

Securing world-class research in UK universities

Exploring the impact of block grant funding



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Foreword



**Sir Alan Langlands,
Chief Executive, HEFCE**

The plurality of funding for university-based research, from public and other sources, is a major strength of the UK system.

HEFCE's quality-related research funding is provided as one 'leg' of the dual support system, enabling institutions to maintain a dynamic and responsive research base of world-leading quality. This encourages ground-breaking basic research, with the potential to drive future innovation and respond quickly to changes in the external environment.

Moving forward we need to:

- maintain the balance between funding for curiosity-driven research and work targeted on identified national needs and priorities
- develop the new Research Excellence Framework to assess the quality of research outputs, their impact on the economy and society and the vibrancy and professionalism of the research environment
- continue to develop the infrastructure and human capital required to support industry collaborations, technology transfer and inward investment.

Strong basic research is a cornerstone of Britain's success and, over time, it can make a real difference to our everyday lives. It is valued by industry and by society but it will continue to need long-term commitment, time and money. HEFCE – the main institutional funder – will continue to work with the Research Councils – the main project funders – in a collaborative partnership.



**Professor Steve Smith,
President, Universities UK**

All of the evidence shows that the research undertaken in our universities is absolutely world class and has wide-ranging impact. This success is underpinned by the fact that we have autonomous institutions that receive a block grant, known as quality-related funding, from the funding bodies, that gives university leaders the freedom to take strategic decisions about their research activities.

This freedom means that risky or more innovative research can be supported, often before it comes onto the radar of other research grant funders. It is not, however, always obvious what role this funding plays, because it is often hidden.

This report clearly shows the vital role that quality-related research funding plays in sustaining the research base, providing the flexibility to respond to emerging societal challenges, and supporting the next generation of researchers who will go on to deploy their skills in a whole range of sectors.

The impact of this funding is wide-ranging and it is vital to sustaining our knowledge economy and supporting economic growth.

Key points

Supporting the cutting edge of knowledge

The flexibility of QR funding allows universities the freedom to support the research areas that are most important to them by:

- investing in strategic priorities or developing new pockets of expertise
- supporting exploratory work on high-risk, but potentially high-reward, projects before seeking further funding from other sources
- supporting the development of partnerships with users of research, helping to achieve greater impact from research findings.

Sustaining responsive research

The block grant approach allows universities to choose how the funding should be spent. By allowing those 'closest to the action' to make these decisions, the UK has been able to:

- sustain research subjects that have faded in and out of popularity but which are now critical to our success
- maintain research groups between funding for specific projects so they can build knowledge and understanding, leading to greater development and exploitation of findings
- ensure research needs are anticipated through strong relationships with industry and Government
- build new research teams in areas of national need to address current issues.

Sustaining a world-class research environment

World-leading research requires a world-class research environment. The flexible nature of quality-related research (QR) funding allows it to be combined with other sources of funding to invest in top-quality facilities. The investment may be in:

- computing, key pieces of equipment or high-quality buildings
- members of staff to support co-ordination of research across disciplines to respond to the major challenges of the 21st century.

Developing people and skills

Developing tomorrow's researchers requires investment today. QR funding allows universities to support development in different ways including:

- supporting postgraduate students by providing opportunities for training and development
- providing bridging funding to retain early-career researchers beyond the scope of funding for a specific project
- enabling staff to take time out from teaching schedules to undertake initial work for a research project, publish papers and prepare grant proposals
- engaging with the research community. QR funding allows this crucial exchange of knowledge to occur within and beyond universities, nationally and internationally.

Introduction

The UK's academic research base delivers world-leading research and supports the knowledge economy. It is underpinned by the 'dual support' funding system, in which grants from HEFCE and the other funding bodies supports the research infrastructure and enables institutions to undertake ground-breaking research in keeping with their own mission, while grants for specific projects and programmes are provided by the Research Councils, charities, the European Union, government departments and industry.

The UK research base is world class. It is second only to the USA on leading scientific indicators and crucially, during the current economic climate, ranks first on publication productivity and citations in relation to research and development public spend¹.

Investment in the UK research base also enables innovation and commercialisation activities, so essential to supporting the success of the UK economy and society, and to paving the way for new products and services. The UK has the highest level of activity on four out of six key commercialisation indicators – invention disclosure, licences executed, licences income in relation to research expenditure, and spin-out companies².

The core grant provided by the funding bodies will amount to almost £2 billion of support for the UK research base in 2009-10, yet it is often the unsung hero of this partnership.

Commonly known as quality-related (QR) funding because it is allocated selectively on the basis of excellence, it is provided as a block grant which allows higher education institutions the freedom to decide how they use these funds. This enables a degree of research stability and independence not provided by other funding sources.

Stability and independence are critical. Autonomous universities can drive innovation and respond flexibly to changing needs; they can invest in new and emerging areas; and they can grow and support new talent and protect important research areas.

But the important activities that benefit from QR funding are often hidden or go unrecognised. We hope that the examples provided in this publication will demonstrate the wide variety of ways in which universities use QR funding, all of which are crucial to supporting a vibrant and healthy research base.

The examples range from supporting cutting-edge research at its initial stages through to supporting early-career researchers who will become the world-leading researchers of tomorrow; and they stretch right across the breadth of research from the sciences to the arts and humanities.

This is only a small selection of the ways in which QR funding is supporting the UK research base, but we hope it highlights the way QR funding underpins the most productive and efficient publicly funded research system in the G8¹ and enables the UK to continue to compete and thrive on the world stage.

¹ 'International benchmarking study of UK research performance 2009', published by Evidence, commissioned by the Department for Business, Innovation and Skills (www.dius.gov.uk/science/science_funding/science_budget/uk_research_base).

² 'Intellectual property and research benefits', Professor Paul Wellings, 2008. A report prepared for John Denham MP, Secretary of State for Innovation, Universities and Skills.

Supporting the cutting edge of knowledge

The flexibility of QR funding allows universities the freedom to support the research areas that are most important to them. They can invest according to their strategic priorities and particular research strengths and focus, or use the funding to develop new pockets of expertise.

For example, QR can be used to begin exploratory work on high-risk, but potentially high-reward, projects before seeking further funding from other sources. It may also be used to support the development of partnerships with users of research, helping to achieve greater impact from research findings. As the examples in this document show, this might be working with the World Health Organisation to target major public health problems more effectively, advising the Government on policy for early childhood development, or many other impacts.

▶ University of Aberdeen: Arresting Alzheimer's

Dementia affects all ages, but particularly older people. In the UK alone, 700,000 people have dementia and this is forecast to rise to 1.7 million by 2051³. As well as the personal costs, which are often devastating, it is estimated that dementia costs the UK over £17 billion a year.

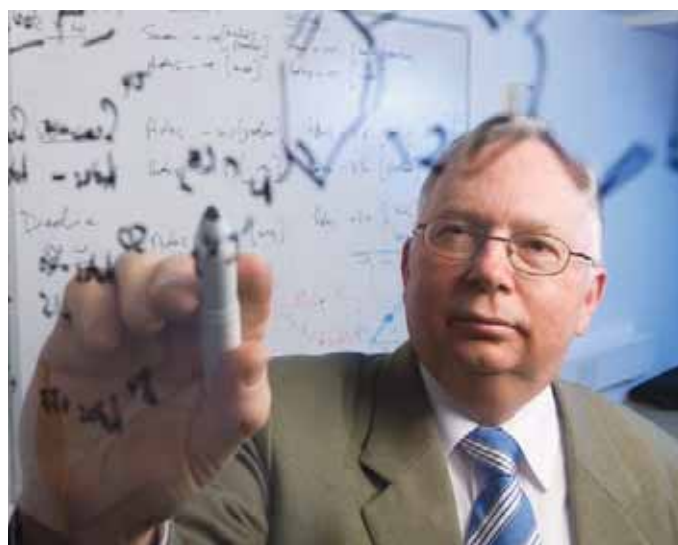
Alzheimer's Disease is the most common form of dementia. As it progresses, 'plaques' and 'tangles' build up in the brain, causing a shortage of some brain chemicals and the death of some brain cells.

Professor Claude Wischik's research team at the University of Aberdeen are working with TauRx Therapeutics, a spin-out company from the university, to develop a treatment for Alzheimer's. They have already managed to reduce mental decline by 80 per cent over two years in a large trial they completed in 2008, and are confident they can do even more, aiming to achieve complete arrest of the disease – perhaps reversal at the earlier stages.

QR funding was essential in providing the infrastructure for this research, including imaging facilities, and expertise in medicinal chemistry and medical sciences. In addition, it supported the staff time required to develop and maintain excellent relationships with the NHS, largely due to the flexibility of QR funding.

Professor Wischik (pictured) founded TauRx Therapeutics in 2002 with investors from Singapore and the university's support. This breakthrough in the treatment of Alzheimer's Disease is an example of how the close relationship between the university and a spin-out company provides the ideal platform for major medical advances.

The team are now preparing for the final trial needed before product launch. If the results continue to be positive, this pioneering treatment could be publicly available by 2012.



³ Figures from the Alzheimer's Society 'Dementia UK' report by Kings College, London and the London School of Economics, available at www.alzheimers.org.uk

University of York: Photographing the brain

The University of York's Neuroimaging Centre (YNiC) works on new technologies and techniques for taking neurological images. The aim is to give doctors more information about patients' conditions, more quickly and inexpensively than ever before.

By combining QR funding with other grants and contributions, the university has developed new ways to explore the chemistry, physiology and psychology of human brain function. For example, YNiC has pioneered the use of parahydrogen – the fuel used in the space shuttle – in chemical brain imaging, bringing together chemists and psychologists and financially supporting the initial investigations.

YNiC's new method has cut the time it takes to obtain highly detailed magnetic resonance imaging (MRI) scans from over 100 hours to a fraction of a second. Similarly, the time taken to record nuclear magnetic resonance data has been reduced from 90 days to five seconds, with the sensitivity of the imaging improved by over 1,000 times. The centre's research has also increased the range of medical conditions that can be examined using neuroimaging, from cancer diagnoses to orthopaedics and trauma. All of this will lead to huge information and efficiency gains in medical treatment.



Roehampton University: Improving social justice

Universities can use QR strategically to develop their key research strengths. For Roehampton University, this included the creation of a small number of multidisciplinary research themes which addressed the challenges at the heart of the university's institutional

values. Focusing on these strategic themes allowed the university to build critical mass in these areas; social justice is one of those themes.

Dr Aisha Gill (pictured) is a senior lecturer in criminology whose work on social justice has been supported through QR investment. Dr Gill's work has been widely recognised, providing expert advice to Government and the voluntary sector on legal policy issues related to so-called 'honour' killings and forced marriage. Dr Gill has challenged politicians to be more inclusive of Black, minority ethnic and refugee women's voices in policy-making on issues of gender-based violence and human rights.

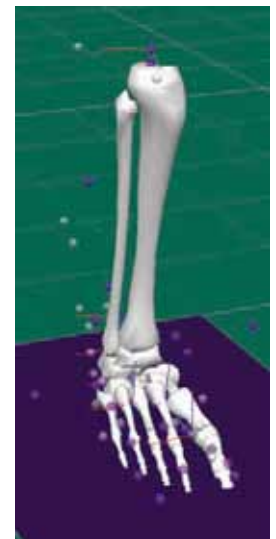


Glasgow Caledonian University: Improving patients' quality of life

Foot and ankle problems cause a significant amount of impairment and disability among patients with conditions such as diabetes and rheumatoid arthritis. Left untreated, they can have severe long-term consequences, in some cases leading to amputation. Orthoses – devices that support or correct musculoskeletal problems – can provide stability and reduce pain.

QR funding at Glasgow Caledonian University has supported significant growth in musculoskeletal rehabilitation research, including the development of a world-class human performance measurement laboratory and medical imaging facilities.

QR funding has also enabled the university to secure significant EU funding for a project focused on patient benefit. Standard orthotics devices do not always fit well and can be slow to deliver the desired effects; the university team are working with small and medium-sized enterprises on innovative manufacturing processes that will change that, and aim to develop a quick, personalised and cost-effective approach to orthotics that maximises patients' quality of life.

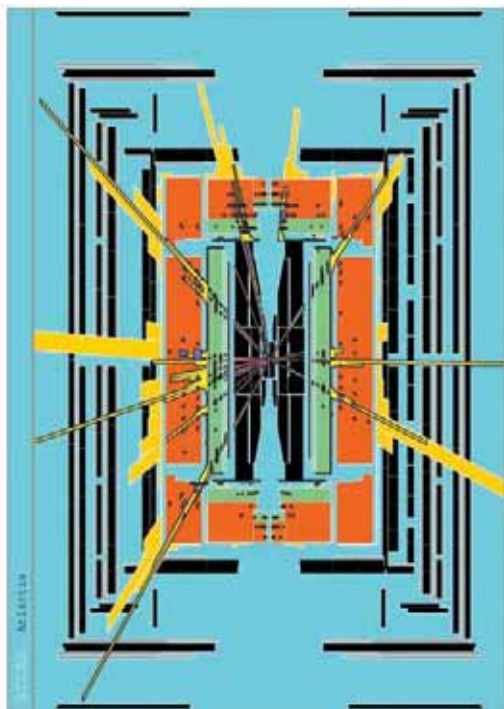


Durham University: Unlocking the universe's secrets

The UK's Institute for Particle Physics Phenomenology (IPPP) was set up by Durham University in 2000 using QR funding combined with support from the then Particle Physics and Astronomy Research Council (now the Science and Technology Facilities Council). The investment enabled Durham to secure further funding from a charity, the Ogden Trust.

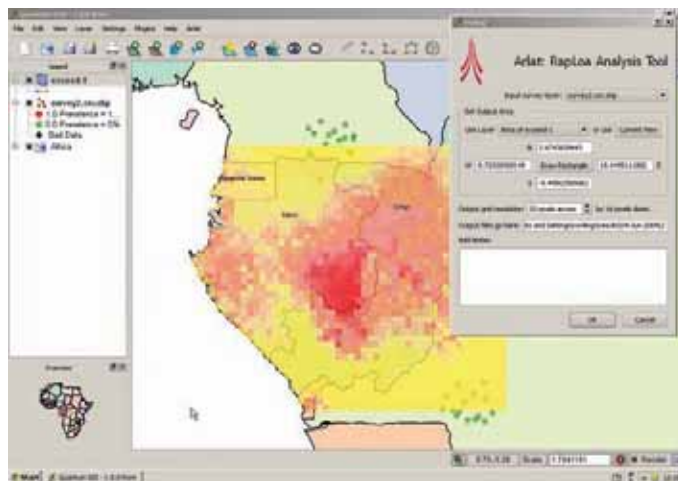
The IPPP fosters world-class research into the tiny building blocks of all matter in the universe and the forces that operate between them, linking theory and experiment. This includes much of the analysis behind the Large Hadron Collider in Geneva, a giant scientific instrument that is helping to seek answers to some of the universe's greatest questions such as the mysteries of antimatter and dark matter, the possibility of extra space-time dimensions and the potential discovery of the Higgs Boson – a hypothetical particle which, if it exists, would help explain how particles acquire mass.

The combination of funding has revitalised this area of study in the UK. Nearly one-tenth of the world's published and top-cited papers in particle physics phenomenology now originate from the IPPP, dramatically contributing to the UK's standing in physics internationally.



Lancaster University: Targeting treatment for tropical disease

River blindness (onchocerciasis) is a major health problem in wet tropical regions. The African Programme for Onchocerciasis Control (APOC), co-ordinated by the World Health Organisation across 19 nations, seeks to reduce the public health burden by treating whole communities with Ivermectin, a drug that fights the parasites that cause river blindness.



More than 30 million people have been treated. But Ivermectin can cause severe, sometimes fatal, adverse reactions when given to people who are also heavily infected with 'eye worm' (Loa loa).

APOC therefore takes precautions in areas of high eye worm prevalence before mass treatment with Ivermectin, and spatial statistical modelling by Professor Peter Diggle of Lancaster University is helping with this by enabling treatment to be better targeted. Lancaster's expertise in statistical modelling has also helped World Health Organisation researchers to develop a questionnaire that is inexpensive to use but effective in identifying areas where there is a high prevalence of eye worm.

Development of international partnerships such as this usually takes several years and therefore often depends on the stability of QR funding. And the real-world impacts are clear: Lancaster's use of this funding advances knowledge in tropical diseases and saves lives.

Sustaining responsive research

Universities are given QR funding as a block grant. This means that, although the amount is calculated by reference to the quality performance of departments in different subjects, universities can choose to spend the money as they think best. By allowing those 'closest to the action' to make these decisions, the UK has been able to:

- sustain research subjects that have faded in and out of popularity but which are now critical to our success
- maintain research groups between funding for specific projects so they can build knowledge and understanding, leading to greater development and exploitation of findings
- ensure research needs are anticipated through strong relationships with industry and Government
- build new research teams in areas of national need to address current issues.

▶ University of Bath: Changing attitudes to death

The University of Bath used QR funding to establish the Centre for Death and Society in 2005. It is the only centre in the UK devoted to the study and research of social aspects of death, dying and bereavement.

For example, although more than half of terminally ill people want to spend their final days at home, less than 20 per cent are actually able to do so. The centre explores issues surrounding this and other problems.

QR funding has been essential in setting up the centre and maintaining the research team. Its stability has allowed the team to build relationships with policy makers and, as a result, the researchers (pictured) are often called upon to contribute to government and charity policies, and to provide education and training for academics and practitioners.

Professor Allan Kellehear, Professor of Sociology at the

centre, is a member of the Department of Health's End of Life Care Strategy steering group. He advises the Department of Health and the National Council for Palliative Care on how to raise the profile of end of life care and how to change attitudes to death and dying in society.

Professor Kellehear also provides practical support to four strategic health authorities in developing programmes that encourage individuals and organisations to help change attitudes towards dying, death and loss in their local communities.

QR funding provided the flexibility to bring this multi-disciplinary team together and has allowed academic staff the time to develop the centre into the highly respected resource that it is today.



▶ University of Sunderland: Building a software city

Sunderland Software City was set up to encourage the growth of the software industry in the north-east of England. The aim is to make the region a location of choice for software-focused businesses and thus contribute to economic growth.

The University of Sunderland helped found this project through its strength in computing and digital media research. As part of this it used QR funding to set up initiatives in support of software and digital media in the region. The first was a Multimedia Club for local companies, which supported networking activities and raised awareness of what is possible with cutting-edge research; from this, further projects grew

with the support of regional funding.

Through this activity, the university obtains real-world case studies that can be used in research projects. The insights gained also influence the content of undergraduate teaching, helping to develop graduates who are well prepared for the workplace.



▶ UEA: Improving diet and health

The Diet and Health Group at the University of East Anglia (UEA) explores contemporary public health problems in the UK. It was established through the flexible use of QR funding, which enabled the university to rapidly build a successful team, attracting research funding from a range of sources including the EC, industry, charities and



Research Councils.

The group undertakes a broad range of research, from physiological investigations to community-based studies, looking into questions such as the nutritional issues associated with an ageing population. It works in partnership with a range of organisations with public health interests, such as the Institute for Food Research, the Norfolk and Norwich

University Hospitals NHS Foundation Trust, and Harvard School of Public Health.

It is well placed to provide answers to some of today's key social and health challenges. For example, Professor Aedin Cassidy is working with Diabetes UK to investigate if flavonoids – compounds found in cocoa – improve the level of defence against heart disease over and above the protection provided by conventional drugs. If confirmed by the clinical trial, this could have a far-reaching impact on the advice given to postmenopausal women with Type 2 diabetes, who are at higher risk of developing heart disease.

▶ University of Reading: The UK's only dedicated soil science department

Following the closure of its undergraduate teaching programme, coupled with periods of difficulty in obtaining funding for specific projects, sustaining the Department of Soil Science was a difficult choice for the University of Reading. But the university recognised the importance of soil science to the UK and with the support of flexible QR funding the department has been sustained.



The only department dedicated to soil science in the UK, it aims to develop a thorough understanding of soil within the earth's systems using field research, laboratory experiments and modelling techniques.

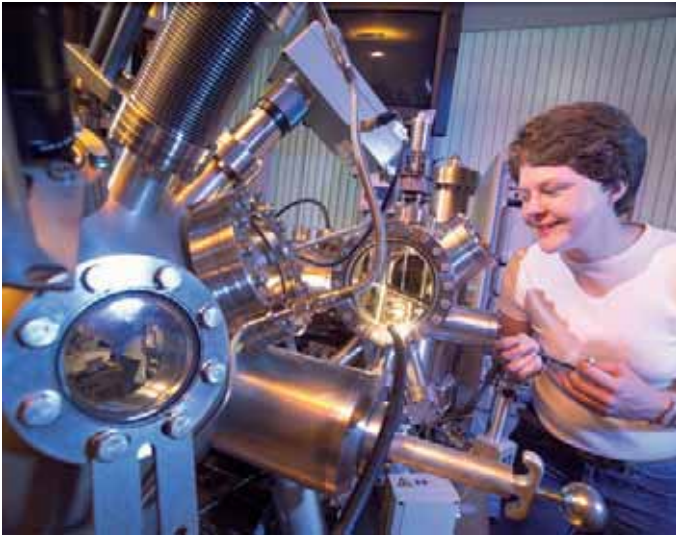
Today's soil scientists are actively involved in solving some of society's most pressing problems. They play a role in maximising food production while maintaining the quality of the environment, planning efficient urban development, safely disposing of waste materials, monitoring the use of land, and conserving and protecting the soil resource.

The department also plays an important part in the university's Walker Institute, which brings together expertise across a range of disciplines that are central to climate system science. The institute aims to address important issues such as how pollutants affect climate, the potential to forecast natural climate variations over seasons and decades, and the influence of climate on agriculture and water resources.

▶ Swansea University: Early disease detection

One of the biggest challenges facing healthcare of the future is enhancing early intervention in diagnosing and treating diseases such as cancer, heart disease and diabetes. The key to early intervention is the earliest possible detection of disease, which is exactly what Swansea University's Centre for NanoHealth is hoping to advance.

The Centre for NanoHealth is a £22 million collaboration that will bring together the expertise of clinicians, life scientists, engineers and industry under one roof. The Centre originated from a partnership between the university's



Multidisciplinary Nanotechnology Centre (MNC) and Medical School to translate nanotechnology applications into healthcare. QR was used to co-fund four RCUK fellowships which cemented and advanced this partnership.

But the support of QR in reaching this point goes back further than this partnership. The university formed the MNC in 2001 to address future challenges which required a multidisciplinary approach and sustained QR investment in new academic staff provided a significant injection of research capability.

The long-term stability and flexibility of QR has enabled Swansea to restructure, invest and advance to produce a unique facility which will be the first of its kind in Europe and will enhance the quality of life for people worldwide by detecting diseases at their earliest stage.

▶ University of Oxford: Sustaining a speciality in early years education

Professor Kathy Sylva's group on early education at the University of Oxford – the Families, Early Learning and Literacy group – is supported by a mixture of QR funding and funding for specific projects. Through flexible use of these funding sources, Professor Sylva (pictured) can sustain a strong team that continues to build on experience.



To enable others to benefit fully from their research, teams such as this need to build expertise and relationships over a period of time. QR funding is stable but offers flexibility, so it enables research groups to be maintained and developed, leading to greater advances and exploitation of findings – other funding that only covers specific projects can result in loss of contacts and continuity through staff moving on to other jobs when that funding runs out.

This team has pioneered studies on early childhood education and care, with a particular focus on how schools and families influence children's development. Recent work has included increasing the understanding of the influences of different types of early childcare on children's development and the effectiveness of pre-school education and care.

The group has responded quickly and in depth to government initiatives including providing specialist advice to House of Commons committees, the Prime Minister's Strategy Unit, and Government ministers. Professor Sylva is Specialist Advisor to the House of Commons Select Committee on Children, Schools and Families.

▶ University of Exeter: Helping community relations

Middle East and Islamic Studies enjoys a high level of topical and political interest, but the numbers of academics working on these subjects in UK universities remains very small. QR funding is therefore crucial to maintain this level of research and allow the researchers to respond to current challenges.

The University of Exeter is home to the Institute of Arab and Islamic Studies, supporting more than 20 academics working across the humanities and social sciences. The Institute has assisted considerably in the development of community relations involving Muslim populations, particularly in the very sensitive years following 2001. The institute has made a significant and important contribution to a range of key debates over the past 10 years, including the Islamic radicalisation of British-born citizens and what it means to live as a Muslim in modern Britain.

The Institute has been involved in developing government understanding in key debates. Professor Gareth Stansfield is a leading expert on the modern politics of Iraq and has worked extensively on UK foreign policy towards the region. In 2009 he briefed the Foreign and Commonwealth Office and the Cabinet Office on the status of the 'disputed territories' in Iraq, after spending an extended period in Baghdad and Erbil as a Senior Political Advisor to the UN.



Sustaining a world-class research environment

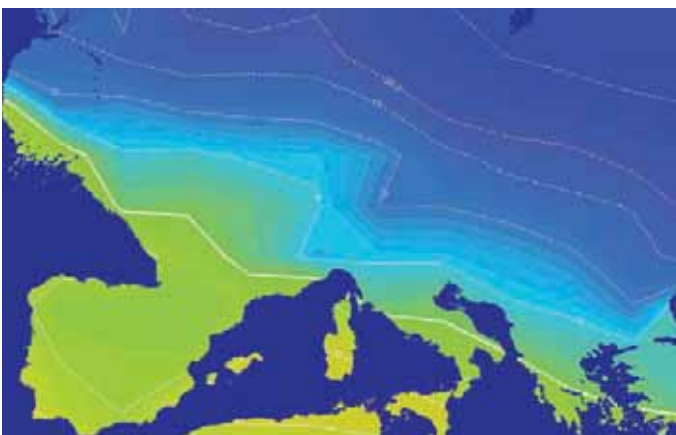
World-leading research requires a world-class research environment. The flexible nature of QR funding allows it to be combined with other sources of funding to invest in top-quality facilities. The investment may be in computing, key pieces of equipment, or in providing high-quality buildings to support high-quality research. Universities can also invest QR funding in members of staff to support the research effort such as co-ordinating research across disciplines, enabling them to get the maximum impact from research – for example, by co-ordinating responses to the major challenges of the 21st century such as climate change and global security, which require a multidisciplinary approach.

▶ University of Bristol: High-performance computing

QR funding has allowed the University of Bristol to provide a unique, state of the art machine room to house 'BlueCrystal' – a new high-performance computing facility. The room can be remotely managed and is fitted with an air-conditioning system that uses energy-efficient, water-cooled racks.

BlueCrystal is one of the fastest and largest computers of its kind in the UK, able to carry out more than 30 trillion calculations a second. High-performance computing is essential to cutting-edge research in many disciplines, and this facility is revolutionising work in areas such as climate change, drug design, aerospace engineering, and flood risk management.

For example, BlueCrystal has already produced important new results in simulations of the effects of planting 'bright' crops that could mitigate more than 25 per cent of the predicted climate warming during the coming century. This has a potentially huge impact for agriculture. Other work has given new insights into how humans adapted to past climate change; this was featured in the BBC series 'Incredible Human Journey'.



▶ University of Kent: A space for drama, film and visual art



The University of Kent's School of Arts is one of the largest of its kind in the UK, with a national and international reputation for innovation in

teaching and research. The university would not be able to continue to excel in these areas without the facilities to support them.

The university has invested around £750,000 of QR funding in a new building for the school, designed by award-winning architects Hawkins\Brown. It will consolidate the school into a single location, encouraging further interdisciplinary teaching, learning and research, and will include state of the art facilities including drama studios, a film studio and editing suite, a large gallery and social spaces.

East Kent is an area undergoing extensive cultural regeneration and the school, with underpinning funding from QR, is increasingly taking an active part in this process. Drama staff at the school have acted as consultants in the redevelopment of Canterbury's Marlowe Theatre, particularly on the creation of a new studio space. The school also has a long-standing relationship with the Gulbenkian Cinema (Kent's regional film theatre) which has presented seasons and special screenings curated by school staff, and with the Museum of Canterbury, where staff and students have curated exhibitions.

▶ UCL: Maximising resources and impact



Responding to the major challenges of the 21st century, such as climate change and global uncertainty, requires the co-ordination of researchers across all disciplines. University College London (UCL) has begun to build strengths in research facilitation and co-ordination by using QR funding to appoint three school research facilitators.

The facilitators bring together multidisciplinary teams that enable new approaches to addressing global challenges such as global security and climate change. For example, following a recent call by the Engineering and Physical Sciences Research Council, the facilitators set up teams in areas such as security science and financial computing in a way that would not have been possible without the QR funding to support them.

The facilitators also advise researchers applying for unfamiliar funding streams. This has ensured that researchers have easy access to the most up-to-date and relevant information, saving time that can then be used for other activity, and propelling researchers forward as they establish their careers.

▶ University of Edinburgh: Flying to investigate air and earth

The University of Edinburgh's School of Geosciences explores the factors and forces that shape our world. The school's Global Change Group aims to forecast the nature of human impacts on our environment by determining how the earth's systems work, how they operated in the past and where they are headed in the future.

The school has used QR funding to purchase an aircraft which can probe the lower atmosphere and collect data on its interaction with the land surface. The aeroplane enables



researchers to make measurements of gas concentrations in the atmosphere up to an altitude of 10,000 feet and to produce images of the earth's surface below. The team can also directly measure the exchange of gases between the earth's vegetation and the atmosphere while flying low above the ground. This is a vital tool in understanding the effect of natural processes on human emissions in the atmosphere.

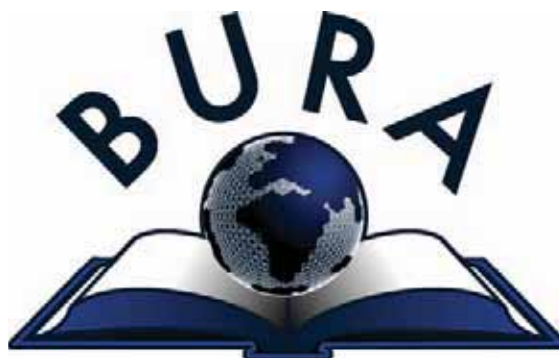
The aircraft underpins an increasing number of research projects which would otherwise not have been possible. It is unlikely that such investment would have been funded by other sources through single grants.

▶ Brunel University: A research archive with worldwide benefit

Effective sharing of research findings is essential for a high-quality research system, but represents a considerable challenge. Brunel University researchers have tackled this by setting up the Brunel University Research Archive (BURA) to preserve and disseminate the work produced at the university.

Established in 2006, it allows electronic access to the products of Brunel research. The archive now contains over 3,100 full-text articles, including doctoral theses, and there have been more than one million downloads.

This open-access archive raises both the impact of research and its value through making it available for others to build on, ensuring that publicly funded research is made as widely and freely available as possible.



Developing people and skills

Developing tomorrow's researchers requires investment today. The flexibility of QR funding allows universities to use it to support development in different ways including:

- supporting postgraduate students by providing opportunities for training and development
- providing bridging funding to retain early-career researchers beyond the scope of funding for a specific project. In addition to benefits for the university, this supports researchers at a crucial time in their careers
- enabling staff to take time out from teaching schedules to undertake initial work for a research project, publish papers and prepare grant proposals. Again, this is particularly important for early-career researchers
- engaging with the research community. The importance of networking with peers cannot be overestimated – it is how research ideas are shared, new ideas and approaches considered, and partnerships and collaborations formed. QR funding allows this crucial exchange of knowledge to occur within and beyond universities, nationally and internationally
- providing co-funding, because many funders of specific projects require universities to co-fund personal awards, such as fellowships.

► Royal Veterinary College: Retaining research talent

The Royal Veterinary College (RVC), University of London, has used the flexibility of QR funding to create a bridging fund that allows it to support high-quality staff whom it cannot employ permanently.

These include Dr Mark Cleasby, a qualified vet researching in basic science, who was seeking work in the UK after a postdoctoral position in Australia. His rare mix of skills,



and research interest in insulin resistance and diabetes, fitted well with the university's research strategy, but no post was available for him at the time. The flexibility of QR funding was used to give Dr Cleasby a temporary contract, and from this position he developed pilot data and won a University Award from the Wellcome Trust.

As both a vet and a scientist, Dr Cleasby can provide versatile teaching support as well as take part in the RVC's research strategy of learning from its veterinary patients. Animal cases of obesity, such as the dog pictured, are increasing, as they are in humans, and obesity can often precede the development of Type 2 diabetes; meanwhile, research into why insulin resistance occurs in some animals but not others may help us understand and treat human health problems.

At the end of his Wellcome Trust University Award, Dr Cleasby will be offered a permanent post.

► Goldsmiths: Supporting early-career researchers

Many funders who support specific projects require co-funding of fellowships to ensure universities are committed to supporting the individuals. Co-funding is usually found from QR.

At Goldsmiths, University of London, Dr Lauren Stewart was awarded a Research Councils UK fellowship in 2006. With

part-funding over the first five years, supported by QR, she has established herself in a permanent lectureship and developed a highly productive research programme investigating the cognitive neuroscience of music.



This is a topic of outstanding significance within brain research. Not only does this research field address the neuroscientific basis of a complex and uniquely human behaviour, it provides a model for the real-world study of many processes, such as the learning of skills, and motor co-ordination.

Dr Stewart has engaged the public in her work through appearances at festivals and on the radio, and through articles in several leading publications. She won the Experimental Psychology Society's prize for distinguished research achievement by experimental psychologists at an early stage in their career. And she is now supporting the development of future researchers through a unique new MSc in Music, Mind and Brain – the first postgraduate course anywhere in the world to look at the biological foundations of music perception and cognition.

▶ Imperial College: Developing graduates' skills

Many universities use QR funding to support graduate schools that run a mixture of subject-specific and generic skills training.

Imperial College, London, has two graduate schools running an extensive series of core training programmes in transferable skills, scientific methods and key laboratory techniques. They also organise activities to promote intellectual discussion, exchange of scientific ideas and staff development.



QR funding supports courses such as business skills and commercial awareness, which provide science and medicine PhD graduates with an introduction to the business world through a mini-MBA programme. The topics include identifying business opportunities, managing finances, innovation strategies and consideration of the intellectual value of research and commercial opportunities in the wider world. The workshops also cover developing entrepreneurship skills, design and intellectual property.

▶ University of Salford: Development for researchers



Universities are increasingly looking at innovative ways to develop the skills and experience necessary to support a research career. The University of Salford's Vice-Chancellor's Early Career Research Scholarship Scheme is an example, and it is supported by QR funding. It is an intensive two-year development programme that provides dedicated research time, mentoring, and some funds to support preliminary research; at the end of their programme, award-holders should have developed research partnerships, produced research outputs and developed grant proposals.

Stephen Pugh and Ian Cummins both benefited from the fund in 2005. Stephen Pugh has done work for the National Assembly of Wales and the UK Government on housing of older people and, in partnership, he has developed an audit tool for the Housing and Older People Development Group – an initiative that crosses government departments. Ian Cummins has conducted a small-scale study of vulnerable adults in police custody, which is attracting regional attention through joint work with the police, supporting the development of training for custody sergeants in courts.

Public funding for research in UK higher education institutions

Research in the higher education sector in the UK is funded primarily by the Government, with additional support from international sources and the private sector, including charities.

The majority of government funding for research in England comes from the Department for Business, Innovation and Skills and is delivered through non-departmental bodies such as Research Councils or the funding bodies (see list below).

Higher education funding for Northern Ireland, Scotland and Wales is covered by their respective parliaments and assemblies. In Northern Ireland, funding is provided directly by the Department for Employment and Learning (in Northern Ireland). The Scottish Executive and the Welsh Assembly provide the majority of their research funding through, respectively, the Scottish Funding Council and the Higher Education Funding Council for Wales.

UK Research Councils

Arts and Humanities Research Council
Biotechnology and Biological Sciences Research Council
Engineering and Physical Sciences Research Council
Economic and Social Research Council
Medical Research Council
Natural Environment Research Council
Science and Technology Facilities Council

UK higher education funding bodies

Higher Education Funding Council for England
Higher Education Funding Council for Wales
Scottish Funding Council
Department for Employment and Learning (in Northern Ireland)

Public funding for research is administered under a 'dual support' system. In this system the funding bodies provide recurring annual 'block grant' funding while grants for specific projects and programmes are provided by the Research Councils, the EU and government departments.

The funding bodies' block grant is intended to support the research infrastructure and enable institutions to undertake ground-breaking research in keeping with their own mission and strategic research priorities. The majority of the block grant is allocated as 'quality-related research' (QR) funding through a formula based on the quality, volume and relative cost of research in different areas. But there is no requirement for universities to spend this grant in accordance with the funding bodies' calculations; they are autonomous institutions and are free to invest the money according to their own priorities.

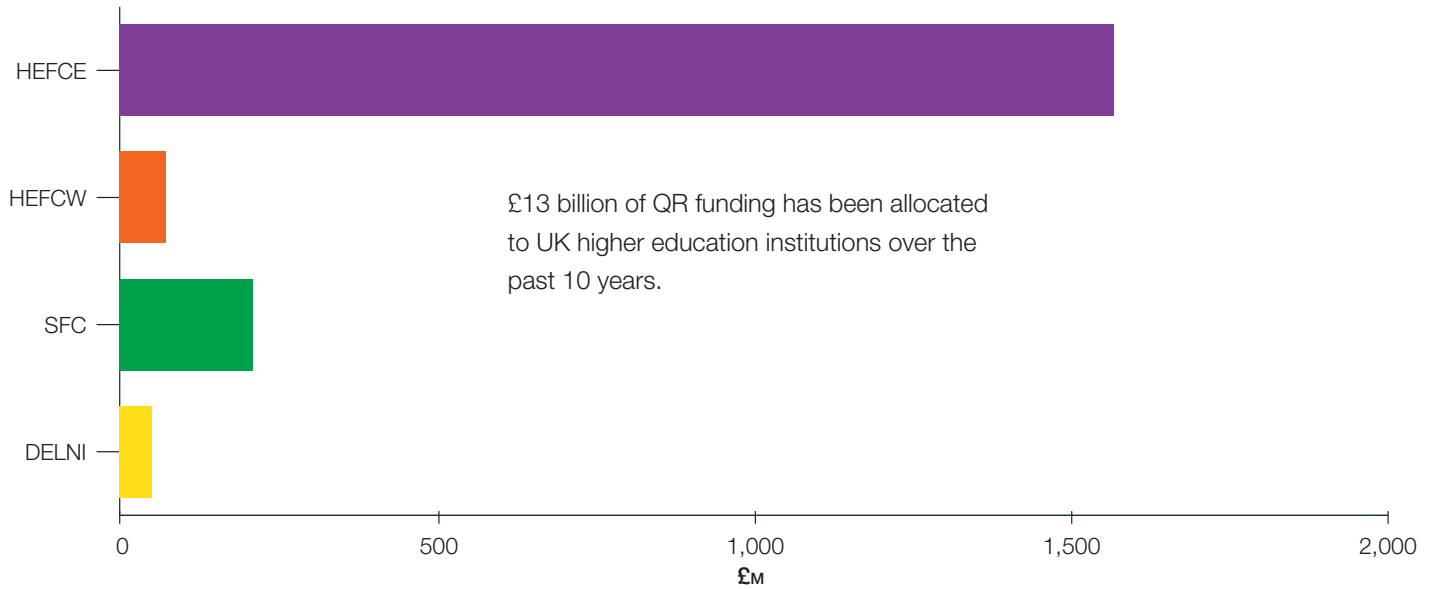
The funding bodies have worked together to carry out the Research Assessment Exercise (RAE) – a periodic peer review exercise to evaluate the quality of research in UK higher education institutions. The outcomes of successive RAEs have informed the funding allocations provided by the funding bodies, but the detailed funding method used to distribute QR funding is individual to each funding body and is described in greater detail below. Further details of these funding methods can be found on the funding bodies' websites: www.hefce.ac.uk, www.hefcw.ac.uk; www.sfc.ac.uk; and www.delni.co.uk.

The last RAE was in 2008 and it took a different form to previous ones, the main change being in the way quality ratings were reported. In previous RAEs, institutions received a single quality score for their research in a particular subject. For the 2008 RAE, they received a profile, showing the proportions of research activity in the subject which met defined levels of quality.

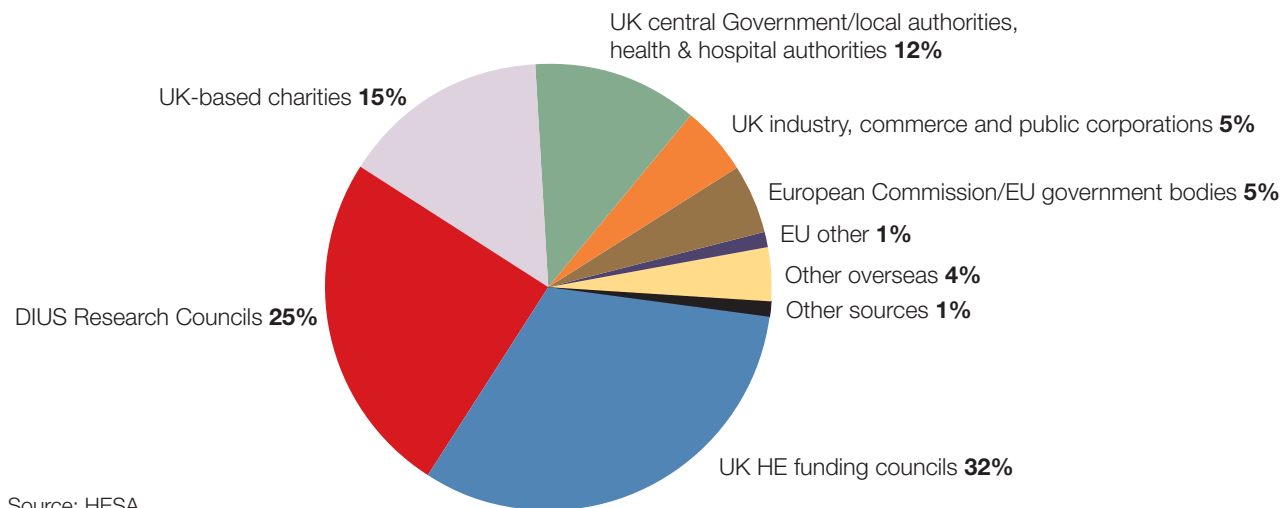
QR funding has always been highly selective, targeted at areas where there is evidence of the highest quality. The new profiles from the 2008 RAE enabled funding bodies to target funding in a more fine-grained way, rewarding excellence wherever it was found.

Facts and figures

QR funding distributed in 2009-10



Research income at UK higher education institutions, 2007-08



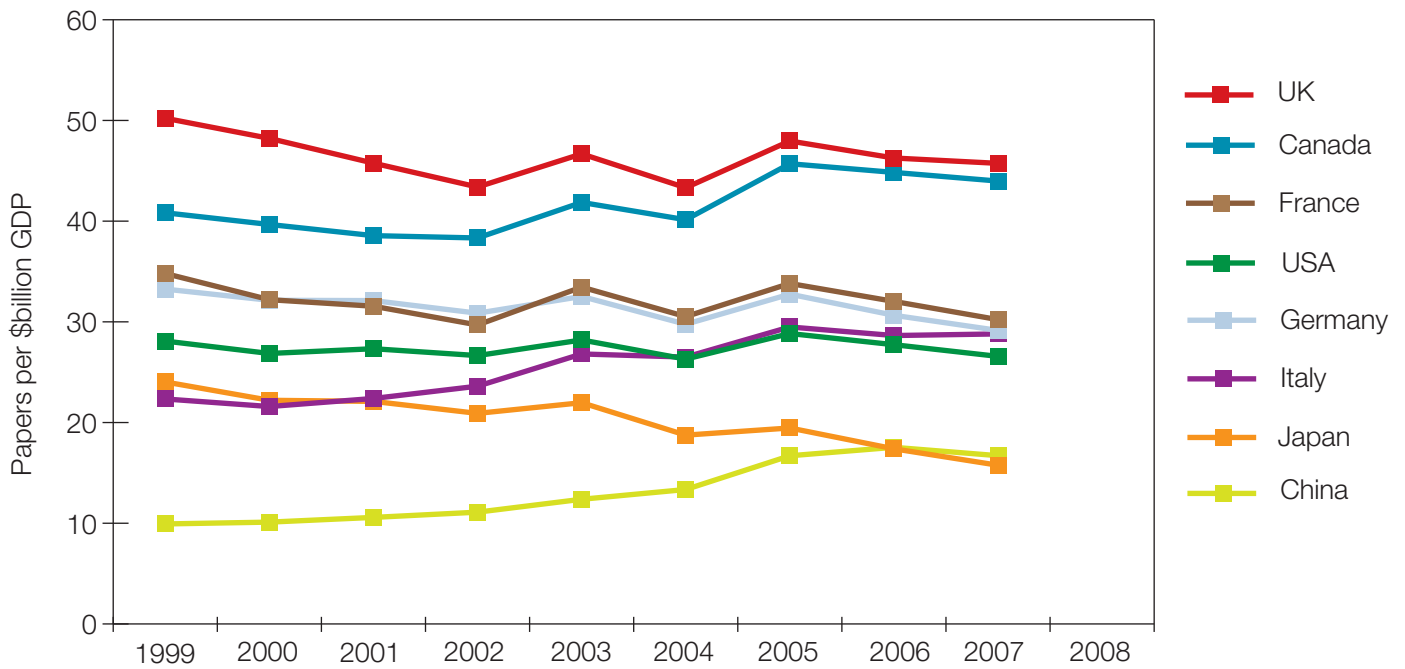
Frequency of occurrence in top three comparator group nations	Recent average (2003-07)	Current value (2008)	Current relative to recent
UK	7.2	7.0	↔
US	9.0	9.0	↔
Germany	5.8	6.0	↔
Japan	1.5	0.0	↓
Canada	2.0	2.0	↔
China	2.8	3.0	↑

Table from 'International comparative performance of the UK research base', published by BIS September 2009.
Data: Thomson Reuters. Analysis: Evidence

This table is an indicator of a country's strengths across all fields by counting the number of times a country is ranked in the top three (out of 26 countries) across fields, by citation volume. The UK is ranked in the top three for seven out of the nine subject areas.

Papers per \$billion gross domestic product

This chart demonstrates the UK's strong position on research productivity. It leads the G8 with about 45 papers recorded for every billion dollars of the nation's gross domestic product.

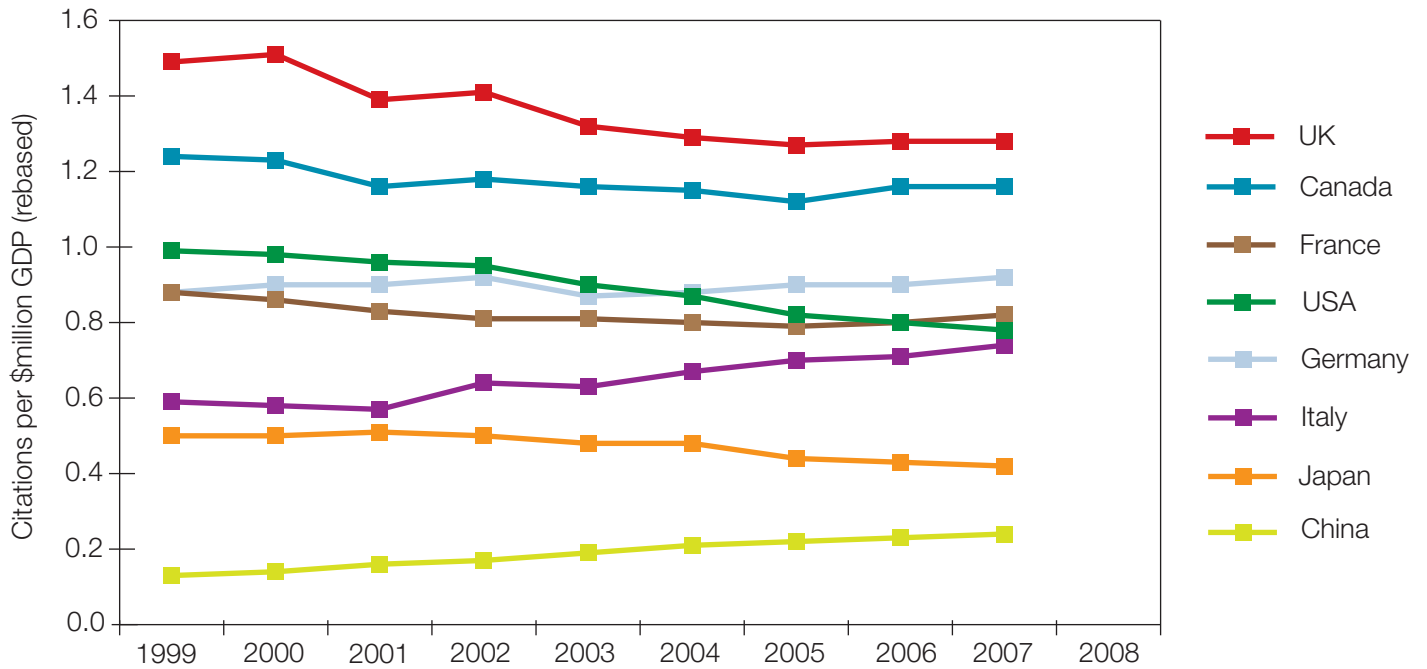


Data: Thomson Reuters and OECD. Analysis: Evidence.

Chart originally published in 'International comparative performance of the UK research base', published by BIS (September 2009).

Citations per \$million gross domestic product

This chart shows the UK leads the G8 in citations per \$million GDP.



Data: Thomson Reuters. Analysis: Evidence.

Chart originally published in 'International comparative performance of the UK research base', published by BIS (September 2009).

