

Science and Research Cross-Cutting Review

Section A: University Science Research Funding

Recommendation A1:

The Government should continue its commitment to increasing investment levels in basic and strategic research.

Status: The Science Budget will rise from £1.9 billion in 2001 reaching £3 billion by 2006; the Government has recently announced the establishment of a 10-year investment framework for science and innovation, and that spending in this area will rise over the Spending Review 2004 period by more than the trend rate of GDP growth.

Recommendation A2:

Government should take the lead in moving the research funding system back on to a sustainable footing. But a satisfactory solution will not be found unless all stakeholders make an appropriate contribution.

Status: Government has consulted and continues to work closely with stakeholders on reforming parts of the Dual Support System and is in the process of implementing the proposed changes to improve the sustainability of research. This has been backed with additional funding in the 2002 Spending Review.

Recommendation A3:

In addressing the underfunding issue, Government and other funding partners should be guided by the principle that the key aim is to properly fund excellent research wherever it is to be found.

Status: The Government remains committed to funding excellent science wherever it is found.

Recommendation A4:

Improving sustainability is key to the long term health of the science and engineering base. But the pace which this moves forward needs to be balanced with the continued need for the UK to invest in new science.

Status: The balance between ensuring a sustainable science and research base and funding new science is clearly important. Sustainability will remain a high priority in the 2004 Spending Review and the balance between this and new science will be a key issue in development of the 10-year investment framework for science and innovation.

Recommendation A5:

All funders and users of the SEB, along with the HE sector itself, should work together to close the funding gap over a number of years.

Status: A Funders' Forum has been set up in order for funders of the SEB and the HE sector to consider their collective impact on the sustainability, health and outputs of the UK Research Base.

Recommendation A6:

There should be a strategic partnership between the Research Councils and the Funding Councils¹ which should ensure that the Dual Support system is co-managed coherently in the best interests of the UK Science and Engineering Base. Government has a role in establishing this partnership.

Status: There are several fora including Research Council and Funding Body representation to ensure the effective co-management of the Dual Support System. These include the recently established Funders' Forum.

Recommendation A7:

This strategic partnership between the Research Councils and Funding Councils should, in time, be extended to embrace other major funders of the Science and Engineering Base, including the research charities, government departments and industry, reflecting the recommendation in the recent Quinquennial Review of the Grant-awarding Research Councils that a Funders Forum be established.

Status: The Funders' Forum includes representation from Research Councils, Funding Bodies, research charities, government departments and industry.

Recommendation A8

The education departments² in the four countries of the UK, together with the Funding Councils in England, Scotland and Wales should address the under-funding problem in a concerted way.

Status: The Ministerial and officials groups to implement Investing in Innovation include representation from the devolved administrations, as do other relevant working groups.

Recommendation A9:

A new forum should be established at Ministerial level bringing together the science ministers from Scotland, Wales and Northern Ireland, together with the Higher Education Minister at the DfES, under the chairmanship of the Minister for Science and Innovation, who has a UK-wide remit. The forum should be shadowed at official level. Its terms of reference should include all issues relating to the UK SEB where devolution is relevant.

Status: A Ministerial Group has been set up to implement 'Investing in Innovation', chaired by Lord Sainsbury, shadowed by an officials' working group.

Recommendation A10:

The Government should in future take the view that continued public support for research at individual institutions will depend on institutions being able to demonstrate that they are recovering the full cost of research (including contributions from other activities). To put this another way, the Government should not in future underwrite shortfalls in research funding arising because of inappropriate management decisions or inadequate management systems within institutions.

Status: Government and the HE sector are in the process of implementing a range of changes to the arrangements for project costing and pricing, including a move towards calculating the Full Economic Cost of research at project level, through extension of the 'Transparent Approach to Costing' (TRAC) method.

¹ It should be recognised that the Department for Employment and Learning in Northern Ireland represents both the "Funding Council" and the department responsible for sponsoring Higher Education. As such, all responses use "Funding Bodies" rather than "Funding Councils".

² It should be recognised that within Northern Ireland, the Department for Employment and Learning is the sponsoring department for higher education funding, not the Department for Education.

Recommendation A11:

The Funding Councils should devise light-touch means of ensuring that universities are behaving appropriately when having regard to cost recovery across their portfolios of research. The aim should be to seek assurances to Government at the minimum cost to institutions.

Status: Funding Bodies are devising a light-touch Quality Assurance process to ensure universities are implementing TRAC (see Rec. A10) and aiming to recover full economic costs across their portfolios of research.

Recommendation A12

In return for Government accepting and acting on the recommendations for closing the research funding gap, other funders must recognise their responsibility to provide Government and other sponsors of research with the strategic information they need about their research plans. Government will need to be able to signal clearly to other research sponsors and to HEIs when research volumes planned are inconsistent with the level of public support planned and discuss with them what action is appropriate. A forum for such discussions should be developed under the wider strategic partnership among the sponsors that is recommended elsewhere.

Status: A Funders' Forum has been set up to enable funders of research to monitor and share information about their research strategies, funding levels and research volumes and provide a mechanism for wider discussion regarding these issues.

Recommendation A13:

The solution to the problem of ensuring a sustainable research base in universities should retain and protect the principle of Dual Support.

Status: The reforms to research costing and pricing retain the overall principle of Dual Support. This was reaffirmed by a letter dated 24 November 2003 from Lord Sainsbury and Alan Johnson to Vice Chancellors of Higher Education Institutions in England (also passed to the devolved administrations).

Recommendation A14:

A key component of any solution to the under-funding problem should be a clear statement about the purpose, scope and operation of the Dual Support system – especially the QR component - within a wider, plural funding system.

Status: 'Investing in Innovation' included a clear statement about the purpose, scope and operation of the Dual Support system (page 29).

Recommendation A15

We recommend that, in appraising the case for using their public funding (QR) to support a given piece of research, HEIs should test whether – and if so, to what extent – the following principles are satisfied:

Research should demonstrably contribute to the enhancement of the UK SEB or in some other way provide a net public good. An indicator of this may be that the results will be published openly in the academic literature and that any intellectual property generated by virtue of the research will vest in the university rather than with the funder (so that revenues generated by licensing or spin-outs benefit the university). Charity funders may, with the agreement of the university, choose to hold and exploit intellectual property themselves, or allow the university to do so;

The funder will have a research strategy which, while recognising the advantages of having a plural funding system, nevertheless takes account of

the strategy and priorities of other key funders, most notably the Research Councils and charities;

Research supported will be only of the highest quality. This implies that funders wishing to benefit from public support will need to demonstrate that they have project appraisal systems in place which ensure that only high quality research is funded; and

Access to research funds should not systematically be restricted to any specific research performers or group of performers. In principle, anyone with an idea for excellent research and the means to carry it out should be eligible for funding.

Status: Appendix A of the Governments consultation on sustainability³ contains a section on principles of pricing research projects. This states that the level of publicly-derived support provided to a project should be related to how the research provides a public scientific good; that the sponsor takes account of the strategy and priorities of other key funders; and that the research supported is of only the highest quality.

Recommendation A16

It is crucial that these principles be understood by all research sponsors and accepted by them as a key part of the landscape in a sustainable research system in the future. Government should make clear its support for them and an expectation that they will be applied by HEIs and accepted by sponsors as part of the quid pro quo in which the level of public support for research is increased.

Status: Joint Ministerial statement in November 2003 restated the Government commitment to the Dual Support system. The Government's consultation on sustainability and Funding Bodies review of research assessment, demonstrate Government support of these principles.

Recommendation A17:

Government should re-instate an earmarked capital funding stream for research infrastructure with the strong expectation that it will be available indefinitely and that no less than three years' notice should be given of it being substantially changed.

Status: SRIF2 is putting £1 billion into research infrastructure over the next two years (April 2004-March 2006). We anticipate similar levels of support for university research infrastructure in the next Spending Review period but there can be no commitment that this funding stream will be available indefinitely.

Recommendation A18:

The capital stream should be allocated by means of a formula based in some way on the volume and quality of research, as with the current Science Research Investment Fund, and the allocations should be set firmly for a number of years at a time. There should be caps and safety nets in place so as to smooth the effects of changes in allocation at institutional level between allocation periods.

Status: SRIF and SRIF2 were allocated on a formula basis. The next round is likely to be allocated along similar lines.

Recommendation A19:

³ *The Sustainability of University Research – A consultation on reforming parts of the Dual Support system*, DTI (2003)

Universities should be free to make their own research infrastructure investment decisions. But they should be encouraged to do so with a regard to the views of their major project funders, in particular, the Research Councils whose role in contributing to the health of the UK SEB gives them a legitimate interest in the provision and distribution of infrastructure within the HE sector. It will be important for such funders to recognise the need for universities to invest in support infrastructure and not simply front-line research facilities.

Status: Institutions are able to determine how they spend their allocations, subject to a light touch assessment by funders and the Research Councils who advise whether projects are broadly in line with RCUK's strategies.

Recommendation A20:

The earmarked capital stream should be set at a level which:

Allows the present infrastructure backlog to be adequately tackled by 2010;

Narrows the gap between the present levels of annual investment in maintenance and a level which would ensure that the substantial majority of the research estate is maintained fit for purpose;

Takes account of the contribution that some funders will make to long-term costs of research when universities recover the full economic costs of research from them or when such funders otherwise enter into strategic partnerships which involve contributions to infrastructure.

Status: We are in the process of commissioning an assessment of the impact of SRIF towards meeting these goals.

Recommendation A21:

As part of the process of accounting for their use of this infrastructure funding stream, universities should be able to demonstrate that investments are dealing with both the backlog and underpinning infrastructure and not simply for creating ever greater research volume capacity. We recommend that HEFCE consider asking universities auditors to verify this.

Status: The report DfES and OST are commissioning will show how SRIF is contributing to dealing with the backlog while at the same time allowing for some increase in overall volume.

Recommendation A22:

Universities should be required to find not less than 10% matching funds for the new capital funding stream.

Status: Under SRIF2 universities are required to find at least 10% matching funding except in cases where an institution can demonstrate that a SRIF2 project is funding a significant collaboration with another institution.

Recommendation A23:

The own-contribution requirement should be waived where universities are able to demonstrate genuine inter-HEI collaboration on investment projects along the lines developed for SRIF.

Status: as above (A22)

Recommendation A24

There should be increased investment in teaching laboratories in higher education. Teaching and research infrastructure funding streams should be designed with sufficient flexibility to allow individual institutions the ability to co-manage them

sensibly in the context of local needs and priorities. In particular, it should be possible to vire between the two streams in any year without limit so long as the original balance is recovered within three years.

Status: The Government is working to bring all university science and engineering teaching laboratories up to standard by 2010. Within England, a total of £60m is being made available for laboratories in years 2004-05 and 2005-06.

In Scotland, SHEFC does not ringfence funding for capital or teaching in this way. Institutions are funded through a block grant with the autonomy and discretion to use funds as they see fit, in order to meet strategic priorities.

HEFCW has separate streams of capital funding for research and teaching. The capital funding for research is joined with SRIF funding to maximise the available resource in a single, consolidated stream. While this arrangement does not admit virement, the discrete stream for teaching is intended to help address capital needs in this area.

Recommendation A25:

Having made clear to the HE sector its responsibility for recovering the full costs of research from all sponsors taken together, Government should signal also to research sponsors what is expected of them in the drive to achieve long-run sustainability of the Science and Engineering Base.

Status: Funders' Forum allows major funders to address together issues concerning the sustainability of the Research Base in terms of costing, pricing and investment, as well as sharing information about their research strategies. Stakeholders (including industry, charities and regional agencies) have been fully involved in the reforms to the Dual Support system. Other Government Departments have also been briefed on what is expected of them when funding research projects in the HE sector.

Recommendation A26

HEIs should understand and accept that a degree of internal cross subsidy from profit-earning activities into research within universities is healthy and indeed is to be expected in institutions with a strong research mission. The expectation should be that this will continue, though the extent to which it continues will be a matter for individual HEIs in the context of their own cost-recovery strategies.

Status: The Government continues to believe that cross-subsidy within HEIs is acceptable, and indeed healthy for institutions with a strong research mission. Such financial flows should be intentional, i.e. the result of conscious decisions by Vice-Chancellors in the context of the institution's strategy. Considering which departments should receive such flows, and monitoring their effect, requires better financial/management information.

Recommendation A27

The HE sector and the Funding Councils should consider building on the principles for public research support recommended earlier in this section by developing guidelines to help institutions to develop more robust pricing strategies. This should be done as part of the project (see recommendation A34) to build on the present TRAC management accounting systems. Any such guidelines should make clear that, subject to the overall requirement in relation to cost recovery, universities are free to take a view on the value to them of non-cost considerations when negotiating prices.

Status: The extended TRAC guidance, which guides universities on systems to support the pricing of research sponsored by funders such as charities, government departments and the European Union, recognises that universities should be free to negotiate prices according to the value of the research, including non-cost considerations.

Recommendation A28:

The overall price payable by Research Councils should be increased significantly, consistent with the additional funding universities receive through the Dual Support System. The increase could be phased in over time.

Status: The reforms to parts of the Dual Support system include an increase in the overall price payable by Research Councils, through the payment of a percentage of Full Economic Cost rather than all direct and some indirect costs. These reforms are phased over a period between 2004 and 2009. An additional £120M has been earmarked to enable Research Councils to increase the overall price payable for university research projects.

Recommendation A29:

The new arrangements should be designed so as to have the maximum impact on the behaviour of other research sponsors in respect of the amount they pay for their research.

Status: The reforms have been designed to enable other research sponsors to accept the TRAC methodology for costing projects and pay an increased proportion of the full economic cost of research, by following the behaviour of Research Councils. Funders of research have been fully involved in the reform project.

Recommendation A30:

Further work is needed to quantify what is needed and to design new arrangements. This work should include consideration of:

Those Research Council funding streams which at present attract no indirect cost contribution⁴;

The question of whether a significantly increased level of funding through the Research Council route would advantage particular disciplines at the expense of others;

The effect of any changes on the overall balance and rationale of the Dual Support system.

Status: The potential effects of the reforms to parts of the Dual Support system have been investigated and any changes in the overall balance will be monitored. The questions of those funding streams with no indirect cost contribution and the effect on different disciplines are being actively investigated.

Recommendation A31:

Government and the charity sector should consciously seek to work more closely in partnership with the aim of putting university research back on a sustainable footing and ensuring greater complementarity of their respective research missions and portfolios.

⁴ Note that this recommendation will have direct cost consequences in respect of the Royal Society and Royal Academy of Engineering fellowships which are funded through the Science Budget.

Status: The Research Base Funders' Forum includes representation from the charity sector, and charities are represented on the group overseeing implementation of the reforms to parts of the Dual Support system.

Recommendation A32:

In return for the Government making explicit HEI's freedom to provide support for charity funding from their public infrastructure funding (QR and capital – see recommendation A15) and for improved levels of Government investment, the charities should fund at least the full direct costs of the research they sponsor. They should remain willing to pay more than this – current or capital – where research meets a key strategic need of theirs which does not match in timing or volume the needs of other major funders or institutions.

Status: Government is involved in discussions with charities about which costs of research the charities might be prepared to sponsor.

Recommendation A33:

Government policy – to secure best value for money – need not change, but departments' assumptions about what prices will contain needs to adjust to the changed context. (See recommendation C16 which relates to the responsibility of departments to ensure the science base is able to meet their future needs.)

Status: Government Departments have been briefed on what is expected of them when funding research projects in the HE sector; that they should expect to pay the Full Economic Costs of research projects.

Recommendation A34:

Government departments should agree that TRAC methodology should in future be used as the basis for determining the full economic cost of their research. This will require on the part of the HEIs (see recommendation A42 below) a willingness to build on the foundations laid by TRAC to develop project costing systems.

Status: Government Departments have been briefed on what is expected of them when funding research projects in the HE sector, including the acceptance of TRAC as a reliable costing methodology.

Recommendation A35:

Prices for contract R&D for industry should reflect the value given and received by each side. This means that HEIs should charge at least at full economic cost.

Status: HEIs have been advised, through the TRAC methodology guidance, to charge at least full economic cost to industry.

Recommendation A36:

The HE sector and relevant representatives from industry should consider getting together to set out some broad guidelines to assist both sides in approaching the issues of costing and pricing industry-sponsored research.

Status: The HE sector and representatives from industry have considered costing and pricing as part of the Dual Support reforms, discussed at Funders' Forum. The Joint Costing and Pricing Steering Group also has a remit which includes: "To communicate effectively with HEIs and other stakeholders". In addition, the Lambert Review and DTI Technology Strategy also made recommendations which may assist in costing and pricing industry-sponsored research.

Recommendation A37:

Government should press the Commission to accept TRAC as the basis of calculating European Union indirect cost contributions to research on the basis of the full cost models. It should do this in time for FP6. However, Government should also seek to ensure that the Additional cost model is retained alongside the full cost models.

Status: Government has attempted to make TRAC less bureaucratic for universities by not enforcing the use of timesheets for academics; however this causes difficulties in enabling the European Commission to accept it as the basis for a costing methodology. At present the Additional Cost model is the most appropriate for UK Universities. We will be proposing that European funding should better reflect the true costs of undertaking research in future.

Recommendation A38:

The Government should accept the need to support EU Framework Programme research in UK HEIs through QR and infrastructure funding and should therefore take this into account when setting the levels of overall public support for research. For future Framework Programmes, the Government should seek to negotiate a greater element of cost recovery.

Status: The Government has made it clear that QR and other public funds may be used to support Framework Programme projects as these do not cover the full costs of the research they commission. The four funding bodies across the UK are responsible for the formulas they use to allocate QR. We will be proposing that European funding should better reflect the true costs of undertaking research in future.

Recommendation A39:

Core research funding should increase in order to ensure the appropriate balance with the dual support system. A permanent capital stream can make a significant contribution to this.

Status: Addressing the imbalance within the Dual Support System will be considered further as part of the 10 Year Investment Framework for Science and Innovation. It is clear that the research infrastructure funding through SRIF and SRIF2 is already making an important contribution.

Recommendation A40

Future spending reviews should take account of the need to maintain the broad balance of the Dual Support system. In addition, when QR levels are set in the future, regard will need to be paid to the strategic plans of other funders as shared with Government as suggested in recommendation A12.

Status: DfES and OST are working closely with the Treasury (HMT), to ensure science research proposals are based on sustainability. The Chief Secretary to the Treasury has written to the Government's Chief Scientific Advisor, stating that other Government Departments must be prepared to pay the Full Economic Cost (FEC) of their research they commission. A partnership with charities is to be established to maintain volume while addressing the gap in infrastructure investment.

Recommendation A41:

In making HEIs accountable for recovering the full economic cost of all research, Government should seek to minimise the costs of compliance by implementing a simple, low-cost mechanism which would give it a reasonable degree of assurance.

An example might be a statement by an institution's external auditors that taking one year with another, the full economic costs of research were being met sustainably.

Status: Funding Bodies are devising a light-touch Quality Assurance process to ensure universities are aiming to recover full economic costs across their portfolios of research.

Recommendation A42:

HEIs should put in hand quickly measures to ensure that they are able to identify the true costs of research at project level and by funder. They should build on TRAC as a management tool rather than just a reporting mechanism.

Status: The extensions to the TRAC methodology being implemented as part of the Dual Support reform include guidelines for institutions to use it in pricing research and managing research strategies as well as reporting costs. The TRAC methods also calculate the full economic costs of projects, for use by Research Councils in sponsoring research in HEIs.

Recommendation A43:

To assist the sector in delivering this next phase of development, HE representative bodies, key research funders and Government should develop the work started under the Transparency Review to embed robust and consistent management information systems across the sector.

Status: The TRAC methodology has been extended to calculate the full economic costs of individual projects in HEIs, through consultation with HE representatives and research funders.

Recommendation A44:

As a result of these measures, HEIs should aim – quickly – to be able to demonstrate that each of their main businesses (or all of their businesses taken together) are sustainable. This should be driven by sound business planning incorporating realistic income projections.

Status: Funding Bodies are devising a light-touch Quality Assurance process to ensure universities are aiming to recover full economic costs across their portfolios of research. The TRAC methodology has also been designed in order to be useable for teaching and other institution activities, as well as research.

Recommendation A45:

In return for the proposed injection of capital, HEIs should develop a research infrastructure strategy setting out the purposes to which they intend to put their funding. In using public funding, priority should, in general, be given to remedying maintenance backlogs first since it is in general more difficult to attract third party contributions to this sort of investment.

Status: Funding Bodies are monitoring the progress HEIs are making with their research infrastructure strategies.

Recommendation A46

The HE sector and institutions should review – and then take steps to improve – its performance in managing its working capital.

Status: The financial information that Funding Bodies have show that the sector overall has net current assets. Net current liabilities would be one factor taken into account in their assessment of institutional risk.

Recommendation A47

The Funding Councils should review with the appropriateness of the existing financial data which HESA gathers and publishes.

Status: This has been done. The Funding Bodies have contributed to the recent HESA review of Finance Statistics Return. Proposals for change are now out with the sector for consultation.

Recommendation A48

In reviewing the RAE and research funding, the Funding Councils should aim to reduce the current incentive to over-trade and to under-invest.

Status: We do not believe that the quality assessment arrangements proposed from the 2008 RAE announced in February (*RAE 2008 Initial decisions by the UK funding bodies, RAE 01/2004*) will provide any significant incentive to institutions to take on commissioned research that is not fully funded. The recent HEFCE review of research funding paid due attention to the need to minimise or abolish possible incentives to over-trade including in specifying fundable research volumes. The model financial memorandum between HEFCE and institutions (HEFCE 2003/54, December 2004) now includes a specific requirement that HEIs should recover the full economic cost of all of their activities taking into account the need to invest.

Recommendation A49

HEFCE and the other Funding Councils should look again at the appropriate gradient of funding between quality ratings, taking into account affordability and the need to provide encouragement for top quality departments as well as to help those below them that demonstrate the potential to improve. In the longer term they should look at the ratings themselves, and whether there need to be as many as at present. They should consider how best to fund weak and emerging critical disciplines in order to develop improved capability where it is both required and sustainable.

Status: HEFCE review the funding gradients annually in determining its grant allocations to HEIs. It remains their aim to stabilise the unit of funding to the highest rated departments while maintaining support for departments somewhat less highly rated that could aspire to achieve higher ratings.

HEFCW also reviews funding gradients annually with the same broad objective as HEFCE. They operate a strategic fund that allows, inter alia, opportunity for the development of capability. However, they do not have a scheme dedicated to that end. QR funding in Wales is provided for 3a and 3b rated departments. HEFCW has been remitted in 2004-05 to consider the dual objectives of maintaining and enhancing research excellence, whilst also supporting the growth of capacity and improved performance in emerging areas, especially those of significant importance to Wales.

HEFCE support capability development in ten selected disciplines through special funding, although HEFCW have no such fund.

SHEFC's Strategic Research Development Scheme (SRDG) funds research that supports national strategies intended to meet economic, social, healthcare, educational or other priority needs in Scotland and the UK, by providing funding for the research base that does not receive funding or significant levels of funding through the main Quality Research Grant because of their relative low levels of quality in the RAE.

The funding bodies' recent decisions on RAE 2008 (see above) include the introduction of a new graded quality profile better adapted to our funding arrangements.

Recommendation A50

The Funding Councils, in the review of the RAE, should carefully evaluate the 2001 exercise and take further steps to ensure that the system does not discriminate against applied research, interdisciplinary research, or secondments to industry.

Status: The funding bodies' decisions on RAE 2008 include a commitment to ensure the appropriate assessment of applied research along the lines proposed in the "Roberts" review. Further measures to ensure non-discrimination in regard to interdisciplinary research and secondments to industry will be announced as the more detailed rules and procedures for the exercise are finalised.

Recommendation A51

The Funding Councils should look again at the increase in the number of departments rated highly in the RAE but submitting a small proportion of their staff, and should aim to tackle the potential problems arising from this, perhaps by setting a limit to the amount of total research volume which can be deemed to be generated by each research active member of staff. As an alternative way of funding small pockets of excellence, institutions could be encouraged to develop research partnerships where academics from one institution could form part of another's RAE submission.

Status: The current funding arrangements attribute the same unit of funding to all eligible staff in departments receiving the same rating in the same subject – thus equalising the volume attributed to each researcher. HEFCE is considering how best to encourage collaborative research provision in context of our recent review of research funding.

SHEFC encourages research partnerships and collaborative research through SRDG and through schemes designed to pool resources and expertise and optimise the influence of international leadership.

Partnership is high on HEFCW's agenda and they operate one scheme targeted at capacity building through collaboration. They are considering what further action might usefully be taken on this front.

Recommendation A52:

There should be a moderate increase in funding for arts and humanities research, to continue the growth in the availability of project funding alongside continued growth in science project funding.

Status: Since 1999-2000, AHRB funding from HEFCE for research and postgraduate work has increased from £37.1M to £71.6M in 2005-06. This represents an average year-on-year increase of some 16.6%. Once the AHRB becomes a Research Council, it will be funded in a manner consistent with the other Research Councils.

Recommendation A53:

The continuing stream of capital funding proposed in the review should, proportionate to relevant income flows, encompass arts and humanities research as well as science.

Status: SRIF2 (unlike SRIF) encompasses arts and humanities.

Recommendation A54:

The Arts and Humanities Research Board should investigate the benefits which accrue from the exploitation of research in the arts and humanities, and how those benefits can be quantified and maximised, bearing in mind the discussion of the proper role for Government in section B.

Status: AHRB has developed and implemented a range of measures and approaches to address the assessment of benefits and increase exploitation of the results of research in arts & humanities. These include establishing a framework for assessment under the Monitoring & Evaluation Committee, seminars to encourage engagement and knowledge transfer, developing stronger links with stakeholders and users, and devising research programmes with particular relevance to society and other users.

Recommendation A55

Further resources should be made available for pay in higher education institutions, to ensure that HE institutions can meet the demands of the market. It is far more common now for there to be a variation in professorial salaries, but there is less variation at lower levels. This needs to change. There should be an explicit presumption that institutions should use any increase differentially to pay the rates required to recruit and retain key staff, and set this out in their human resources strategies, so that their salaries are altered to reflect national and international market forces.

Status: In addition to the overall funding for HE, the DfES is providing an extra £330 million to improve institutions' human resource capability between 2001-03 and 2003-04 and further £167 million between 04-05 and 05-06 through the Rewarding and Developing staff initiative. They have made it clear that institutions' human resource strategies are for all staff, including postdoctoral and other researchers. Increase in stipends and post-doc salaries are in line with the Robert Review recommendations. £5 million to support promising researchers within institutional HR strategies. New Academic Fellowships in 2004 will guarantee permanent positions. The DfES are to undertake a survey of staff time, which will be available next winter.

(No Recommendation A56)

Recommendation A57:

The three departments which have a direct interest in the work of the British Library should discuss with each other and the Treasury how they might better contribute to its work. The recommendations emerging from the Follett Review should be considered alongside the totality of the British Library's bid to the Spending Review in order that priorities are identified which would add most value for universities and the private sector.

Status: OST is currently reviewing the work of the Department for Culture, Media and Sport (DCMS) and its relationship with the British Library.

Section B: Knowledge Transfer

Recommendation B1:

Effective knowledge transfer from the SEB is essential for the UK to reap the maximum benefits from public investment in the SEB. Effective knowledge transfer requires a careful mix of public and private action. Public funding should be carefully directed to areas of market failure in line with the above analysis. We recommend further increases in public funding for knowledge transfer, within this framework.

Status: The 2002 Spending Review settlement provided significant increases in resources (see answer to Recommendation B9) to address identified market failures i.e. lack of seed funds (through University Challenge and HEIF) and lack of properly trained knowledge transfer practitioners staff (£1m funding provided in 2003 to support training for knowledge transfer practitioners).

Recommendation B2:

The Research Councils are the main source of public funds for the SEB and have a key role to play in promoting knowledge transfer. In line with their Royal Charters, they should continue to:

- Take account of user needs in their strategic planning and funding decisions;
- Fund research of relevance to their remits and importance to users jointly with users when the expected balance of public and private benefits justifies this;
- Promote knowledge transfer from their grant holders and Institutes.

Status: Councils are continuing to actively engage the full spectrum of their user communities in planning and funding activities, and are promoting a wide range of knowledge transfer activities from HEIs and Council institutes via knowledge and people flow, education and training, collaborative R&D and commercialisation activities. The Councils' significant contribution in this area was recognised by the Lambert and Innovation Reviews. Councils are currently developing plans and goals to increase their rate of knowledge transfer activities and level of interaction with business, as recommended by the Innovation Review.

Recommendation B3:

The establishment of RCUK provides an opportunity for the Research Councils to work better together on these issues at a strategic level. Likewise, the formation of the new Innovation Group and Knowledge Transfer Strategy Group and appointment of a Director General Innovation in DTI provide an opportunity for RCUK and DTI to work together more closely at a strategic level. RCUK should make these areas an early priority. The Quinquennial Review of the Research Councils recommended the creation of an earmarked knowledge transfer fund for the Research Councils. This should also be taken forward by RCUK, on the basis of a strategic overview of the Councils' current portfolio in this area. The overall aims of all this work should be to

- Ensure user needs are taken into account in the development of the RCUK forward vision for Research Councils' support for science;
- Build on current achievements in jointly funded research;
- Build on current achievements in knowledge transfer, particularly from their Institutes;
- Achieve more strategic and rapid participation in schemes such as LINK and Faraday;

Achieve greater co-ordination and synergy between Research Councils' work on knowledge transfer and that supported through 3rd stream funding to HEIs (see recommendations below).

Status: Through the RCUK platform, the Research Councils are increasingly working together, for example by launching the joint Research Councils business plan competition in November 2002 and are currently developing an RCUK Knowledge Transfer Strategy. Councils are also engaging collectively with OST and the DTI Innovation Group, particularly in contributing to the development of the Technology Strategy and delivery of the Technology Programme set out in the Innovation Review.

In autumn 2002, RCUK undertook an audit of knowledge transfer investments by the Councils and OST in selected universities to look at the effectiveness of existing schemes, barriers to knowledge transfer and gaps in current support. In response to the issues raised by the HEI sector, plans for an earmarked knowledge transfer fund were superseded by a "Proof of Concept Fund", which aims to increase the level of commercialisation of research outputs by providing funds to demonstrate the commercial potential of ideas arising from research supported by the Councils. A pilot scheme was launched in November 2003.

Recommendation B4:

DfES should ensure that HEIs work through UUK and with HEFCE to develop indicators to measure and celebrate the quality and volume of HEI departments' applied research, technology development and consultancy work of direct benefit to, and fully funded by, industry. HEIs should also be encouraged to provide appropriate incentives and rewards for their staff to become involved in work of this kind.

Status: In terms of technology development and consultancy, work on knowledge transfer metrics is being taken forward with HEFCE via the HE Business Interaction Survey which HEFCE administers.

HEFCE will be consulting shortly on the membership, assessment criteria and working methods of the assessment panels for the next Research Assessment Exercise. The consultation outcomes will inform the methodology for recognising and rewarding applied research in each subject discipline in the 2008 RAE.

Recommendation B5:

HEFCE should, working with other providers of research information (including Invest UK and Universities UK), consider establishing a database similar to that operated by SHEFC, which would provide detailed information about the range of research projects and interests of research groups across the sector.

Status: HEFCE has investigated the feasibility and likely cost of establishing such a database. It is felt that this would be very costly to set up and maintain, and whilst such a database could be valuable, it could only supplement, and not replace, provision for "users" to have access to well informed people working in a brokerage role to help them to specify their needs and to find the best person to help them.

Through HEROBAC and HEIF, HEFCE have encouraged HEIs to develop improved forms of professional support for interactions between HEIs and business, most HEIs have now developed ways of ensuring that their expertise and advice are easily available to business.

Recommendation B6:

DfES should ensure that HEFCE's review of research assessment procedures and related funding formulae to implement the development of the dual support system, as proposed in Section A of this report (recommendation A50), take appropriate account of high quality research of all kinds that research funding distributed by HEFCE may properly be used to support, including that jointly funded with business.

Status: The re-styled Research Assessment Exercise recently announced by the Funding Bodies has taken on board the demands for better recognition of applied and near-to-business research. The next RAE will have different assessment panel structures which will also be able to assess a greater range of discipline-specific research outputs than before to ensure that all kinds of research are given due weight and esteem. The Funding Bodies will be consulting shortly on the membership and operation of panels for the 2008 RAE.

Recommendation B7:

A further clear signal should be given that 3rd stream funding is intended to form a permanent component of funding for the HEI system from now on, reconfirming the Science and Innovation White Paper commitment that HEIF would be "a permanent third stream of funding for universities".

Status: The language used in the call for proposals for the second round of the Higher Education Innovation Fund (HEIF 2) creates a clear signal that third stream funding is intended to form a permanent component of funding for the HEI base alongside the funding for research and for teaching.

Recommendation B8:

Current funding for HEIF, SEC and UC should be brought together into a new 3rd stream of funding for HEIs, allocated to DTI and DfES, to support:

Work to promote enterprise in HEIs and businesses and to promote networking between the HEI and the user communities for the outputs of research;

The infrastructure and capability to transfer knowledge from HEIs into business and the community through applied research, technology and knowledge development and application, and consultancy; and

The formation, through seedcorn funding, of companies to spin out new knowledge, or the development of commercial enterprises to pursue the activities in the point above;

Support for all these activities will generally be through pump-priming, except in cases of clear market failure where there may be an appropriate ongoing contribution.

Status: The current funding streams of HEIF, UC, and SEC have been brought together into a single stream of funding through HEIF 2 for the period 2004-05 and 2005-06.

Recommendation B9:

If possible, there should be a modest increase in funding in SR2002 for the infrastructure and capability to transfer knowledge from HEIs into business and the community through applied research, technology and knowledge development and application, and consultancy. In addition, it will be important to ensure that seed corn funding continues to be made available for a further period until returns from early ventures begin to make the activity self-sustaining.

Status: Done – SR2002 provided an increase in resources for knowledge transfer from the science base of £20/36/50m, from a baseline of £64 million in 2002-03 to £114 million in 2005-06 (including £20 million per year from DfES). This included HEIF funding for seed funding to support early stage commercialisation of research, previously funded under University Challenge.

Recommendation B10:

The next round of funding should be awarded for a three year period. HEIs should be asked to propose a programme of work within the classes of activity set out in recommendation B8 above. They should be asked to make clear how this would build on existing strengths and achievements (including from funding allocated in past rounds), and to propose measures by which their progress and success could be judged. They should also be asked how third stream funding has been, or will be, replaced over time with earned income, or to explain the underlying market failure that is being addressed.

Status: In the current bidding round for HEIF2, HEIs have been tasked to illustrate how their proposals build on existing strengths and achievements and to propose measures by which progress and success can be judged. HEIF2 will be allocated over a two year period, but consideration of future award periods is being considered in the response to the Lambert report.

Recommendation B11:

Any expansion of funding in the SR2002 period for the activities described in section 2 of Recommendation B7 should be focused in particular on non-research intensive departments in HEIs – working in partnership with one another and with research-intensive departments as appropriate – for work to engage with SMEs and less technologically sophisticated businesses in research, technology development and application, and consultancy, with:

Funding clearly targeted at departments or groups of departments with the will and skills needed to work in these ways, and to develop sustainable portfolios of such work in the medium and longer term;

The work to be supported clearly led by users, as demonstrated by a willingness to pay, either by users directly and/or by those representing their interests;

RDAs involved in ensuring that what is proposed is aligned with the needs of business in the regional and, where appropriate, in providing funding alongside or instead of that from users;

Funding primarily for pump-priming HEI work that will, over time, become fully funded by customers - with the exception of clear market failures such as useful work with SMEs that would not otherwise take place.

Status: The new money allocated in SR2002 for knowledge transfer activities will be targeted at less research intensive HEI departments through HEIF 2.

Recommendation B12:

OST and DfES should work with funding bodies and HE sector further to develop metrics for knowledge transfer to:

Help the sector manage its own knowledge transfer activity;

Help funders and the Government as a whole to assess value for money, both at project and programme level; and

Inform the future allocation of funds, though recognising that a simple formulaic allocation of funds is unlikely to be possible for some time, if ever.

Status: OST's knowledge transfer activities have been assessed against a basket of indicators including number of licensing agreements, patents and spin-out companies. Latest data available, for the academic year 2001-02, shows an improvement in 8 of the 9 indicators where data is collected annually. Work has now started on developing more metrics including business perception of HEI knowledge transfer, for the period from April 2005 to March 2008.

Recommendation B13:

OST and the new Business and Innovation Groups in the DTI should work through the new DTI Knowledge Transfer Strategy Group to improve the coordination of funding for knowledge transfer through SEB push and business pull.

Status: Work within OST and DTI's Innovation and Business Groups on knowledge transfer activities is co-ordinated through a single Departmental Objective which is "owned" by the Director General for Innovation.

Recommendation B14:

The review of DTI Business Support should ensure that new arrangements can continue to support and promote jointly funded research and business capacity to pull research through into markets, in ways similar to those that have proved successful in the current LINK, Faraday, TCS, SMART and ITS schemes. New arrangements should also allow for ad hoc, innovative forms of support for these activities where this is required to ensure success with a particular technology and/or sector.

Status: Four new Business Support products were announced in July 2003; a further 6 will be announced in April 2004.

The new products broadly address the business needs served by former schemes but offer greater flexibility and potential for creating holistic business support packages. For example, the "Knowledge Transfer Networks" product will include not only managed networks like the Faraday Partnerships, but also the potential for virtual networks which might address specific issues for business, or the need for promoting better information flows.

The products are carefully designed to focus on delivering against identified business need and will be easier to understand by virtue of using common methodologies to address broadly similar structural problems in the various sectors.

Recommendation B15:

Invest UK requires access to information, in a useable format, to enable it to identify world class research being carried out in the UK which is of relevance to its clients and thus contributes to meeting its objective of maintaining the UK's position as the largest recipient of inward investment in the European Union. Recommendation B4 should go a considerable way towards addressing this. OST, the Research Councils and universities should also consider whether they could develop more systematic

ways of working more closely with Invest UK, to provide it with the information it needs. Invest UK and the UK Development Agencies should also consider how they can continue to improve the quality and relevance of the information they share to ensure that opportunities to link UK universities with overseas firms are not missed due to lack of information; and should continue to identify, and work with, universities across the UK (see recommendation B4).

Status: UK Trade and Industry's Inward Investment Group (IIG) is currently working on preparations for a website (to supplement the existing R&D website) which would signpost other sites/sources of information (especially those of RDAs and Devolved Administrations) to identify specific sources of Science and Technology work in universities and elsewhere of practical interest to potential inward investors.

Recommendation B16:

The Treasury, working with OST, Invest UK and the Inland Revenue, should consider how information about the UK's positive environment for research, encompassing legal and fiscal measures, can be better promulgated internationally. We should use the British Council, the scientific attaches and ITS to get this message over better. This work should be coordinated and pushed forward by the Committee on International Science and Technology (CIST) chaired by the CSA.

Status: IIG seeks digestible information on legal and fiscal measures to do with R&D, to deploy with potential inward investors. IIG has various sources for this - usually DTI or consultants. IIG uses 'scientific attaches' and International Technology Promoters to help in making informed contacts with potential inward investors.

Recommendation B17:

Consideration should be given to developing a regional science investment fund which would facilitate a time-limited development of research and technology capacity, which could then migrate to conventional excellence driven funding. The funding would be directed at emerging or sub-critical regional research strengths and needs, which would need to have demonstrable regional exploitation potential and the prospect of longer term sustainability. The investment funding would pick up potential excellence, thus complementing the formulaic approach of the RAE which rewards existing excellence. It would not compromise the basic principle that science funding should be determined on the basis of excellence. Its primary focus would be on pre-competitive technologies and inter-disciplinary application research rather than seeking to underpin blue skies research.

Status: This area of work is currently being considered in the response to the Lambert Report.

Section C: Science in Government Departments

Recommendation C1:

Departmental published science and innovation strategies should be costed, including actual and projected costings for research and development in the current Spending Review period and beyond, and this costing should be provided to the appropriate Treasury Spending Team, and copied to OST.

Status: This recommendation has been underpinned in Treasury Guidance for Spending Round 2004. OST will review S&I strategies for quality and effectiveness as soon as the round is completed. Sir David King has written to Permanent Secretaries to alert them to the guidance and offering guidance on the preparation of the science elements of departmental bids. This work is presently underway with departments.

Recommendation C2:

Departmental Analyses of Resources submitted to the Treasury and early Spending Review discussions between the Treasury and departments should, in future, clearly identify the research component. Departments should agree research budgets for the SR period with the Treasury, in consultation with OST, before settlement letters are issued. The working assumption, as in the last SR, should be that expenditure on research will at least be maintained real terms.

Status: See answer to C1 above

Recommendation C3:

Based on the recommendation in Section A of this report that HEIs should recover full economic costs for much of the research undertaken for government departments, departments need to ensure that their future costings fully take account of the cost implications of the Transparency Review, for any research contracts they intend to place with HEIs.

Status: OST has alerted departments to this requirement as part of the review of S&I strategies and costings.

Recommendation C4:

Departments should not transfer resources from, or fall below, the agreed research and development allocation as set out in the settlement letters without seeking permission from the Chief Secretary to the Treasury in writing, and consulting the Government's Chief Scientific Adviser.

Status: Spending Round guidance for 2004 makes clear that the recommendations of the Cross Cutting Review remain in effect following completion of the spending round negotiations.

Recommendation C5:

Every department which conducts or commissions an appreciable amount of research, or uses science should have a Chief Scientific Adviser, accountable to the Secretary of State and Ministers for science procurement and advice within the department. Departments which rely heavily on scientific and technological input across the range of their activities need a more or less full time Adviser, with a place on the department board. Other departments will not necessarily have places on strategy boards, but should ensure that the Chief Scientific Adviser meets the board several times a year, and spends enough time with the department to understand its work.

Status: A number of departments have appointed DCSAs in line with this recommendation. Examples include Defra, DfT, ODPM and MoD. Others have nominated their heads of research to the role. Discussions are continuing between the Government Chief Scientific Adviser and other departments on how DCSA roles should be enhanced.

Recommendation C6:

The Government's Chief Scientific Adviser should be involved in the appointment of departmental Chief Scientific Advisers, so he can ensure that appropriate criteria are being applied across Government.

Status: GCSA has made it clear to Departments that he wishes to participate in such appointments and has been involved in recent appointments. Discussions continue with those departments which do not yet have dedicated DCSAs.

Recommendation C7:

Departmental Chief Scientific Advisers should be accountable to Ministers and the departmental top-level board for the level of scientific expertise in the department. They should review regularly the deployment of that expertise, report to the Board on whether that resource is optimally deployed, and make changes when needed.

Status: Sir David King, as the Government's Chief Scientific Adviser, advises the Prime Minister and Cabinet. OST has been working with Departments to encourage the development of the head of profession role of departmental chief scientific advisers. This relates also to the responses to recommendations C8 and C9.

Recommendation C8:

Chief Scientific Advisers will need to work in partnership with their department's personnel function to review and categorise posts in terms of the requirement for scientific expertise. Departments should maintain records on specialist staff in order to be able to identify their scientific qualifications and experience.

Status: Progress across Government is varied. OST is promoting good practice and is planning to run a seminar to exchange such practice in the coming months.

Recommendation C9:

Chief Scientific Advisers across Whitehall should act to ensure that professional staff engaged in research management undertake continuing professional development and are exposed to the latest science in their area of work.

Status: Professional development is being undertaken by the majority of Departments. The precise manner in which it is being undertaken varies. Following a seminar on best practice – organised jointly with the NAO and Rand Europe in November 2003, OST established a network of programme managers in which issues of cross departmental interest can be discussed – either bilaterally or through seminars.

Recommendation C10:

Departmental Chief Scientific Advisers should work together, and with the Government's Chief Scientific Adviser, to ensure that opportunities and resources for career progression for scientists are available across the civil service wherever appropriate.

Status: OST is monitoring this in discussion with departments along with progress against recommendation C8 as part of the CCR implementation plan.

Recommendation C11:

Departments should ensure that knowledge transfer objectives are included in their science and innovation strategies and in their research programmes. A senior official should be responsible for delivery, by the department and the PSREs for which it is responsible, of the action points listed in the Government Response to the Baker Report, Small Business Research Initiative targets and other relevant guidance. Treasury and OST should continue to monitor implementation of the Baker Report.

Status: This is being reviewed by OST as part of the assessment of S&I Innovation Strategies for quality and effectiveness.

Recommendation C12:

Departments should ensure that the PSREs for which they are responsible have a framework in place for commercial exploitation. As far as possible, they should ensure that their PSREs are given the financial and other freedoms recommended by the Baker Report. Where a department does not consider such freedoms to be appropriate, it should justify its decision by writing to the Treasury, copied to OST, to explain its reasons.

Status: See answer to recommendation C11.

Recommendation C13:

The PSRE fund, which was worth £10 million in SR2000, should be continued in SR2002 at least at that level to support the aim of developing knowledge transfer capacity. Consideration should be given to the creation of a separate seed corn fund.

Status: The PSRE fund was increased by 50% to £15 million in the 2002 Spending Review.

Recommendation C14:

When departments undertake a major review of policy or launch public consultations on policy development, they should consult their Chief Scientific Adviser at an early stage and report on the scope for enhancing the evidence base and on how they will deliver and evaluate improvements in knowledge and technology transfer.

Status: Sir David King is head of OST and leads on any policy review within Government as a whole. OST is monitoring progress in implementing this recommendation in other departments.

Recommendation C15:

The Government's Chief Scientific Adviser should explore the scope for increased use of merged research budgets in cross-cutting areas of research.

Status: OST has discussed this approach with HM Treasury but has not been encouraged to pursue the issue at present. There will be a need to consider further the scope for joint management of cross cutting research themes in areas such as CBRN and Energy.

Recommendation C16:

Departments, with OST, should ensure that, within those areas of science on which they rely, arrangements for government funded research across the spectrum from

basic to applied are sufficiently co-ordinated to ensure that their future research needs will continue to be met, and that they take action if this does not appear to be the case.

Status: This issue is being considered further in development of the 10-year Investment Framework for Science and Innovation. Departments have been asked specifically to consider their own needs, the extent to which these can be met from the science base and to what degree it may be necessary to fill relevant gaps in the science base over the period.

Recommendation C17:

The Government's Chief Scientific Adviser should be responsible for a rolling programme of review in order that he can deliver on his responsibility for the quality of departments' research. The programme and content of the reviews should incorporate regular external scrutiny, independent external assessment and benchmarking, and should focus on the management of research and use of science, including scientific advice. It should incorporate international benchmarking of good procurement and research commissioning practice.

Status: Science Review Directorate established in 2003. A review of DCMS is currently underway. It is intended that the first round of SRD's rolling review will be completed within three years.

Recommendation C18:

The review process should be assessed in 4-5 years time, to see whether measurable improvements have been introduced. If not, other mechanisms for improvement should be considered, including the question of a central science budget.

Status: Noted.

Recommendation C19:

Resources should be made available to support the Chief Scientific Adviser's new central team to implement the recommendations of the review relating to science standards in government departments.

Status: See answer to Recommendation C17.