

The End of the Beginning

NESTA's response to the Sainsbury Review of Government's Science and Innovation Policies

NESTA welcomes Lord Sainsbury's Review, published on 5 October 2007. It contains a detailed analysis of the innovation challenges facing the UK and represents a comprehensive survey of the Government's existing innovation policy. Its recognition of the compelling need to understand innovation in the UK's service sectors, and to move away from R&D spend and patent production as proxies for innovation performance are particularly welcome.

The Government, led by the newly created Department for Innovation, Universities and Skills (DIUS) and the Technology Strategy Board (TSB), now has two challenges: to implement the best of the Review's recommendations and to develop and deliver a bold innovation policy agenda that is tailored to the needs of all sectors of the UK economy.

To meet the weight of expectations placed upon them, it is critical that the Prime Minister gives DIUS and the TSB the authority to work across the business community and Whitehall to achieve their objectives. In implementing the recommendations, they must be careful to concentrate not only on the production of knowledge and STEM-skilled people, but on making sure both are put to effective use for the benefit of the UK. Importantly, the Review's focus on building on strengths, particularly in existing high-tech clusters around research-intensive universities, should not be misinterpreted as an acceptance of a 'two-speed' innovation system.

A clear and positive message about the importance of innovation

Winning the 'race to the top'

Comparing internationally, variations in levels of innovation are related to economic growth and trade performance.¹ In the changing global economy, the UK's growth will be increasingly dependent on its ability to successfully exploit new ideas. As a result, NESTA strongly supports the positive tone set by the Review: that the UK must consciously engage in a 'race to the top'.

Supporting the UK's 'innovation ecosystem'

Innovation is now widely recognised as a multi-directional process that involves multiple actors – an ecology rather than a pipeline.² A country's capacity to innovate is therefore highly dependent on the interactions of the different elements that participate in the innovation process. The Review recognises this complexity, describing innovation as occurring within an 'innovation ecosystem'.³

The UK needs new targets for innovation

The UK underperforms on traditional innovation indicators such as public and private sector investment in research and development (R&D),⁴ private sector engagement in innovation activity and the number of patents registered.⁵

However, as the Review recognises, these traditional metrics are flawed. They focus on the 'high-tech' manufacturing businesses that represent only 2.5 per cent of the UK's economy.⁶

The Review therefore recommends that rather than focusing on traditional indicators, innovation policy should build on the four goals of the TSB:⁷

- To help our leading sectors and businesses to maintain their position in the face of global competition;
- To stimulate those sectors and businesses with the capacity to be among the best in the world to fulfil their potential;

1. As defined by the Department of Trade and Industry (DTI). See DTI (2003), Innovation Report, Competing in the global economy: the innovation challenge, (DTI, London).

2. NESTA (2006), The Innovation Gap: why policy needs to reflect the reality of innovation in the UK, (NESTA, London).

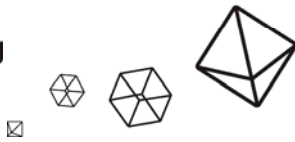
3. Lord Sainsbury of Turville (2007), The Race to the Top – a Review of Government's Science and Innovation Policies, (HM Treasury, London), p.4.

4. The UK's 'R&D intensity' (total expenditure on R&D as a percentage of national GDP) at 1.73 per cent of GDP in 2004, is below that of Japan (3.18 per cent), Germany (2.5 per cent), France (2.14 per cent) and the United States (2.68 per cent). Public sector R&D expenditure also remains comparatively low despite significant increases in the UK's science budget in the last few years; net expenditure on science, engineering and technology by UK Government departments has risen in real terms from £1.45 billion in 1997-8 to an estimated £3.45 billion by 2007-8. See Department of Trade and Industry (2005) Science Budget Allocations 2005-06 to 2007-08, May 26 2007, (DTI, London).

5. OECD (2005), Main Science and Technology Indicators (MSTI): 2005/2 Edition, (OECD, Paris).

6. NESTA (2006), The Innovation Gap: why policy needs to reflect the reality of innovation in the UK, (NESTA, London).

7. Lord Sainsbury of Turville (2007), The Race to the Top – a Review of Government's Science and Innovation Policies, (HM Treasury, London), p.37.



- To ensure that the emerging technologies of today become the growth sectors of tomorrow;
- To combine all these elements in such a way that the UK becomes a centre for investment by world-leading companies.

Intelligently developed, these new goals should lead to better and more appropriate innovation policies that are more relevant to a greater share of the UK's economy.

Policy must recognise that different sectors innovate in different ways

The Review recognises that 'we need to understand better how innovation takes place in the very different industries which make up the services sector'.⁸ However, it goes on to suggest that applying existing policies to the service sectors will be sufficient to support innovation there. This is unlikely to be the case.

The majority of current initiatives focus on supporting formal R&D and commercialisation. However, in many service sectors, innovation relies on other types of innovation: the exploitation of existing technologies or the development of new business models.⁹

Recognising this, the Department for Business, Enterprise and Regulatory Reform (BERR) has commissioned research on broader categories of innovation, including innovation in services.

The BERR-NESTA Sector Innovation Groups (SIGs) will be completed in early 2008 and deliver recommendations for future Government action geared towards supporting innovation in six service sectors under-served by traditional innovation policy.

Chapter 3: A larger and more strategic role for the TSB

An innovation champion with a broader remit

NESTA welcomes Recommendation 3.1 that 'the TSB should be given a new leadership role, with more formal relationships with the RDAs, government departments and Research Councils' to co-ordinate public sector technological innovation activity and leverage public sector resources.

NESTA also welcomes Recommendation 3.6 that the TSB work more closely with knowledge-intensive service sectors where technological innovation is important, such as the creative industries and financial services.

A clear opportunity – but with attendant challenges

This increased independence and new leadership role presents an opportunity for the TSB to develop bold new initiatives that capitalise on its new position as an executive non-departmental public body.

However, if the TSB is to substantially improve the UK's innovation performance, its new high-level objectives must quickly be converted into more detailed goals.

Further, the TSB is a newly-reinvigorated entity with a new Chief Executive and governed by a new Board. If it is to deliver on the high expectations set out in the Review, it must be given the space and political authority to rapidly establish its remit – across both the business community and Whitehall.

Chapter 4: Accelerating and improving knowledge transfer

Developing knowledge transfer activities

Recommendations 4.3 to 4.6 call for a more formulaic Higher Education Innovation Fund, increased support for knowledge transfer between business-facing universities and SMEs, firmer research targets for Research Councils, doubling the number of knowledge transfer partnerships (KTPs) and the introduction of 'mini-KTPs'.

Policy must focus on knowledge exchange

Many of these recommendations build from a set of policies that are firmly rooted in a 'linear model' of idea production in universities followed by commercialisation in industry. This model remains relevant in very few sectors; most involve multiple exchanges of knowledge over an extended period of time – 'knowledge exchange', rather than 'knowledge transfer'.¹⁰

In developing policy for 'knowledge exchange', the Government should supplement supply-side initiatives with ways to stimulate business demand from all sectors. For instance, the Innovation Voucher scheme developed in the Netherlands and currently being piloted by Aston University provides high-growth SMEs with vouchers to purchase academic support.¹¹

Developing a strategy to support knowledge transfer in FE

Recommendation 4.7 suggests that DIUS develop a strategy to support and promote knowledge transfer in Further Education (FE). This includes through staff secondments, KTPs and raising business awareness of FE knowledge transfer activity.

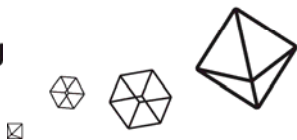
FE colleges have long been an overlooked part of the knowledge base. NESTA therefore welcomes an increased focus in exploiting

8. Lord Sainsbury of Turville (2007), *The Race to the Top – a Review of Government's Science and Innovation Policies*, (HM Treasury, London), p.5.

9. NESTA (2007), *Hidden Innovation: how innovation happens in six 'low innovation' sectors*, (NESTA, London).

10. NESTA (2006), *The Innovation Gap: why policy needs to reflect the reality of innovation in the UK*, (NESTA, London).

11. Aston University Press Release (27 November 2006), 'Aston University pilots revolutionary innovation voucher scheme', available at <http://www.aston.ac.uk/downloads/bpu/index2.pdf> (accessed 5 October 2007).



their potential, particularly in collaborating with SMEs.

Obtaining IP is only one step in obtaining value from it

The Review recommends open access and electronic searching of the UK-IPO patent registration database to make the processes of application and award more efficient (Rec. 5.1).

While this is welcome, if potential innovators are to make the most of their ideas, they not only need to protect them but to be able to make strategic choices as to how to best develop their intellectual property portfolio.

The Government should therefore work with UK-IPO to develop a business support product which focuses on both IP tactics and strategy. This could be modelled on NESTA's 'IP Accelerator'.¹²

Chapter 7: Giving people the skills for innovation

Welcome boost for STEM subjects

It is estimated that by 2014, the demand for science and technology professionals will increase by one fifth, compared to an increase for all other occupations of 4 per cent.¹³ The Review recognises this need, focusing a quarter of its recommendations (Recs. 7.1 to 7.17) on boosting STEM skills.

Specifically, the Review recommends the launch of a major campaign to improve the teaching of STEM subjects in school and to increase the number of young people studying these subjects. It also recommends that careers advice is built into the curriculum for pupils and into the Continuing Professional Development for teachers. Finally, it recommends the creation of a National Science Competition.

NESTA welcomes these efforts to ensure that STEM supply meets demand. Without such measures, efforts to boost the knowledge base in the UK will be undermined.

A need to keep STEM graduates, not just train them

STEM graduates are in high demand and are highly mobile. Moreover, the largest employers of STEM-skilled people tend to be global companies. The UK needs to ensure that it does not simply train large numbers of STEM graduates as a gift to the world.

Policies must therefore concentrate on both developing and retaining STEM graduates. This could be done directly, for instance through the application of residency requirements to STEM schemes, or indirectly by further investing in a world-class science infrastructure or ensuring that the UK remains an attractive location to live and work.

But a further need for broader innovation skills

STEM skills alone are rarely enough to turn young people into innovators. Cross-disciplinary skills such as problem-solving, leadership, adaptability, creativity, collaboration and interpersonal skills are central if people are to develop the capacity to absorb knowledge and recombine ideas into new products and processes. Many of these skills are most effectively developed at an early age.

As a consequence, to ensure an integrated skills pipeline for innovation, NESTA would like to see DIUS, BERR and the Department for Children, Schools and Families (DCSF) working together to recognise the importance of these skills in school teaching and the school curriculum.¹⁴

Chapter 8: Making Government more innovative

Innovation is a cross-departmental issue

The influence of framework conditions, such as regulation and taxation policy, means that innovation is inherently a cross-departmental issue. All government departments should act to stimulate or be hospitable to innovation elsewhere in the economy.¹⁵

Recommendation 8.2 states that the Director of Innovation in DIUS should produce an annual 'Innovation Report on the innovation activities of DIUS, including the Technology Strategy Board, other government departments and the Regional Development Agencies'.

Such an Innovation Report has the potential to be a powerful tool for DIUS in understanding and driving innovation across the UK's economy and society. Given how important 'non-innovation policy' can be in stimulating or hindering innovation, NESTA is pleased that Recommendation 8.3 recognises that innovation should be 'embedded in Departmental Strategic Objectives'.

Using the 'power of the purse' to stimulate innovation

Recommendation 8.8¹⁶ announces further reforms to the Small Business Research Initiative (SBRI) so that it more closely resembles its US counterpart. While this is welcome, the SBRI governs only a small proportion of the £125bn Government spends each year¹⁷: in future, DIUS should therefore take further steps that look at procurement far beyond the narrow remit of the SBRI.¹⁸

12. The NESTA IP Accelerator is a module of its mentoring programme focused on the strategic importance and management of IP. The module is tailored by expert practitioners to the particular requirements of small innovative businesses, which often fail to understand the true value of their intellectual property and lack the skills to effectively exploit it.

13. SSDA (2006), Working Futures Report 2004 – 2014, available at <http://www.sdda.org.uk/PDF/Working%20Future%2020042014%20National%20Summary%20R%20060215.pdf> (accessed 5 October 2007).

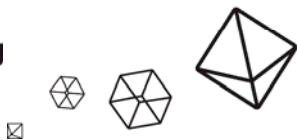
14. NESTA (2007), Education for innovation, (NESTA, London).

15. NESTA (2007), Hidden Innovation: how innovation happens in six 'low innovation' sectors, (NESTA, London).

16. The second one (on p.131) – there are two Recommendation 8.8s.

17. HM Treasury (2007), Transforming Government procurement, (HM Treasury, London).

18. Luke Georghiou (2007), Demanding innovation: lead markets, public procurement and innovation, (NESTA, London).



Chapter 9: Developing regional policy to support innovation

RDA's should play a more active role in promoting innovation

The Review recognises the 'potential of RDA science and innovation policies to drive regional economic growth'.¹⁹

Recommendation 9.2 calls on the RDAs to direct further resources to activities which support science and innovation, including TSB programmes, Knowledge Transfer Partnerships between universities and businesses, high-tech clusters around universities and a nationally-agreed specification for proof-of-concept funding.

Making businesses 'investor ready'

Recommendation 6.3 is right to recognise that proof-of-concept funding should include an element of 'investor readiness'. However, NESTA believes that the Government should go further and develop a specific 'investment readiness' business support product as part of the Business Support Simplification programme. This would ensure that early-stage businesses are aware of the types of finance available, which ones are most suitable for their business objectives, and how to focus on the sound business practices that will attract investment.

RDA's should place their ambitions in a national context

It is critical that regions build on their specific strengths and focus on identifying their unique capabilities and challenges. However, many regional innovation strategies are very similar. Of England's nine regional innovation or economic strategies, eight include biotechnology or health sciences as a priority area.

This similarity of approaches inevitably leads to competition. But it is not clear exactly how many biotechnology hubs the UK really needs or can sustain, and this duplicative approach may waste resources. This number of competing efforts may also be counterproductive – preventing the formation of critical mass at any one location. Regional innovation strategies must complement each other and work towards national targets.²⁰

The UK must avoid a 'two-speed' innovation system

With too-great a focus on the UK's small subset of 'research universities' and the high-tech clusters that surround them, the UK runs a risk of developing a 'two-speed' innovation system. To prevent this, the UK must recognise the role of all regions in its ecology of innovation – and ensure that innovative clusters and cities are well-connected to the areas that surround them.²¹

Chapter 10: Supporting collaborative activity

Recognising the need for international collaboration

As the Review recognises, 90 per cent of the world's scientific output is produced outside the UK.²² It therefore recommends that the TSB has more of an international focus, that it works closely with UKTI to develop a strategy to enhance the UK's position as a place for investment by world-leading companies, and that it takes over support for the EUREKA programme from DIUS (Rec. 10.3). In addition, Recommendation 10.1 says that the Research Councils UK (RCUK) should focus resources abroad into single points of contact to 'raise the profile of the RCs and promote the excellence of the UK research base'.²³

Supporting domestic collaboration

With 'open innovation' systems becoming increasingly important, it is not only the UK's universities that need to collaborate, and not only internationally. UK businesses need to actively engage with other domestic businesses and universities. However, small businesses often do not have the knowledge to engage in such processes.

A nationally branded, regionally delivered Innovation Advisory Service should be developed to actively facilitate open innovation. This should build on the existing regional innovation advisory services, and would ensure that all regions have a core offering to businesses to support open innovation. Crucially, it must be led by highly skilled and credible advisors and work with businesses from all sectors.

The End of the Beginning

Lord Sainsbury's Review of Government's Science and Innovation Policies does just that: reviews current policies and makes recommendations for their improvement. However, it is necessarily limited by its remit.

Existing governmental policies are firmly rooted in a long history of support for science, with 'innovation' in a broader sense only appearing in the last few years. Moreover, as the Review recognises, the UK innovates as part of an international system. However, for the UK, this includes England's 'near neighbours': Wales, Scotland and Northern Ireland, all of which are only partially covered by the Review's recommendations.

Lord Sainsbury has produced an authoritative review and set a challenge to the Government's new innovation architecture. It is now their job to meet that challenge. To paraphrase Churchill, this is not the end of the innovation story, nor is it even the beginning of the end, but it is the end of the beginning.

19. Lord Sainsbury of Turville (2007), *The Race to the Top – a Review of Government's Science and Innovation Policies*, (HM Treasury, London), p.7.

20. NESTA (2007), *Innovation in UK Cities*, (NESTA, London).

21. NESTA has developed an 'Innovation and Place' research programme, which aims to explain the impact of innovation on the economic performance of cities, regions and other territorial spaces, and the differences between 'places' in their ability to innovate. For more information, see http://www.nesta.org.uk/information/policy_and_research/research_in_progress.aspx (accessed 5 October 2007).

22. Lord Sainsbury of Turville (2007), *The Race to the Top – a Review of Government's Science and Innovation Policies*, (HM Treasury, London), p.153.

23. *Ibid.*, p.157.