

ECONOMIC IMPACT BASELINE, 2010 UPDATE

BBSRC DELIVERING ECONOMIC IMPACT



“None of this [Solexa sequencing] would have happened without the support of BBSRC. Their backing was essential for the blue skies research that gave rise to our original inventions. The continued funding of fundamental research by BBSRC will be an essential part of future enterprises and, ultimately, wealth creation”

Professor Shankar Balasubramanian,
2010 BBSRC Innovator of the Year

SUMMARY

Excellent bioscience research underpinning the UK economy

BBSRC is the leading UK public funder of bioscience research which underpins directly or indirectly key economic sectors, including:

- **Food and drink:** the largest manufacturing sector in the UK (turnover £77.3Bn, 2008^[32]), when the UK was the 7th largest food and drink manufacturing industry in the world and 9th largest exporter of food and drink^[33]; in 2009 total exports £14.3Bn^[39]
- **Agriculture:** worth £7.7Bn to the UK economy in 2008; food and agriculture together accounted for 14% of the UK workforce^[32]
- **Biotechnology:** the UK industry is one of the most advanced in the world, but this sector remains vulnerable in the current economic climate^[40]
- **Pharmaceuticals:** one of the UK's most successful industries: £21.3Bn exports in 2009 and trade surplus of £7.2Bn^[42]
- **Chemicals:** the UK is the world's seventh largest chemicals producer; with exports worth £46Bn (2009)^[42] and annual sales over £60 billion^[43]

Excellent bioscience research supporting innovation and commercialisation

Bioscience research outputs are directly exploited to the benefit of the UK economy, through

- The development of innovative products and processes, including new medical treatments and diagnostics, novel approaches to industrial processes, and practical applications for agriculture and food production
- The creation of spin out companies that generate employment and add dynamism to bioscience and related sectors

BBSRC supports innovation and commercialisation in the bioscience research community:

- Through specific schemes to develop and exploit research results
- Increasingly embedding an entrepreneurial culture within its institutes and leading university bioscience departments

Excellent bioscience research addressing public policy issues

BBSRC-funded bioscience underpins developments and options for ways forward in key areas related to major global challenges, including: medicine, food and farming and other industries.

- **Food security:** bioscience research is essential to feed growing world populations: plant breeding has produced crop varieties suitable for UK climates, and that assure food security for half a billion people across Africa and Asia^[37]
- **Climate change and land use:** bioscience is vital to help: farmers to grow and harvest crops under different, more variable, temperatures and rainfall; livestock producers to rely more on conserved feeds for their animals; and the whole agricultural sector to fight new plant and animal pests and diseases
- **Renewable energy:** bioscience research drives the development of alternatives, and the rate and efficiency of production from biomass; biofuels and industrial materials could provide transport fuels with no net contribution to greenhouse gasses and reduce dependency on petrochemicals
- **Healthcare:** the increasing human lifespan, without a comparable increase in 'healthspan' is a growing policy challenge for which sustained investment in bioscience research leads to improved quality of life into old age, and to reduced pressure on the healthcare system

Excellent bioscience research training and skills to sustain research and impact

BBSRC:

- **Provides high quality training for bioscience researchers**, vital for maintaining a strong bioscience research base, and for attracting and supporting knowledge-intensive industries and investment in the UK
- **Supports high-quality PhD training** to ensure new researchers develop the necessary breadth of skills to sustain the research base and to supply highly skilled bioscientists across the economy
- **Ensures that early-career researchers develop a broad range of skills**, and drives culture change in the employment of postdoctoral researchers to support their career development and movement between sectors
- **Works with the research community** to build mutual understanding of the wide impact of the bioscience research base and the research community's role in helping to deliver impact
- **Encourages and rewards** researchers who develop their research results to the benefit of the economy and society through successful innovation and knowledge exchange

BBSRC Impact Highlights 2009-2010

- BBSRC-funded researchers at the John Innes Centre and elsewhere are continuing to work with the pharmaceuticals industry in leading research programmes in *Streptomyces*, which have huge significance for the production of novel antibiotics: an increase of just 1% in revenue streams from new antibiotics would generate revenue potential of c£300M
- In August 2009, Novacta Biosystems, spun out from the John Innes Centre, received £13.1M investment from Celtic Pharma Holdings and others to develop its novel antibiotics platform to address challenges, e.g. hospital-acquired infections of *C. difficile* and MRSA
- The diet and health research industry club (DRINC) provided a unique opportunity for representatives from industry to meet and network with academic experts: contacts established through DRINC brought Marks & Spencer together with the Rowett Institute of Nutrition and Health, Aberdeen University and it is this partnership that led to the development of the new M&S Simply Fuller Longer© food range
- It is estimated that research at the BBSRC Babraham Institute in inflammation and auto-immunity could generate an estimated efficiency saving of £860M pa from successful pharmaceutical development
- Professor Shankar Balasubramanian was named as the 2010 BBSRC Innovator of the Year in recognition of his work on Solexa Sequencing, the high speed genome sequencing technology that is revolutionising bioscience. Solexa Sequencing has 50% of global market share in next generation sequencing, and its research base is in the UK
- Professor Dave Goulson won the Social Innovator of the Year award for his work disseminating findings about bumblebee conservation through the founding of the Bumblebee Conservation Trust
- Former participants in the Biotechnology YES process developed commercial knowledge and awareness, financial awareness and communication in a commercial setting, and other transferable skills and improved confidence; 94% of former participants felt that the competition improved their employability

ECONOMIC IMPACT, 2009 UPDATE: BBSRC DELIVERING ECONOMIC IMPACT

CONTEXT

The BBSRC is the UK's principal funder of basic and strategic research across the biosciences, and has a mission to support high-class science and research training, to promote knowledge exchange with all relevant users and to encourage public engagement in bioscience research. The Council currently invests c£450M pa in research at universities, sponsored research institutes and other organisations through a range of funding schemes. (See Annex 1.)

As a leading UK public funder of bioscience research underpinning key economic sectors, BBSRC plays an essential role in encouraging the uptake and translation of bioscience research to address user needs, and to deliver economic and social impact from the research and training it funds.

BBSRC research underpins agriculture, the food and drinks industry, biotechnology, pharmaceuticals, and the chemical industry and strives to engage users from these sectors in the development and translation of its research base. Bio-industries in particular rely extensively on bioscience research, and in the broader pharmaceuticals and chemicals sectors BBSRC-funded research in basic biology provides crucial understanding of basic concepts which can be exploited directly by industry and indirectly through strategic or translational research funded by others, including other Research Councils and research charities.

Sound bioscience research is also crucial to inform public policy decisions and to address many of the UK's and the world's most pressing policy challenges: feeding a growing population; deciding land use priorities when there is increasing competition for its use; coping with climate change; generating the energy we need without relying on fossil fuels; improving the quality of life for an ageing population. The outcomes from BBSRC research are increasingly vital for addressing these major issues.

In April 2008 BBSRC published a preliminary Economic Impact Baseline (BBSRC Delivery Plan 2008-11, Annex 2), refined and updated in the 2009 EI baseline^[2]. The present document, the *2010 BBSRC Economic Impact Statement*.

- Demonstrates further progress against the 2008 EI baseline document
- Sets out growing evidence of BBSRC's impact
- Shows how our methodology for building the evidence is developing
- Outlines research plans, and how these should enhance the EI of our research and training

ATTRACTING R&D INVESTMENT FROM GLOBAL BUSINESS

“The UK’s success in biomedical research relies upon access to skills and knowledge, in terms of the quality of the graduates and postgraduates emerging from our universities and the quality of the science carried out there.” [Association of British Pharmaceutical Industries]

“Pfizer did a review of their global R&D operations and it only chose one operation to continue outside of the United States, and that was in Sandwich in Kent” [Science Minister, oral evidence to the House of Commons Science & Technology Committee, March 2010]

A fundamentally strong research base producing the highest quality bioscience research is essential for the delivery of economic and social impact. All research funded by BBSRC must be internationally competitive and advance world-wide understanding of basic biological principles. The UK’s track record in the biosciences is first class; this must be maintained and BBSRC’s role in doing so is vital. BBSRC invests c£450M in a mixed economy of funding schemes designed to sustain the UK biosciences research base.^[2,3]

Excellent basic research is a magnet for investment by UK companies in science-based industry and for inward investment by multinationals, driving innovation in new and existing companies.

Developments: BBSRC investing in excellent bioscience research

- The UK maintains its world-leading position in terms of quality of publications in the biological sciences, with citation rates at 162% of world average, up from the 154% reported last year, despite a slight reduction in the UK’s share of world citations as the emerging economies increase their scientific output^[34]
- BBSRC’s funding is being channelled to HEIs with the biggest groups of highest performing biological scientists^[3]
- BBSRC institutes continue to deliver excellent research with impact; in 2005-06, 82% of assessed programmes scored high international/international (quality of science) or outstanding/good (strategic relevance)^[15]
- Prestigious research prizes and recognition won in 2009-10 by BBSRC-supported researchers, including^[11]
 - Austin Smith: Louis-Jeantet prize for medicine, for ground-breaking research in stem cells
 - Caroline Dean: elected a Foreign Associate of the US National Academy of Sciences (one of only 18 elected each year)
 - Ross King: in top 10 scientific discoveries of the year (*Time* magazine) developing ‘Adam’, the first machine to have independently discovered new scientific knowledge
 - Bill Davies: *Times Higher Education* Research Project of 2009 for fundamental biology with a real impact on farming practices in drought-challenged areas

Developments: BBSRC delivering impact

- Five of the top 25 investors in R&D in the UK are pharmaceuticals or biotechnology companies; two of the five account for 27% of major R&D spending in the UK^[35]
- Bluetongue: A new molecular test, developed and commercialised at the BBSRC sponsored Institute for Animal Health (with colleagues at the French Laboratoire Service Internationale), will positively identify and distinguish seven different European BTV types: vaccination against a serotype of BTV that threatened the UK in 2008 is estimated to have avoided losses of around £400M^[10, 25]
- Research at the Babraham Institute in inflammation and auto-immunity could generate an estimated efficiency saving of £860M pa from successful pharmaceutical development^[30]
- In 2008 GlaxoSmithKline invested c£1.4 billion (more than 35% of its global investment R&D) in the UK, employing around 5,000 research staff (about a third of all its research staff; this compares with c17% of its total workforce being based in the UK) indicating the research focus of its activities in the UK^[36]
- UK food and drink exports grew to £14.3Bn in 2009, a fourth consecutive year of record performance^[39]

WORKING WITH UK INDUSTRY

“BBSRC has created a unique opportunity with its diet and health research industry club (DRINC) for us to meet and network with academic experts. Marks & Spencer are committed to creating innovative, convenient product solutions that support and encourage our customers to choose a healthier diet and we feel that it’s important to underpin these products with strong nutrition science. It is through BBSRC’s scheme that we were able to establish links with the Rowett Institute of Nutrition and Health, Aberdeen University and it is this partnership that led to the development of our new M&S Simply Fuller Longer range.” [Claire Hughes, Head of Health, Nutrition and Science, Marks & Spencer]

BBSRC seeks to engage with industry and other users of the research it funds wherever this adds value. Such engagement can influence the strategic direction of research, encourage networking and interactions between research base and user communities thus enhancing knowledge sharing, innovation and commercial uptake of ideas and technologies. It is vital in ensuring that there is a healthy research base in the UK, undertaking internationally competitive research, and that this research is of real benefit and advantage to the UK economy, in the short and long term.

Engagement and interactions take a variety of forms. Higher Education Institutions, industrialists and other research users are well represented on BBSRC Council, Boards, Panels and Committees, and other formal and informal interactions are woven into all aspects of BBSRC activity. BBSRC runs and participates in numerous schemes to encourage collaborative working, including Research and Technology Clubs, Industrial Partnership Awards, and LINK.

Developments: BBSRC investing in excellent bioscience research

- BBSRC runs four Research and Technology Clubs (Crop Research Improvement Club has been added to Integrated Biorefinery Technologies, Bioprocessing Research, and Diet and Health Research Clubs), involving over 50 companies
- Total income to BBSRC institutes from LINK collaborations and other partnerships and contracts with industry continues to hold up well despite the reduction in size of the institute base, and changes in UK agri-industry: £11.6M in 2006-07 and £11.4M in 2007-08, from seven institutes and £8M in 2008-09 from five^[2]
- £19M allocated in 2008-09 to Industrial Partnership Awards, up significantly from 2007-08, with major investments in IPAs in bioenergy^[2]
- In universities, 95% of bioscience departments funded by BBSRC also receive research income from industry and/or commerce; this represents on average 5% of their total research income, with a further 1% from exploitation income^[19]

Developments: BBSRC delivering impact

- The longest-running club, BRIC, has started to deliver important results; BRIC supports high-quality, industrially-relevant research in a strategically important area, with potential to deliver significant impact. Since its establishment it has^[18]
 - strengthened the UK bioprocessing research community; encouraged new academic researchers into bioprocessing research; provided good training to postdoctoral researchers; developed networks and partnership links between academia and industry.
 - contributed to new centres of excellence in UK bioprocessing research, addressing key bioprocessing challenges, of broad strategic relevance to the UK bioprocessing industry.
 - made noteworthy progress towards rebuilding this essential strength, with new academics and postdoctoral researchers entering the community as a result of BRIC
- BBSRC-funded researchers at the John Innes Centre and elsewhere have, for several years, worked with the pharmaceuticals industry in leading research programmes in *Streptomyces*, which have huge significance for the production of novel antibiotics: an increase of just 1% in revenue streams from new antibiotics would generate revenue potential of c£300M^[20]
- The Babraham Biocubator, managed by Babraham Bioscience Technologies (owned by Babraham Institute), has hosted 60 bioscience companies since 1998, which have raised >£300M in equity finance^[30]

ENCOURAGING ENTREPRENEURSHIP AND COMMERCIALISATION

“The continued funding of fundamental science by BBSRC will be an essential part of future enterprises and, ultimately, wealth creation” [Shankar Balasubramanian, winner of the 2010 Innovator of the Year Award]

BBSRC supports schemes to encourage an entrepreneurial culture within the academic bioscience research base and to help identify and develop specific, exploitable research outputs. These include: the Biotechnology YES (Young Entrepreneurs Scheme) competition to raise awareness of the commercialisation of bioscience ideas among postgraduate students and postdoctoral scientists; the Research Council Business Plan Competition, to help entrepreneurial researchers from across the UK find successful routes to market; the Enterprise Fellowships scheme, run with the Royal Society of Edinburgh, to support researcher involvement in commercialising their research; Industry fellowships to encourage industrialists to spend time in universities; the Follow-on Fund, run with EPSRC, NERC and STFC, to increase the level and accelerate the rate of commercialisation of ideas arising from the research community.

Developments: BBSRC investing in excellent bioscience research

- The 2010 Innovator of the Year Award was won by Shankar Balasubramanian for his work on Solexa sequencing, the high speed genome sequencing technology that is revolutionising bioscience. The Solexa product is based in the UK and currently has 50% market share in next generation sequencing^[10]
- BBSRC's Excellence with Impact initiative gained significant momentum, with 20 bioscience research groups across the UK involved in demonstrating how they are introducing a culture which values impact as well as excellence in research, and how well they are delivering economic and social impact
- Former participants in the Biotechnology YES process developed commercial knowledge and awareness, financial awareness and communication in a commercial setting, and other transferable skills and improved confidence; 94% of former participants felt that the competition improved their employability^[22]
- Oxford spin-out Zyoxel, supported by BBSRC Follow-on fund money, has secured £1M from Hong Kong based CN Innovations Holdings to commercialise a new technology which provides a more realistic tissue environment for drug testing; this has potential to save the global pharmaceuticals industry significant amounts in otherwise wasted development and testing, and thereby saving around 10% of animal testing^[4]

Developments: BBSRC delivering impact

- Over the last ten years, university bioscience departments funded by BBSRC have generated over 200 spin-out companies, over 150 of which are trading and employing over 1,000 people^[19]
- BBSRC institutes have established 16 spin-out companies employing over 130 staff^[2]
- In August 2009, Novacta Biosystems, spun out from the John Innes Centre, received £13.1M investment from Celtic Pharma Holdings and others to develop its novel antibiotics platform to address challenges, e.g. hospital-acquired infections of *C. difficile* and MRSA^[4]
- Other companies have been spun out from JIC's research in *Streptomyces*: Kosan Biosciences; Biotica Technologies; Procarta Biosystems; Mycobics^[20]
- Crescendo Biologics, a spin-out from the Babraham Institute, has raised £4.5M to develop novel techniques designed to bring human antibodies suitable for use in medicine closer to everyday use^[4]
- Over recent years research at the Institute for Animal Health led to the development of Paracox vaccine by Schering-Plough Animal Health Ltd, protecting chickens against the economically important disease, coccidiosis. c1Bn doses are sold annually worldwide^[4]
- Drawing on research funded by BBSRC, Prof Jeff Errington FRS founded Prolysis Ltd, and Demuris Ltd to develop new antibiotics for drug resistant infections^[21]
- Dr Andrew Almond, funded through BBSRC fellowships and Follow-on funding successfully combines running spin out Conformetrix Ltd with his bioscience lectureship^[21]

IMPROVING PUBLIC POLICY

“Research is crucial to find ways to sustainably meet the increase in demand for food, and to support healthier diets.” [John Beddington (Chief Scientific Adviser), March 2010]

“Science and, most importantly, its application on the ground ... is needed to provide the solutions to the huge challenges we face as a nation and globally” [Peter Kendall, President of the National Farmers Union, BBSRC Business, Summer 2009]

BBSRC's research has a very wide impact, the most significant of which is on public policy making and key global policy challenges. In the policy arena, research supported by BBSRC sheds light on many issues of public interest which are of growing importance, particularly climate change, food security, sustainable agriculture and land use, renewable energy, and healthcare. The impact of BBSRC research on policy has been a major focus over the last year of BBSRC's growing activities to identify and assess the impact of our research. As well as building awareness and evidence of existing impact on public policy, BBSRC is working closely with the institutes to ensure their research in particular is made available to policy makers.

The level of public confidence in research-based policy making requires public engagement with, and support for, research within the Research Councils' remits. Openness and responsiveness to public concerns are key elements of BBSRC's activities to maintain public trust in UK bioscience.

Developments: BBSRC investing in excellent bioscience research

- BBSRC's new Strategic Plan identifies three key areas for investment, all with great potential to enhance policy making and address global challenges: food security; industrial biotechnology and bioenergy; basic bioscience underpinning health^[1]
- BBSRC's considerable investment in ageing research is delivering very important, policy relevant results, including:
 - improved understanding of changes to posture and muscle composition as ageing occurs and how to reduce adverse effects
 - how to boost the naturally lower effectiveness of white blood cells in older people
- Scientists at three BBSRC institutes are identifying key factors in the genetics, efficient cultivation and efficient combustion of bioenergy crops (willows and *Miscanthus* grass) which will identify how such crops could provide renewable carbon-neutral sources of fuel for the UK
- BBSRC-funded research is helping to understand how the cycles and interactions in soil contribute to supporting plant life and to its ability to self-renew and break down pollutants
- Funding through the cross-Council Rural Economy and Land Use (RELU) programme is helping us to understand the role of the farm veterinarian, how to reduce the risk of *E. coli* infection in rural communities and how to use “greener” approaches to pest management

Developments: BBSRC delivering impact

- Following confirmation of the H1N1 swine flu outbreak as a pandemic, BBSRC research enabled scientists to progress vaccine screening, using a system developed at JIC licensed to Plant Biosciences Ltd^[6]
- Research on insect pollinators has shown how to lure pests away from food crops towards so-called “trap” plants where they can be more easily controlled; planting of this kind has already helped over 3000 farmers in Eastern Africa^[5]
- Researchers at the Institute of Food Research pioneered the development of predictive computer modelling for the growth of *Clostridium botulinum*, and indicate whether or not it might grow under different combinations of temperature, pH or salt concentration; a small outbreak of which would cost the UK c£350M^[6]
- BBSRC supports policy placements for researchers to spend time with the Parliamentary Office of Science and Technology and, through RELU, shadowing staff at Defra
- Professor Dave Goulson won the Social Innovator of the Year awards for his work disseminating findings about bumblebee conservation through the founding of the Bumblebee Conservation Trust^[10]

DELIVERING HIGHLY SKILLED PEOPLE

“The capacity building awards are proving to be an excellent example of how public and private funding organisations can work together to build an essential area of UK biomedical research” [Dr Mike Collis, IMB project coordinator and chairman of the British Pharmacological Society Integrative Pharmacology Fund, BBSRC Business, April 2009]

BBSRC is committed to maintaining the strength of the UK bioscience base, and its potential for widespread impact, through funding of postgraduate and postdoctoral training, and by working with the universities to attract and retain the best bioscientists. The high-quality training supported by BBSRC, frequently in cutting edge areas of interdisciplinary research, has a substantial impact, by maintaining the supply of quality research expertise for key areas of the knowledge-based economy and across the economy more widely: individuals trained through BBSRC schemes are highly employable, and bring important skills into the economy. The pre-eminence of UK bioindustries is substantially based on the availability of high-level skills and expertise in the UK.

BBSRC works with industry on two CASE studentship schemes: Industrial CASE funds allow leading companies to decide which universities to collaborate with, and individual CASE awards, which have recently been refreshed to bring in new industrial partners, e.g. Organon Laboratories Ltd, and Advanced Technologies (Cambridge) Ltd.

Developments: BBSRC investing in excellent bioscience research training

- BBSRC supports 540 PhD students trained in collaboration with industry through CASE, involving over 200 different companies. In the most recent competition, over 110 four-year PhD studentships were awarded to over 30 companies (including SMEs) for collaborative research, doubling the number of awards made over the previous competition^[2]
- Studentships are increasingly awarded in research priority areas, where BBSRC wishes to develop or maintain critical mass of expertise, including areas in which the Research and Technology Clubs operate
- An independent report on niche skills has endorsed BBSRC’s approach to targeting its support for biosciences training in the right areas^[13]
- Over 2,000 postdoctoral researchers are supported on BBSRC research grants, working in innovative and cutting edge areas of research^[2]
- BBSRC has launched its Advanced Training Partnership in agri-food to establish training for food security research and development, alongside the new industry-led AgriSkills Strategy, which is being launched by Lantra (the sector skills council for environmental and land-based industries) and NFU (National Farmers Union) with support from the Secretary of State for Environment, Food and Rural Affairs. The AgriSkills Strategy aims to ensure the UK can equip itself with the right skills to enable a profitable and sustainable agricultural industry for the future and is complementary to the new BBSRC scheme

Developments: BBSRC delivering impact

- Of BBSRC students awarded their PhD in 2007-08:^[2]
 - 34% moved into industry or commerce (compared with 25% of the 2005-06 cohort)
 - 44% started academic careers (36%)
 - 6% moved to the public sector (9%)
 - 3% went to teach in schools (3%)
 - 92% were employed in some capacity (87%)
- Previous investment (BBSRC with partners from the public and private sectors) to develop skills and capacity in integrative mammalian biology (IMB) is starting to deliver important results: four centres funded through the IMB initiative are attracting a range of additional public-private funding and leading to new links between academia and the pharmaceuticals industry

PROGRESS IN METHODOLOGY AND FUTURE PLANS TO DEVELOP THE EVIDENCE BASE

In 2010 BBSRC introduced:

- A new evaluation framework in which impact is a key focus^[14]
- A new approach to case studies combining contemporary history with formal economic impact assessment^[20]
- A new approach to research evaluation combining a review of outcomes and impacts from responsive mode research^[16] with those from managed research programmes^[17] [report due June 2010]
- A strengthened commitment to build on existing links between BBSRC institutes and industry by developing institute capacity for knowledge exchange and commercialisation

And worked with RCUK to support:

- the development of a toolkit for assessing the economic impact of research^[31]
- a pilot study of joint publishing patterns between academics and research users in the area of applied genomics
- with Technology Strategy Board an evaluation of joint working between RCUK and TSB [report pending]
- through RELU the development of the Stakeholder Impact Analysis Matrix (SIAM) for demonstrating impacts across different sectors

To extend further our understanding of EI from **excellent research** BBSRC will:

- Finalise a meta evaluation of the responsive mode remit as a whole, drawing on the detailed evaluations of each responsive mode area, to bring together all the relevant evidence
- Aim to build a portfolio of detailed case studies and timelines demonstrating the widespread impact of research funding over different periods of time
- With RCUK introduce a new system to collect outcomes and impacts from all funded research

Further evidence of EI through **collaboration** will be gathered from:

- An evaluation of the IPA scheme, to identify specific and potential impact
- Continue to work with RCUK and TSB on approaches to evaluation, building on the outcomes from the new procedures introduced this year

Further evidence of EI through **training and skills development** will be sought by:

- A formal evaluation of BBSRC's David Phillips fellowships schemes
- A formal evaluation of BBSRC investment in doctoral training grants
- In association with The Association of the British Pharmaceutical Industry (ABPI), an analysis of the economic impact of CASE PhD students in the workplace

We expect to demonstrate the continued effectiveness of our approach to **commercialisation and entrepreneurship** through increased and more widespread demand for funding through KT schemes in coming years. In addition BBSRC will:

- Finalise work with other Research Councils to evaluate the RCUK Business Plan Competition
- Continue to build knowledge exchange and commercialisation (KEC) activities at BBSRC-sponsored institutes, key players in the delivery of economic impact, and demonstrate outcomes through the next Institute Assessment Exercise, and a review of KEC arrangements

Further evidence of impact on **public policy** will be developed by:

- Further evaluation of cross-Council RELU programme
- Identification of further policy-related impact from increased monitoring of EI at institutes

FUTURE PLANS: INVESTMENT FOR FUTURE EI

BBSRC will continue to support the **highest quality bioscience research** through responsive mode and research programmes and to sustain the dynamic UK bioscience research base. Specifically over 2008-11 BBSRC will ensure the continued health and international competitiveness of UK bioscience by:

- Investing £115M in systems/predictive biology including tools and resources to effect further change and consolidate advances made under SR2004
- Protecting levels of responsive mode funding
- Providing £80M for FEC, to support investigator-inspired research, the lifeblood of innovation

BBSRC has major plans to extend its portfolio of **collaborative research**, in partnership with other funders, particularly the TSB. Specifically, BBSRC plans to:

- Increase business interactions by redirecting £50M to research directly relevant to industry
- Provide at least £34M for complementary and collaborative activities with the TSB
- Operate at least four Research and Technology Clubs by 2011, with over 40 companies
- Increase the number and effectiveness of business-university links, including fostering specific larger-scale partnerships in the biomedical sector and supporting technology development approaches in the agri-food sector

BBSRC will provide the **skilled people** for our science base, bioindustries and economy, by:

- Increasing by a third, to £62M, funding for fellowships and training and skills development, and increasing the number of PhD students to 2,400 by 2010-11
- Virtually doubling funding for fellowships to £10M, developing early career bioscientists
- Investing up to £2M in new Industrial Impact Fellowships, to bring professionals from industry to work on BBSRC-funded projects, programmes, and in BBSRC centres, to support the translation of academic research into economic and social benefits for the UK

BBSRC regards a further **change of culture within the academic community** as key to delivering a step change in economic impact of its research. To facilitate this BBSRC will:

- Provide up to £15.5M over the SR 2007 period to strengthen business awareness and focus on academic research through entrepreneurship and commercialisation
- Awarding the Excellence with Impact prizes for promoting a culture of EI within university departments, to complement the Innovator of the Year celebrating the delivery of EI by individuals
- Increase by 50% the number of Enterprise Fellows supported

BBSRC plans significant investments in research relevant to **public policy development** and will run further programmes to encourage public engagement:

- BBSRC to lead a multi-funder programme of research to address the grand challenges of global food security for the next spending review
- Commit £22M to research in underpinning food security during environmental change, including £7M to help secure agriculture and animal health in the developing world (with DfID)
- Secure national research capability and unique facilities in key strategic areas, particularly in animal health and welfare with major capital commitments of around £200M, focusing on redevelopment of IAH-Pirbright, as vital national facility
- Increase the impact of public dialogue activities, including public dialogue on energy research and activities to celebrate the Darwin bicentenary
- Share good practice between BBSRC institutes through networking activities, and among HEIs through the RCUK Beacons

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Chart 1: BBSRC Research Funding: Analysis of Gross Expenditure by Funding Type

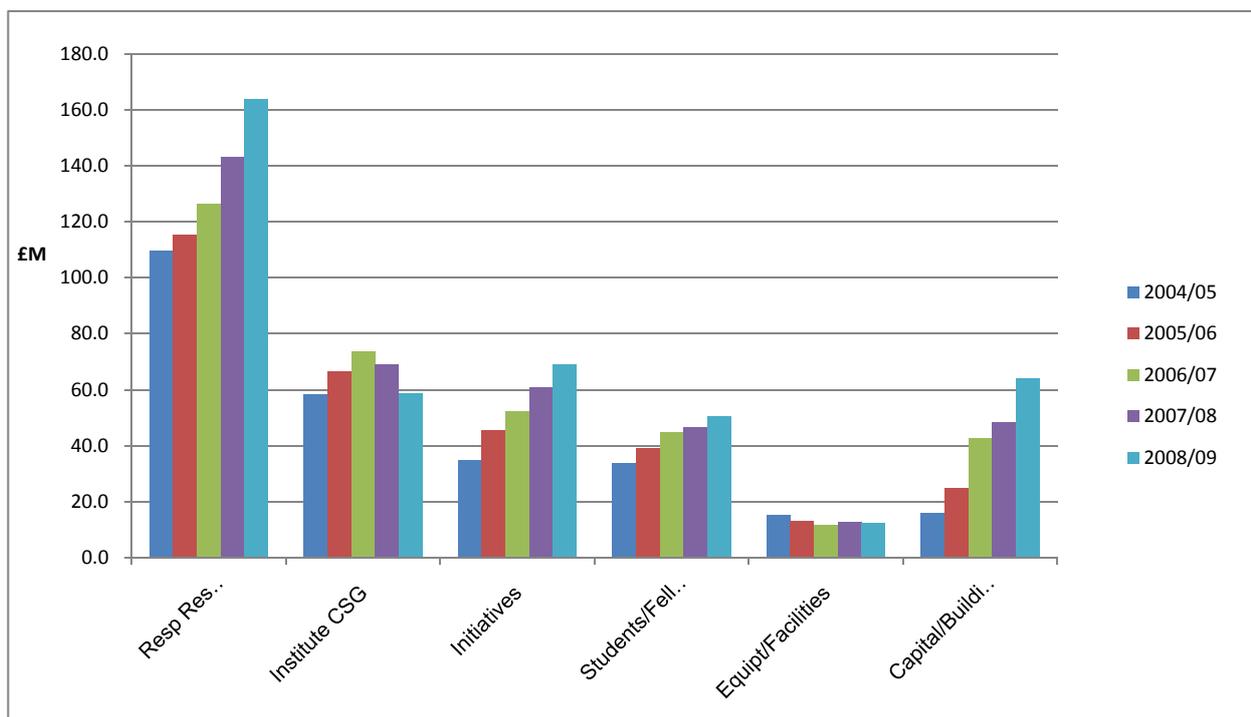
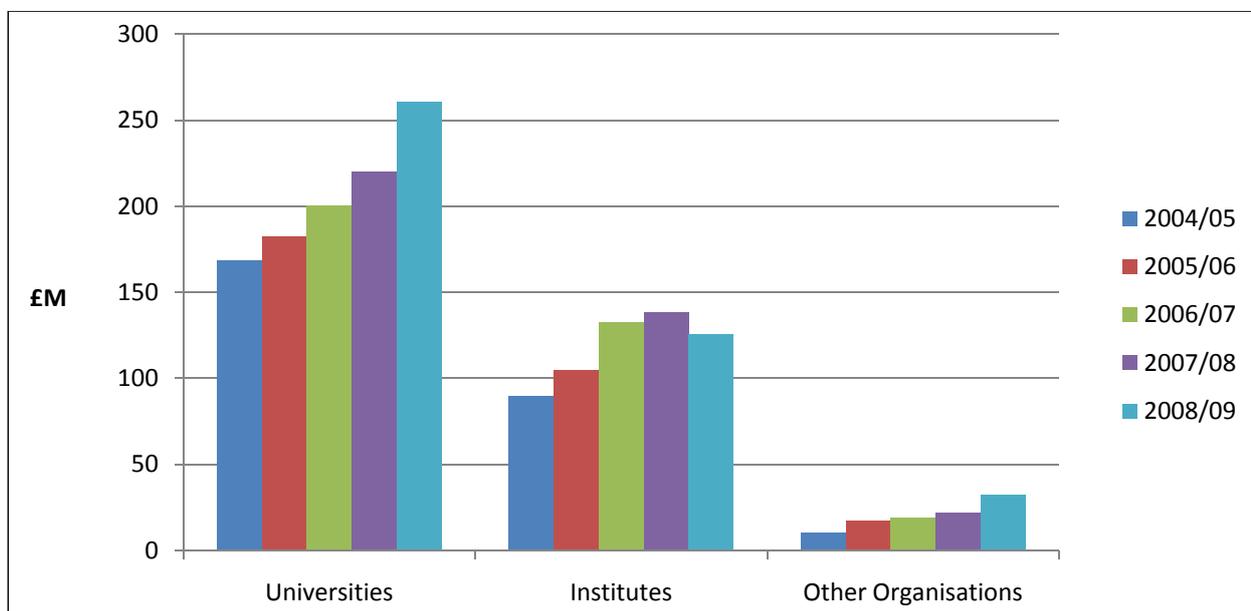


Chart 2: BBSRC Research Funding: Analysis of Gross Expenditure by Institution Type



Source: BBSRC Annual Reports