

Russell Group submission to inquiry on scientific infrastructure

1. Introduction

- 1.1 We welcome this opportunity to contribute to the House of Lords Science and Technology Committee's inquiry into the state of scientific infrastructure in the UK.
- 1.2 The Russell Group represents 24 leading UK universities which are committed to maintaining the very best research, an outstanding teaching and learning experience and unrivalled links with business and the public sector. Our universities are no ivory towers but rather work hand in glove with businesses - they contribute £30 billion a year to the UK economy and much of this is founded on critical mass and high concentrations of excellent research and cutting-edge scientific infrastructure.

2. Current availability and status of scientific infrastructure

- 2.1 We note the Committee states that it does not intend to consider scientific infrastructure that can be funded within individual university budgets. However, such infrastructure is a critical, and underpinning element of the UK's wider resource, which is in many ways as important (and perhaps even more so in some areas) than national infrastructure.
 - (a) Many of the UK's national medium and large scale facilities are held within universities and run on consortia-based models.¹
 - (b) There is an argument that aggregations of smaller scale equipment should be considered as regional or national facilities.
 - (c) The value of large-scale national infrastructure, such as synchrotrons, depends on universities from which emerge the scientific problems and resource to undertake research. University-based teams who work in national facilities need equipment in their own universities to design and prepare experiments through which the value of national infrastructure is realised.

¹See for example, the EPSRC National Centre for III-V Semiconductors hosted at the University of Sheffield (<http://www.epsrciii-vcentre.com/Home.aspx>) and the EPSRC and BBSRC funded 850 MHz Solid-State NMR Facility hosted at the University of Warwick (<http://www2.warwick.ac.uk/fac/sci/physics/research/condensedmatt/nmr/850/>).

- 2.2 We trust that the Committee will take into account this wider context of scientific infrastructure available to UK researchers within this inquiry.
- 2.3 To stay at the forefront of their field, researchers need access to cutting-edge facilities and equipment at all scales. Very large, specialist infrastructure such as synchrotrons, neutron sources and telescopes are sometimes operated on an international or European basis. However, the UK is also largely responsible for a number of facilities, such as the ISIS (neutron source) and Shared Laser Facility at Rutherford Appleton, and the Diamond Light Source at Harwell. Facilities such as these are critical to maintaining the competitiveness of UK science. The UK cannot afford to become complacent and expect international facilities to take the place of first-class UK facilities.
- 2.4 UK universities are implementing actions to achieve greater efficiency and value for money from public funding and we know that the Research Councils are also under significant pressure to demonstrate savings. However, it is important not to confuse savings with productive efficiency, where greater output is achieved for same or less input.² For example, we understand that STFC is considering reducing the running time of ISIS to around 60 days next year; this will impact on fundamental and industrial research programmes, training and the UK position in neutron science. Instead, we should like to see the Research Councils work collectively to increase scientific output from our world-class facilities such as ISIS and increase access so that this can be achieved.
- 2.5 Within the Research Council 'family', greater emphasis should be placed on breaking down barriers and encouraging cross-Research Council support and shared responsibility for essential national infrastructure.
- 2.6 Nevertheless, the majority of research undertaken in the UK relies upon access to small and medium-scale research infrastructure, much of which is located within leading research-intensive universities. The quality of this research infrastructure is an important determinant in the choices made by leading researchers to work in the UK and of business to work with those universities.
- 2.7 The growth of asset sharing across the higher education sector is changing the broader landscape of research facilities. When access to facilities is combined through consortia and broadened to a wider pool of users – including both academics and

² A recent report to the Department for Business, Innovation and Skills highlights, though examples from UK universities, that efficiencies often require investment. *Making the Best Better* <http://www.n8research.org.uk/assets/files/EfficiencyReportFinal.pdf>

commercial partners – individual ‘small’ pieces of equipment are transformed into a much larger scientific infrastructure.

- 2.8 UK research success relies both on investment in universities and maintaining and developing critical, underpinning national research facilities and e-infrastructure. Research increasingly needs infrastructure not just for ‘doing’ but also for sharing. As we move towards greater ‘openness’ in science and research, universities’ reliance on infrastructure provided through the JANET network and national support infrastructure that supports universities at a national level will only increase, and these will need to be supported. Jisc itself is undergoing a transition in governance and funding, and much e-infrastructure and associated support survives on uncertain financial footing and is at risk to short-termism. For example, in the light of the Government’s current open data agenda, the removal of funding for the Arts and Humanities Data Service looks at best premature.

3. Long-term needs, setting priorities and funding

- 3.1 The UK needs a long-term plan for investment in research, innovation and teaching infrastructure and a stable funding environment will ensure the UK can continue to compete internationally.
- 3.2 Our universities must not lose the autonomy to invest in areas of scientific opportunity identified by our world-leading researchers. A top-down policy of ‘picking winners’ will only succeed where there is a critical mass of excellence in place. Recurrent formula funding for capital, based on research excellence, should be reinvigorated and provided in a way that promotes institutional autonomy and innovation.
- 3.3 As well as dealing with a major funding shortfall from cuts in recurrent capital spend and making significant efficiency savings through equipment sharing and similar initiatives, universities have also had to cope with increased targeting of funding by Government. The move from formula-based recurrent to targeted capital funding raises a number of challenges for universities that impact on their operations.
- (a) Universities must take a long-term approach to capital planning, reaching beyond timetables set by Government. Furthermore, universities are obligated to demonstrate their financial sustainability to funding councils and thus significant spend, such as on large capital projects, needs to be undertaken in a managed way.
 - (b) The on-going running costs associated with any new capital infrastructure must be met long after the initial funding has run out. In addition to maintenance and running costs, technological advances mean that scientific equipment can become obsolete in a relatively short timescale and require upgrading to maintain a facility’s capabilities and competitiveness.
 - (c) These general running costs are compounded by the requirement to meet energy-related targets both to reach external commitments, such as funding council carbon targets, and to control increasing institutional energy costs. As

a result, the most efficient and sustainable means of spending capital funds may be through refurbishment³ – bringing old and out of date buildings up to modern energy and educational standards – rather than in new builds which might have greater immediate appeal.

- 3.4 In the latter part of the current spending round period, the Government has re-injected capital funding into research through targeted schemes, e.g. graphene and synthetic biology, or leveraging non-Government investment such as through RPIF and TSB funding. In total, there has been a welcome reinjection of over £1.1 billion since capital cuts for the research base were announced in the 2010 Spending Review. However, the new 2014-15 capital funding total (£1.008 billion) is still only £47 million more than what might have been expected by increasing the pre-Spending Review capital figure for 2010-11 (£853.6 million) by 3% a year to account for inflation – it also comes with fewer freedoms.
- 3.5 With reductions in formula-based recurrent capital funding and the reductions in available funding for research equipment as a result of Research Council efficiency measures, the universities have had to find new ways to invest in and maintain infrastructure. HEFCE reported on the financial health of the sector in November 2012 and noted that there has been a major change over time in how universities expect to fund capital investment.⁴ In 2009-10 capital grants (primarily from Government) provided 49% of funding, while internal cash (from operating surpluses and reserves) funded 11%. By 2014-15 the sector is forecasting just 12% of capital funding from grants and 74% from internal cash.
- 3.6 Over the five year period from 2012-13 to 2016-17 Russell Group universities plan to invest around £9 billion in capital and infrastructure projects primarily from their own resources.⁵ These investments are necessary to ensure that the UK's leading universities continue to provide world-class facilities for teaching and research. They include refurbishment of existing estate and investments in new sites and buildings.

³ The latest round of HEFCE's revolving green fund for improving energy efficiency is £20 million, which, based on the last round, may fund around 50 projects – a small but important contribution and institutions do not have to make a matched contribution to access this money.

⁴ http://www.hefce.ac.uk/media/hefce/content/pubs/2012/201230/financial_health_112012.pdf

⁵ Based on initial reports from Russell Group universities' capital projects planned or already being implemented.

Research Partnership Investment Fund (RPIF)

- 3.7 The success of the RPIF has demonstrated that our universities are ready to do business with public and private partners and that those partners also see great benefit in such collaborations.
- 3.8 RPIF has undoubtedly been very useful in securing outside investments, but a more strategic approach to RPIF could be achieved with a longer-term and more flexible initiative having either an open-ended time period for putting forward proposals, or at least a clear set of proposal closing dates known well in advance.
- 3.9 If business is to be encouraged to engage more extensively in future rounds of RPIF, then a lower proportion of matching may be required and/or sufficient flexibility allowed to include more in-kind and other non-financial contributions.
- 3.10 The speed with which RPIF bids had to be made means that they were likely to be more 'tactical' – typically projects that were already under consideration and/or involving partners with a strong existing relationship with the universities involved.
- 3.11 A longer-term perspective would also fit with business planning cycles. Businesses typically look five or more years ahead in making major capital investments so the longer lead-time universities have to talk to business about potential investments, the better quality of bids that can be put forward, the wider universities will be able to look for partners, and the more likely that they will be of strategic importance.

4. Governance structures

- 4.1 Our universities have had to respond to the changing pressures in constrained economic times and the push for efficiency in the higher education sector. Funding from the Engineering and Physical Sciences Research Council (EPSRC) has been critical to developing asset sharing initiatives through regional consortia such as GW4, M5, N8 and SE5. Whilst national infrastructure is of course important, the significance of geographical proximity of researchers to scientific infrastructure cannot be underestimated.
 - a. The 'M5' consortium of universities (Birmingham, Nottingham, Warwick, Leicester and Loughborough), has launched a new website which includes a searchable database detailing each piece of equipment that can be shared across all M5 universities. The initiative is designed to boost the potential for research collaboration and ensure expensive equipment can be used efficiently.⁶

⁶ <http://www.m5universities.ac.uk/facilities/>

- b. UCL and Imperial College London have developed a joint centre for nanotechnology. Opened in 2006, it provides state of the art facilities and a critical mass of research activity linking across departments in both universities and out to commercial communities.
- 4.2 Our universities will not flourish if they are over-regulated or are too restricted in how they can spend resource and capital funds. International research shows university autonomy leads to better outcomes and this is key to our future success. Our world-class universities need to have the freedom to invest in infrastructure that will ensure they remain internationally competitive.
- 4.3 Long-term curiosity-driven research produces the biggest economic pay-offs in the long run. The expertise to understand the major national and international research challenges and opportunities for innovation in science and engineering lies within our research-intensive universities. The more constraint is put upon researchers the less likely they will be able to sustain the UK's role in leading world-class cutting-edge research. So, the more Research Councils are constrained to focus investment on perceived current needs in Government, the less likely they will be able to sustain the UK's leading edge in the long run. This goes against the Haldane Principle and, taken to its extreme, could deprive the UK of investment in up-coming areas of knowledge and competitive advantage arising from the research base.
- 4.4 As a current example, recent allocations of research capital funding announced by Government – while very welcome and absolutely necessary – have given rise to some concern about the level of top-down direction apparently involved. Research priorities must be established through appropriate governance procedures involving the research community, potential user communities and other key stakeholders as required.
- 4.5 RCUK's strategic framework for capital investment demonstrates the value of drawing on expertise from the research community to assess the needs for scientific infrastructure.⁷ However, it is important that each stage of the decision-making process is transparent – from gathering input through open consultation to determining funding priorities – to ensure that decisions are not swayed by short-termism and partisan interests.

⁷ *Investing for growth: Capital Infrastructure for the 21st Century*
<http://www.rcuk.ac.uk/documents/publications/RCUKFrameworkforCapitalInvestment2012.pdf>

5. Partnerships

- 5.1 Universities lost an important source of investment in infrastructure and a channel for investment of European funding in science with the abolition of the Regional Development Agencies (RDAs). In 2008/09, BIS reported that English RDAs spent over £300m on innovation infrastructure.⁸ The 39 Local Economic Partnerships (LEPs) are new and relatively untried bodies and it remains to be seen if they will take a similar approach to investing in scientific infrastructure to underpin regional research and innovation.
- 5.2 There are significant opportunities to use EU regional development funding to support research and innovation activities that can underpin sustainable growth. As ERDF, ESF and parts of EAFRD are brought together into an 'EU Growth Programme' there is a real opportunity to radically overhaul the governance and reporting structures and to foster the support of projects that will deliver meaningful economic outcomes (rather than focusing on those where reporting against expenditure plans is easier, as has sometimes been the case with ERDF).
- 5.3 The Russell Group has proposed to the European Commission that EU structural funding could be used in some of the newer Member States, in Eastern Europe in particular, to develop centres of research excellence that would enable them to compete effectively for Horizon 2020 funding in the future. Rather than focusing on typical road and rail projects etc, funding could be used for R&D infrastructure and investments in intellectual capital to enable these countries to develop knowledge-based capacity and capability.
- 5.4 In the UK, we already have world-class centres of excellence in our research-intensive universities, so we can and should focus on developing them further. European structural funding could be used to develop, refurbish or expand key facilities.

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<http://webarchive.nationalarchives.gov.uk/20100407022214/http://bis.gov.uk/assets/biscore/innovation/docs/2009-innovation-report.pdf>