over 2500 businesses in sectors ranging from engineering to insurance, broadcasting to biotechnology.

Business Engagement

- Collaboration with business can deliver high quality products and economic growth
- Universities are an integral part of the skills and innovation supply chain
- Knowledge spillovers
  - Publicly funded research raises the productivity of R&D in the private sector through knowledge spillovers
  - Encourages companies to do more R&D themselves
  - Also leads to inventions that can be commercialised through licensing to private companies or via the formation of new start-up companies

Delivering highly skilled people

- Direct contribution to the labour market beyond academia
- Ensure RCUK mechanisms encourage people exchange between research base and user partners at all career stages:
  - Internships
  - Collaborative Studentships
  - Mid and Late Career Placement Schemes
- Skills contribution

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Infrastructure

- Alongside this we invest in and provide access to a full range of world-class research facilities, both in the UK and abroad
- For example the establishment of the Daresbury and Harwell Science and Innovation Campuses provides a unique environment for innovation and business growth
  - Over 4,500 people now work on the Harwell campus in some 100 organisations

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Continued Investment

- Importance of continued government spending for innovation
  - A cut of £1 billion in annual spending would lead to a fall in GDP of £10 billion (Haskel and Wallis, 2010)
  - Strategic delivery of focused research programmes, alongside nurturing innovative basic research
  - Risky research is vital and unlikely to be paid for by private sector (need for 'transformative research')
  - The internet, mobile communications and life sciences revolutions impossible without earlier investments in the fundamental science and research behind these technologies
  - Long-term strategy which is more than research funding

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Continued Investment

- Growth of the Science budget
  - Doubled between 1997 and 2007, but what about the future?
  - The US intends to double its scientific research budget between 2006 and 2016; Australia, Canada, China, France and Germany also intend to increase spending significantly
- Investment in R&D has been far lower in the UK than in many other countries; in 2004, the UK spent 1.1% of GDP on business R&D activities compared with an average of 1.7% for France, Germany and the United States

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Accessible Information

- Free provision of publically funded research
  - The Open Access agenda
- Better access to research data
  - Transparency and replication
- Better use of existing resources
  - Administrative Data Taskforce

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New ways of thinking about innovation

- Move from linear model to an innovation ecosystem
- Acceptance of the co-creation model and the role of partnerships, including with the public
- Research is vital at all stages of innovation
- Recognising the importance of the service sector (80% of economies?)
- The role of social innovation (wikipedia etc)
- Innovation for public, not just economic, good
- Not all innovation is good!