



Impact Report 2011

EXECUTIVE SUMMARY

The UK's investment in research is a vital long-term investment in its future growth and prosperity. To maximise the impact of UK research, Research Councils UK (RCUK) actively supports and promotes activities to realise the greatest potential for new discoveries and new ideas to result in economic growth, cultural enrichment and societal well-being.

The RCUK impact report complements the impact reports prepared by the individual Research Councils for the UK Department for Business, Innovation and Skills (BIS), and reports on cross-Council areas of activity to achieve greater impact from the research we fund. *Impact* needs to be understood broadly – it embraces all the diverse ways in which research-related knowledge and skills benefit individuals, organisations and regions by:

- fostering global economic growth, and specifically the economic competitiveness of the United Kingdom;
- increasing the effectiveness of public services and policy;
- enhancing quality of life, health and creative output.

This is the first RCUK Impact Report in the current Spending Review period (2011-15) – it covers the final year of the 2007 Spending Review period (April 2010 – March 2011), and the first six months of the current period (April – September 2011). The overall performance targets for RCUK are detailed in the RCUK Delivery Plan 2011-15¹ and further examples of what we achieve together are featured on our website.

HIGHLIGHTS

This report details the many ongoing activities through which the Councils are working together to achieve greater impact, as well as examples of the economic and social benefits which have been realised in this period on the basis of earlier investments in excellent research.

■ Section 1

Looks at collaboration with key sectors and strategic partnerships with government departments, including:

- Strategic engagement with the UK pharmaceutical sector.
- Work with the Technology Strategy Board to support the development of Catapult Centres.
- Strengthening knowledge flow in the creative economy.
- Strategic partnerships with the Department for Communities and Local Government (DCLG), Home Office and MOD.

■ Section 2

Highlights collaboration through six major cross-Council research themes:

- Working as part of a cross-governmental Global Food Security programme.
- A portfolio of over £180 million of projects tackling Global Uncertainties.
- Realising the impact of new technologies for the Digital Economy.

■ Section 3

Sets out the range of cross-Council evaluations, including surveys that demonstrate impact:

- The 2010 User Satisfaction Survey.
- Impact through highly-skilled people.
- Inspiring the next generation of researchers.

■ Section 4

Summarises how the Councils will be developing the impact agenda, including other priorities agreed with BIS for the current Spending Review Period 2011-15:

- Making research findings more accessible to all users.
- RCUK's leadership role in the HE Sector and embedding a 'whole system' approach to maximising the potential impact of Research Council funding.

■ Section 5

Sets out the aims of the RCUK Impact Strategy:

- Engaging key stakeholders.
- Maximising research impact.
- Delivering highly skilled people.

¹ RCUK Delivery Plan - http://www.rcuk.ac.uk/documents/documents/RCUK_delivery_plan_2011_15.pdf

I. STRATEGIC PARTNERSHIPS

RCUK is committed to further developing and strengthening its strategic partnerships with a number of key governmental bodies and commercial sectors in the UK to ensure that the potential impact from investments is maximised. RCUK also collaborates with the Technology Strategy Board in a number of ways. The areas in which we are seeking to develop stronger collaborative working are listed below.

1.1 Sector Relationships

The 2011-12 World Economic Forum report on Global Competitiveness ranked the UK at number two in the world for higher education-business relations, ahead of the USA which has always previously been regarded as the most successful country in technology transfer and higher education-business links. In order to maximise the impact of business engagement further, specific sectors have been identified where there are already significant levels of engagement with individual Research Councils, but where a coordinated approach will offer opportunities for more strategic cross-Council engagement. Some of these cross-Council strategic relationships are already well developed whilst others are in the early stages of development, and will provide significant long-term benefits and opportunities for effective collaboration.

1.1.1 Pharmaceuticals sector:

The pharmaceuticals sector draws on a broad range of cutting-edge research, and so it is vital for the Research Councils to offer the industry a coordinated approach to research and training aligned to the development of new medicines. A cross-Council "Pharma Forum" has been launched this year, bringing MRC/ BBSRC/ EPSRC and the Technology Strategy Board together with large pharma companies and SME representatives. Priority topics include the changing relationships between companies in the pharmaceutical sector and opportunities in open innovation; new technologies such as cell-based therapies; and opportunities to increase the impact of the UK's research base in the area.



1.1.2 Creative economy:

This strategic relationship is about creating the foundations for future improved knowledge flow in the sector. In tackling this complex and diverse sector collectively, RCUK will help stimulate and clarify pathways for demand for, and supply of, research to creative businesses. A workshop will be held to gain an overview of existing Research Council engagement with the Creative Industries, in order to then prioritise areas for cross-Council focus.

1.1.3 Water:

The aim of a strategic relationship is to help address the research challenges in the water sector in an integrated manner that does not distinguish between environmental, engineering, chemical, biological, social and economic science. A UK Water Research and Innovation Framework has been developed through meetings facilitated by the RCUK Living With Environmental Change (LWEC) programme. This contains a set of priority areas for further research and knowledge exchange which will act as a springboard for future work.



1.1.4 Energy:

The RCUK Energy theme works closely with government, especially The Department of Energy and Climate Change (DECC), and has more than 130 collaborating companies. The theme will seek to extend the range of users engaged with the portfolio, particularly around the challenge of reducing energy demand.



1.2 Working with the Technology Strategy Board (TSB)

Given the UK's excellent research base, its many innovative businesses and its success in knowledge transfer, there is great opportunity in RCUK and the Technology Strategy Board working even closer together to boost the development of new products, processes and services for tomorrow's economy. This includes using research and innovation to find new solutions to the major challenges of our time – which is where many of the greatest opportunities for future markets and economic growth will lie.

This partnership allows RCUK to take advantage of the industry-led expertise of the Technology Strategy Board in catalysing innovation in focussed priority areas; and enables the Technology Strategy Board to capitalise on the Research Councils' role in funding and influencing excellent research and knowledge transfer – so that both are more effective in strengthening the knowledge-based economy and attracting inward investment.

The aim of the partnership is to generate economic benefit for the UK through coordinated strategic programmes that ensure continuity of support across the innovation system in order to deliver successful commercialisation.

Looking back at the 2007 Comprehensive Spending Review, RCUK set a target of committing a minimum of £120 million in collaborative and complementary activities with the Technology Strategy Board, between April 2008 and March 2011. The target was exceeded by 27 per cent, collectively reaching over £165 million. Examples of the types of impact from RCUK-Technology Strategy Board collaboration are detailed below:

■ Cardiac Scanner will cut time, money and patient stress

The portable magnetometer technology has been developed by Professor Ben Varcoe of the University of Leeds School of Physics and Astronomy and is due to begin a preliminary clinical study. It will dramatically improve the process of diagnosing heart conditions, saving time for medical staff and patients and ultimately relieving pressure and costs for healthcare providers. The device being developed by Professor Varcoe will provide a viable alternative to large scale magnetometers currently on the market. Whilst these devices have



been used in the oil, gas and aerospace industries, their size and cost – along with the specialist skills required to operate them – have effectively prohibited their use in many healthcare settings. The underlying research which has led to the development of this technology was initially funded by the EPSRC. Proof of concept investment, aimed at accelerating this fundamental research through to commercial reality has been provided by the Centre for Regenerative Therapies and Devices proof of concept fund, which is funded by the EPSRC, the Technology Strategy Board and the BBSRC.

■ **Next generation solar energy harvesting projects will improve quality of life and generate economic benefit**

EPSRC and the Technology Strategy Board launched a joint £7 million investment through a staged approach in 2010 to transfer world class knowledge from universities into business led early stage projects to research the use of nanoscale technologies. The technology focus was to develop and scale up the next generation of solar energy harvesting. The purpose of the investment was to connect UK based supply chains and position industry as a dominant force in next generation solar



energy harvesting for worldwide markets and as a cost effective course to the UK renewables energy mix for 2020/50. Building on the success of this competition, EPSRC and the Technology Strategy Board have teamed up to deliver a joint £9 million investment in nano-enabled healthcare diagnostics and targeted delivery of therapeutics in November 2011.

■ **Avoiding casualties during Japan Tsunami and developing the business leaders of tomorrow**

This Knowledge Transfer Partnership (KTP) involved Intercontinental Hotels Group (IHG) plc and Oxford Brookes University and was funded by the ESRC and Technology Strategy Board. It demonstrates the impact of highly skilled people such as Catia Guimaraes who won one of the prestigious Business Leaders of Tomorrow awards at the 2011 KTP awards. Catia used mapping and business impact analysis during the Japan tsunami crisis to provide timely and accurate information to the IHG risk management team to allow them to respond effectively to a very complex disaster; helping them to make the right decisions regarding the safe and sustainable operation of IHG's corporate sites in Japan. Thankfully they reported no casualties.



■ **Stimulating low carbon vehicle innovation**

The Technology Strategy Board has established an Integrated Delivery Programme (IDP) which aims to integrate the low carbon vehicle innovation chain, from the science base, through collaborative R&D to fleet-level demonstration. The programme is a key tool for the Low Carbon Vehicles Innovation Platform which has created over 440 company and academic partnerships. The programme has funding from the Technology Strategy Board, the Office for Low Emission Vehicles, the Engineering and Physical Sciences Research Council, the Department for Business, Innovation and Skills, regional bodies and devolved administrations. The Integrated Delivery Programme has so far launched seven funding programmes to stimulate low carbon vehicle innovation, and has accelerated the pace of innovation in LCV technologies. This will help grow the automotive industry sector in the UK and reduce transport emissions. The EPSRC's involvement facilitates the flow of research ideas from academia into the programme generally; as a result, a high proportion of the IDP's research and development projects have academic involvement. Two of the seven competitions have been run by the EPSRC; one on feasibility studies and the other to explore research challenges in a number of technical areas supporting the development of low carbon vehicles, projects which are now under way.

Within the current spending review period, a range of areas have been identified where closer collaboration would be of benefit to both RCUK and the Technology Strategy Board. These include:

- **Societal and sector challenges:** Challenges which require a multidisciplinary and multi-Council approach, collaboration across government and between sectors and partnerships across supply chains (e.g. Digital, Healthcare, Sustainability, Energy).
- **Underpinning themes:** Focusing on a small number of broad based, enabling capabilities where the UK has particular strengths to benefit a large number of sectors from the new innovation generated. Focus will be on well chosen, disruptive technologies which will underpin high-risk, high-reward businesses and grow existing markets (e.g. High Value Manufacturing, Industrial Biotech, Extraction of Value from Data, Emerging Technologies).
- **Specific Programmes:** Collaboration in areas such as Catapult Centres, Knowledge Transfer Networks (KTNs) and Knowledge Transfer Partnerships (KTPs) will maximise the benefit of existing Technology Strategy Board and RCUK investments to both business and academic communities.
- **Influence and leadership:** Working together we can create an attractive innovation environment for the UK through leadership and increased influence on important partners in the UK and overseas (e.g. entrepreneurship, international engagement).

Some specific examples of these areas where a further deepening and strengthening of RCUK-TSB collaboration is envisaged are illustrated below.

■ Catapult Centres

Research Councils are working closely with the Technology Strategy Board on the development of Catapult Centres to ensure each is optimised to link to the excellent research base in relevant fields such as high value manufacturing, cell therapy and offshore renewable energy. In addition, RCUK, the Technology Strategy Board and the Funding Councils have now embarked on a joint project to clarify and optimise the interface between Catapults and RCUK-funded infrastructure (such as Research Council innovation campuses and institutes) and the wider HE sector. RCUK is also represented on the Technology Strategy Board's Oversight Committee for the Catapult Centres, enabling RCUK to provide strategic input and advice from its experience in the development of research and innovation campuses.

■ Industrial Biotechnology

Industrial Biotechnology is one area where RCUK and the Technology Strategy Board are working together to translate scientific discoveries into commercial impacts through the development and utilisation of novel processes as well as the generation of new products. In this area the Technology Strategy Board, BBSRC and EPSRC have committed to co-fund academic-industry proposals, work together on relevant ERANETs and encourage more applications for industry relevant research in industrial biotechnology through a variety of mechanisms e.g. the joint BBSRC and EPSRC Integrated Biorefining Research and Technology Club (IBTI), strategic longer and larger grants (sLoLas), Spark Awards and KTPs.

■ Space

The formation of the UK Space Agency (UKSA) has altered the funding landscape within the UK. In order to ensure a coherent approach across the funding sectors, a strong and growing collaboration has developed between the agency, the Research Councils and the Technology Strategy Board. This collaboration exists at all levels from operational through to strategic - the Chief Executives of the Technology Strategy Board, STFC, NERC and UKSA are members of the Space Leadership Council which drives implementation of the recommendations of the Space Innovation and Growth Strategy (IGS). All four organisations are active members of the International Space Innovation Centre at Harwell (ISIS) which is a unique public sector and private sector collaboration which aims to accelerate the commercialisation of Space technology and applications.

■ Regenerative Medicine

The Technology Strategy Board, MRC, BBSRC and the Department of Health have agreed co-funding for phase 2 for the Stem Cell for Safer Medicines (SC4SM) programme in 2010, with work beginning in 2011. The project is focussed on developing preclinical toxicology tools based on the use of stem cells, and is also partnered with GSK, AstraZeneca, Roche and UCB. The Research Councils and the Technology Strategy Board will support the SC4SM consortium ensuring that governance and scientific oversight for the project address the needs of all stakeholders.

■ Sustainable Agriculture and Food

BBSRC has worked closely with the Technology Strategy Board in the development of two new funding initiatives designed to support industrially relevant collaborative research projects in sustainable agriculture and food. These are a new Animal Health Research and Technology Club (RTC) and an initiative to address challenges facing the Horticulture sector. NERC co-funded a workshop to explore the applications of new e-technologies in agriculture with a number of Technology Strategy Board-funded KTNs. The Technology Strategy Board also worked with BBSRC in assessing applications to the Advanced Training Partnership (ATP) competition; a new £12 million initiative that aims to support high level skills development for those working in the Agri-Food sectors.



1.3 Strategic partnerships with government departments

Research Council collaboration with government departments already takes a number of forms:

- identifying joint strategic priorities and funding excellent research to address societal challenges;
- running efficient joint programmes, such as the cross-Council themes, to enhance the speed and depth of impact;
- providing tailored, quality assured guidance for government through mechanisms such as policy seminars, briefings, placements;
- maximising knowledge exchange through movement of people or making one to one links more efficiently.

In addition, RCUK is engaged with BIS and relevant government departments in the second phase of the growth review to ensure that the potential for growth underpinned by innovation from cutting-edge research is integrated into wider policy initiatives.

In order to develop more strategic relationships, RCUK are in the early stages of piloting strategic partnerships with three government departments: the Department for Communities and Local Government (DCLG), Home

Office and Ministry of Defence (MOD). These have been chosen due to the extent of their existing multiple interactions with different Research Councils, where a more coordinated approach would allow for a more strategic engagement. The following progress has been made to date:

DCLG: A concordat for collaborative working with DCLG was signed in March 2011. This is the first cross-Council concordat with a government department. Discussion about new DCLG research strategy will be initiated in the autumn of 2011, and RCUK will play an active role in helping the department develop and address its research priorities.

Home Office: EPSRC and the RCUK Global Uncertainties programme have had initial scoping discussions with the Home Office Scientific Adviser. The aim is to agree a memorandum of understanding with the Home Office which will form the basis for effective ongoing dialogue to identify research areas and priorities of mutual concern.

MOD: Following discussions with Defence Science and Technology Laboratory (DSTL), which leads the non nuclear R&D programme for MOD, the Research Councils will participate in MOD capability mapping across academia as well as in house within relevant MOD agencies. In addition MOD will second a member of staff to RCUK to strengthen understanding of the research base, as well as engagement between MOD and the Research Councils.

2. MAJOR CROSS-COUNCIL RESEARCH THEMES

Many of the major challenges facing the economy and society today are complex and multi-faceted, requiring interdisciplinary and cross-disciplinary research to address them. In order to facilitate coordinated and strategic approaches to funding research in these areas, the Research Councils have established formal cross-Council 'research

themes' to oversee a strategic and integrated programme of work. These cross-Council research themes can also involve Government departments and agencies to achieve a coherent and focused cross-governmental approach to the major challenges that we face. The current cross-Council research themes are:

CROSS-COUNCIL THEME	LEAD COUNCIL	THEME LAUNCH DATE	PARTNER COUNCILS
Digital Economy (DE)	EPSRC	2008	ESRC, MRC and AHRC
Energy	EPSRC	2004	ESRC, STFC, NERC and BBSRC
Global Food Security (GFS)	BBSRC	2010	ESRC, EPSRC, MRC and NERC
Global Uncertainties (GU)	ESRC	2008	Involves all Councils
Lifelong Health and Wellbeing (LLHW)	MRC	2008	EPSRC, AHRC, BBSRC, ESRC
Living with Environmental Change (LWEC)	NERC	2008	AHRC, BBSRC, EPSRC, ESRC, MRC,

Examples of impacts from the cross-Council research themes are included below:



Digital Economy (DE): was launched in 2008 and works to rapidly realise the transformational impact of digital technologies' use and functionality in everyday life on aspects of community life, cultural experiences, future society, and the economy. DE supported projects demonstrate: a strong user-engagement and co-creation dimension (including society, business and/or Government), multidisciplinary working, and clear routes to realise the outputs and associated impacts from the research. It seeks to understand and respond to the question of how people will live in a future digital economy.

DE is changing the mindset of the research community, bringing people together who would not usually work together, in a highly interdisciplinary context – including computer science, engineering, psychology, business, geography, art, design and Social Sciences. A major achievement has been to attract a wide range of partners, totalling over 400, from industry; government; and charitable organisations; as well as covering a vast range of sectors including financial; creative industries; healthcare; leisure and tourism; energy; IT/computing; and communications. It also covers a broad range of technologies, including mobile and ubiquitous computing; cloud and internet services; and positioning and location.



Energy Programme: The Programme was agreed as part of the 2004 Spending Review – its mission is to position the UK to meet its energy and environmental targets and policy goals through high quality research and postgraduate training. Research is the key to achieving an affordable low-carbon energy system whilst preserving natural resources, the environment and quality of life. Over 500 public and private sector organisations are involved in energy projects, bringing the current portfolio value to in excess of £0.5 billion.

Offshore wind research being funded as part of the RCUK Energy programme will support the generation of £4.2 billion in Gross Valued Added per year to the UK economy and in the marine energy sector, £3.4 billion of capital investment is anticipated assuming development of only one of the technologies in an advanced stage of developed.

Ceres Power was formed in 2001 to take forward the results of fuel cell research and now employs 70 staff. The AIM-listed company is working with British Gas to develop fuel cell products for Combined Heat and Power.



Global Food Security (GFS): The UK's main public sector funders of food-related research and training joined forces to develop and launch the GFS programme in 2011. Around a billion people globally do not have adequate food to meet their basic nutritional needs. The world faces a potentially even greater crisis in food security as the global population is expected to grow from about seven billion to more than nine billion by mid-century. The central challenge is to meet the rising demand for food in ways that are environmentally, socially and economically sustainable, in the face of evolving world-wide markets and distribution mechanisms, and global climate and demographic changes.

A key feature of GFS will be adding value to current and future research across many disciplines, through greater coordination to improve the design, delivery and translation of research into policy, regulation and practice. Food security is a complex challenge that needs to be tackled from all perspectives, using the whole breadth of knowledge to both stimulate new thinking and ensure that any solutions are environmentally, socially and economically sustainable.



Global Uncertainties: The programme was established in 2008 to enable the UK academic community to contribute to addressing global security challenges in a co-ordinated, focused and interdisciplinary way. The Programme has a portfolio of over £180 million of projects bringing together security research and related activities from all disciplines and sciences to help governments, businesses and societies to better predict, detect, prevent and mitigate threats to the security of individuals, communities or states.

Work on military policy in Afghanistan through research in the field has led to a restructuring of UK inter-agency operations in Helmand. Professor Theo Farrell who holds a Global Uncertainties fellowship on Organisations, Innovation and Security on the Twenty-First Century has advised the UK Army, MOD and the International Security Assistance Force (ISAF), drawing on his findings. He undertook assessment of performance in Operation Moshtarak for the Army and the first annual assessment of ISAF Joint Command, receiving the ISAF Joint Command Award for Excellence.



Lifelong Health and Wellbeing: was launched in 2008 as a major cross-Council initiative aimed at preparing for the socio-economic challenges and opportunities associated with an ageing population. Life expectancy in the UK has risen by 30 years in the past century. In common with other developed countries, this increase in longevity has been accompanied by a decrease in the fertility rate, leading to a growing proportion of the population over 65 years of age.

Poor sleep is one of the most common complaints of old age. SomnIA (Sleep in Ageing) led by Professor Sara Arber and funded by the New Dynamics of Ageing programme, has examined the causes of sleep disturbance among older people living in their own homes and in care homes, and examined ways of improving sleep among older people without the use of sleeping medication. Many older people are exposed to insufficient bright light during the day, either because they rarely go outside or because they have dim lighting in their own home or in a care home. These observations resulted in the project trialling 'blue-enriched' light and brighter light in seven care homes and among 35 older people with poor sleep living in the community. New technological devices were designed to help older people obtain a more restful sleep such as a pillow through which recorded music can be played a hand-held hearing device that could be used by care staff at night and automatic bedroom lighting.



Living with Environmental Change (LWEC): was launched in June 2008 as a 10 year partnership between Research Councils, Government Departments, Devolved Governments Agencies and key partners, such as the Met Office, to respond to the societal and economic challenges resulting from population growth and continuing reliance on fossil fuel use.

The UK National Ecosystem Assessment (UK NEA) involving Defra, NERC, ESRC, Scottish Government and others is an excellent example of the research community responding to policy needs. It had an immediate impact on policy as its work influenced the recently published Natural Environment White Paper. At the UK NEA launch Ministers described it as a paradigm shift in the way society takes account of environmental resources in decision-making.

Cross-council research programmes are not new, and previous joint activities are still underway and effecting impacts. Examples are provided below of how by drawing together world-leading interdisciplinary research programmes RCUK, can contribute to the complex challenges facing society:

Rural Economy and Land Use (RELU): was launched in 2004 and enables researchers to work together to investigate the social, economic, environmental and technological challenges faced by rural areas. The Programme encourages social and economic vitality of rural areas and promote the protection and conservation of the rural environment.

The Loweswater Care Project brought together a local community, agency representatives and other stakeholders to work together to improve the sustainability of Loweswater's environment and address the occurrence of potentially toxic blooms of blue-green algae on the lake. The project was inclusive, giving institutions, researchers, and local residents an equal say and encouraging innovation resulting in a range of improvements to environmental practices. Practical outcomes from the project to benefit the local community and economy included alterations to farming practices, improvements in septic tank management, initiatives to clear vegetation and an improvement in relations between the National Trust and farmers. Good links were established with other community groups who sought advice, and written evidence was provided to various Government consultation documents, including the Environment Agency's consultation on the EU Water Framework Directive and the Commission for Rural Communities' Uplands Inquiry.

Genomics: The Research Councils have been working collaboratively on genomics since the late 1990's. For example, BBSRC-supported genomics research has played a very important role in capacity building through the establishment of 10 new Centres, employment of 123 staff directly employed and trained in 'genomics' techniques, and providing training opportunities for the wider research community. This will ensure that the UK has the skills base needed for academic research, industry and clinical practice which will be underpinned by understanding gene function.

3. CROSS-COUNCIL EVALUATIONS

The Research Councils regularly undertake evaluations, reviews or surveys in order to better understand the economic and social impact of the research, training, knowledge exchange and public engagement activities which we fund. The previous section demonstrates the impact of RCUK funded research, but over the past year a number of cross-Council evaluations have provided evidence of the wider social and economic benefits of RCUK investments and activity. Examples of the evidence demonstrated by these evaluations are included below.

■ User Engagement

Users of research say that Research Councils are effective at meeting their needs, according to the RCUK 2010 User Satisfaction Survey. The survey found that there are high levels of awareness and user involvement in RCUK knowledge exchange activities and users recognise the important role Research Councils play in this.²

■ E-Infrastructure for Research and Innovation

E-Infrastructure refers to a combination and interworking of digitally-based technology (hardware and software), resources (data, services, digital libraries), communications (protocols, access rights and networks), and the people and organisational structures needed to support modern, internationally leading collaborative research be it in the arts and humanities or the sciences. This definition reflects a broader understanding of e-Infrastructure as defined in the RCUK report *Delivering the UK's e-Infrastructure for Research and Innovation*. The findings of this report show that the UK's e-infrastructure is well developed and among the best in the world. It provides the basis for the development and growth of new world-leading companies and services in an increasingly knowledge-led global economy.³

■ Highly-skilled People

Studies show that over 90 per cent of doctoral graduates felt that their doctorate enabled them to be innovative in the workplace⁴ and employers felt doctorate holders play a pivotal role in the delivery of commercial impact through their R&D contribution and fostering absorptive capacity.⁵



Doctoral research training is a good foundation for a wide variety of occupations and doctoral graduates have a high degree of mobility, usually associated with progression. PhD graduates demonstrate flexibility to take advantage of a diversity of employment opportunities.⁶

■ Public Engagement

According to the National Audit Office (NAO), schools using enrichment and enhancement programmes, such as the flagship scheme funded by RCUK to inspire the next generation of researchers, see positive impacts on pupil attainment and take-up of sciences and maths. For example, a statistically significant improvement in A-level maths of 1.2 per cent.⁷

² RCUK 2010 User Satisfaction Survey <http://www.rcuk.ac.uk/media/news/2011/news/pages/110202.aspx>

³ <http://www.rcuk.ac.uk/documents/research/esci/e-Infrastructurereviewreport.pdf>

⁴ What Do Researchers Do? Doctoral graduate destinations and impact three years on

⁵ EPSRC/DTZ Study "The value of PhDs: the impact of doctoral Education in Research Intensive Employers

⁶ What do researchers do? Career paths of doctoral graduates (Sept2011)

⁷ 2010 NAO Report – Department for Education: Educating the next generation of scientists

4. KEY PRIORITIES FOR THE SPENDING REVIEW PERIOD 2011-15

Key priorities for RCUK are set out in the RCUK Strategic Vision⁸ and Delivery Plan⁹. This section sets out how RCUK are taking forward a number of these priorities aimed at maximising the impact of the research.

4.1 Making research findings more accessible to all users

As the public bodies charged with investing tax payers money in science and research, the Research Councils take seriously their responsibilities in making the outputs from this research publicly available – not just to other researchers, but also to potential users in business, Government and the public sector, as well as to the public. Each Research Council publishes comprehensive information about its own research outputs and achievements on their website. In addition there are several projects underway to enhance the accessibility of the research findings funded by the Research Councils.

■ Open access

RCUK is playing an active part in a new national *Working Group on Expanding Access to Published Research Findings* which was established in autumn 2011. The purpose of the group is to provide a means through which research funders, the research community, publishers, and libraries can examine how most effectively to expand access to quality-assured published outputs of research, and to propose a programme of action to that end.

■ Recording research outcomes

Research Councils have developed a common approach for gathering quantitative and qualitative evidence of the outcomes and impact of their investments. It is vital for outcomes to be captured as they arise at any point within the funding of a research grant and beyond, recognising that often impacts from research are realised some time after funding agreements have been completed. This type of information is key to the Research Councils' strengthening of their evidence base for strategy development, and crucial in demonstrating the benefits of Research Council funded research to society and the economy.

AHRC, BBSRC, EPSRC and ESRC have developed the Research Outcomes System (ROS) based on ESRC's existing system (ESRC Society Today). ROS is an online, web based system which will allow researchers or research managers to provide outcomes information (both narrative and data) for a number of categories including publications, other research outputs and collaboration. The system was released to all users in autumn 2011. NERC (currently using its own Research Outputs Database), MRC and STFC (using MRC's e-Val system) will consider their long-term approach at an appropriate time in light of existing contractual arrangements.

4.2 Embedding a 'whole system' approach

Embedding a 'whole system' approach to maximising the potential impact of Research Council funding means ensuring that the various parts of the UK research base work in harmony to support, promote, capture and demonstrate the emergence of social and economic benefit from publicly funded research.

The impact of RCUK policies can be seen in the influence they have on other funding bodies, as well as on universities. Universities often introduce changes in their own structure or management in order to be better respond to the research policy and funding decisions made by RCUK:

- The creation of the Centre for Food Security at the University of Reading in April 2010 enables the University to draw together its expertise in agricultural production systems and their environmental impact, food sciences and nutrition, and social science modelling of consumer dietary choice and the international trading systems in food commodities.
- In response to the *Concordat to Support the Career Development of Researchers*, which RCUK actively supports and champions, a 2010 evaluation found that 70 per cent of institutions had embarked upon implementing a programme of changing policies in the light of their assessment of the Concordat requirements; 81 per cent of all institutions reported that the governing body was kept regularly informed about and involved in Concordat implementation.¹⁰
- In response to the Wakeham report, *Financial Sustainability and Efficiency in Full Economic Costing of Research In UK Higher Education Institutions*, RCUK is working with the research base to encourage more intensive utilisation of assets and

⁸ RCUK Strategic Vision - <http://www.rcuk.ac.uk/Publications/policy/Pages/StratVision.aspx>

⁹ RCUK Delivery Plan - http://www.rcuk.ac.uk/documents/documents/RCUK_delivery_plan_2011_15.pdf

¹⁰ Higher Education Institutions' Strategic Responses to the Concordat (Sept 2010)

equipment in times of austerity to ensure that there are resources available to underpin the excellence of UK research. There is evidence that institutions are already developing methods to pool resources. For example, as part of N8, eight Northern universities (Liverpool, Manchester; Leeds, Sheffield, Durham, Newcastle, Lancaster and York) have initiated a project on research capital asset sharing and development.

- An independent review of the mid-term evaluation *from the Beacons for Public Engagement initiative* (October 2010) provides evidence on the success of

this initiative in achieving culture change within universities, so that public engagement is embedded alongside research and valued as an important activity.

Key to achieving this 'whole system' approach is ensuring that the different policy and funding policies of the major public research funders are aligned, and therefore that researchers are not subject to conflicting messages with regard to the importance of exploring the potential for impact from their research. RCUK are taking this forward in a number of ways which include:

■ Implementation of Pathways to Impact¹¹

The RCUK Pathways to Impact policy encourages researchers to give more consideration to the potential impact of their work and gives scope for better knowledge exchange.

The introduction of Pathways to Impact has enabled researchers to plan project-specific and appropriate impact generating activities, and to seek funding for these. Due to the diverse range of potential beneficiaries and funded research projects, a wide variety of impact generating activities have been funded - including career development, people movement, public engagement, direct collaborations with beneficiaries, events, policy briefings, patent agreements, involvement of specialised staff, etc.

Several Research Organisations have reported that the introduction of Pathways to Impact has helped to breakdown prejudice about knowledge exchange and encouraged researchers to work with support services (i.e. knowledge transfer and technology transfer offices) to explore the potential for impact from their work. It has also encouraged enterprise and knowledge exchange to be taken into account as an integral part of the research, rather than a separate activity.

■ Research Excellence Framework (REF)

RCUK have been closely involved with the Higher Education Funding Councils over the development of the REF. RCUK was represented on the Steering Group for the REF impact pilot, which advised on the implementation of the pilot and its outcomes, and on the development of a robust, workable and efficient approach to assessing impact in the REF. Research Council observers attend the main REF panel meetings and RCUK is engaged in on-going dialogue with HEFCE (on behalf of all the Funding Councils).

A joint statement on Impact by HEFCE, RCUK and UUK has been published¹² – clarifying a common position on the wide range of types of benefits that come from excellent research, and reaffirming a commitment to working together to sustain that excellence and to facilitate its translation.

¹¹ <http://www.rcuk.ac.uk/kei/impacts/Pages/home.aspx>

¹² <http://www.rcuk.ac.uk/kei/maximising/Pages/Impactstatement.aspx>

■ **HEFCE HE Innovation Fund (HEIF)**

Following discussion with RCUK, HEFCE have advised Universities to make clear how they will support academics to deliver Pathways to Impact. RCUK is represented on an Expert Group established by HEFCE to review the findings of an assessment of the knowledge exchange strategies that were submitted by the 99 institutions qualifying for HEIF 11-15 at the end of July 2011.

■ **Strategically Important and Vulnerable Skills (SIVS)**

RCUK engaged with HEFCE over 2011 in order to help identify areas of SIVS which may need specific support in view of changes to higher education funding. RCUK have expert knowledge of the high-level skills for current research, and a good working relationship with HEFCE, and will play an active role in helping inform their strategy for SIVS.

■ **Career Development for Researchers**

RCUK have invested in researcher development (Roberts) funding and a major uplift in provision for skills development for post graduate researchers and research staff has been achieved. A review identified improvement in the way career development and transferrable skills training is provided for researchers. RCUK also funds the Vitae programme to support universities in providing training and development opportunities for PhD students and early-career researchers. Over the spending review period, RCUK will be seeking to move the programme to a self-sustaining basis.

■ **Concordat for Engaging the Public with Research**

RCUK have worked with other funders of research to provide a clear unambiguous statement of the expectations and responsibilities of research funders with respect to public engagement. RCUK will continue to have a national leadership role in implementing the Concordat to help embed engagement within universities and research institutes to maximise public engagement as a pathway to impact.

■ **International Impact**

Working across international boundaries and through building global partnerships we can increase the scale and scope of UK research. For example, since 2008 RCUK India has facilitated over £80 million of UK-India research funding, with seven different research funders in India. Broader research impacts include the work done by researchers and health care workers in Africa and the UK collaborating closely to run the Development of Anti-Retroviral Therapy in Africa (DART) clinical trial. This was the largest clinical trial of anti-retroviral therapy (ART) for people with HIV infection ever run in Africa. The trial found that regular laboratory tests offer little additional clinical benefit to populations when compared to careful clinical monitoring. These results suggest that many more people with HIV in Africa could be treated for the same amount of money as is currently spent if lab tests are not routinely used to monitor the effects of ART. The evidence will be of value to low income or resource poor countries that are prioritising ART access over investment in expensive laboratory facilities. DART was funded by the MRC, with further funding provided by the UK Department for International Development and the Rockefeller Foundation. Antiretroviral drugs given to trial participants were donated by GlaxoSmithKline, Gilead Sciences, Abbott Laboratories and Boehringer Ingelheim.

5. MOVING FORWARD WITH IMPACT

We will continue to build on our successes and our vision for excellence with impact. At the heart of the impact strategy is an emphasis on achieving, rewarding and celebrating economic and societal impact. The three aims of the RCUK impact strategy include a commitment to:

- **Engaging key stakeholders:** Advancing the rate of innovation from our investments by developing forward-looking relationships that identify and address the needs of users of research.
- **Maximising research impact:** Increasing the impact from our investments by improving mechanisms, as well as through evaluation, sharing best practice and communicating the benefits of our continued support of research, training and the provision of facilities.

- **Delivering highly skilled people:** Driving innovation in knowledge exchange through enhancement of knowledge exchange skills in the research base and encouraging the movement of highly skilled people between the research base and user communities at all stages.

The RCUK Impact Group, working with a wide range of partners will continue to drive forward this agenda over the next twelve months. The membership of the RCUK Impact Group is derived of Directors from across the seven Research Councils working collectively on this agenda.

