



Researchers' Report 2014

**Country Profile: United
Kingdom**



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1. Key data

National R&D intensity target

“The higher education sector was responsible in 2010 for EUR 8.19 billion of R&D activities, representing 27.2% of total R&D performed. This share increased from 20.6% in 2000 at an average annual growth rate of 3.2%. Business enterprise finances 45% of R&D and performs around 61% of R&D. R&D expenditure by business enterprise amounted to EUR 18.3 billion in 2010, close to the level of 2003. Government finances around 32% of R&D. An important characteristic of the UK research system is the significant R&D investment financed from abroad — some 17% (8% EU average) — and from the non-profit sector — about 5%. In 2010, the UK's gross domestic expenditure on R&D was some EUR 33 billion and had decreased by 0.8% in real terms, from 2009. UK institutions also benefitted from EUR 3.9 billion from FP7 (14.9% of the total, which is the second-highest share among Member States). The success rate of UK applicants in FP7 is 23.62%, well above the average EU rate of 21.5%. For 2007-2013, the UK has been allocated around EUR 10.6 billion in Cohesion Policy funding. The UK plans to invest EUR 4.5 billion of this in RDI.

R&D intensity (2011) was 1.77% of GDP¹, down from 1.86% and lower than the EU average of 2%. The trend since 2000 shows an initial fall, a mild recovery from 2005 (peaking in 2009), and a recent decline. Public spending accounted for about one-third of the total. Albeit with ups and downs, growth has been negative overall for the past decade (averaging out at -0.3% per year); Business R&D intensity has fell from 1.17% in 2001 to 1.08% in 2010. As part of the government's 2010 fiscal consolidation strategy, the budget for science was frozen in cash terms at just over £ 4.6 billion (EUR 5.4 billion) for the next four years. This amounts to a cut of some 10% in real terms over the period. The capital expenditure budget for science was not protected and is expected to be cut by some 44% over the same period. In spite of this negative trend, the UK has not set a national R&D intensity target corresponding to the request of the European Council regarding Europe 2020 headline targets. The current Government has stated that it does not believe that Lisbon targets have proved effective in the past. However, it indicated that the level of R&D investment will be monitored on an annual basis, although data will be available with an 18-month time-lag. In the last decade, R&D intensity has averaged around 1.8%. Reinforced fiscal incentives, the new "patent box" and an ambitious public procurement policy may yet succeed in progressively reversing the negative trend in business R&D.”²

Key indicators measuring the country's research performance

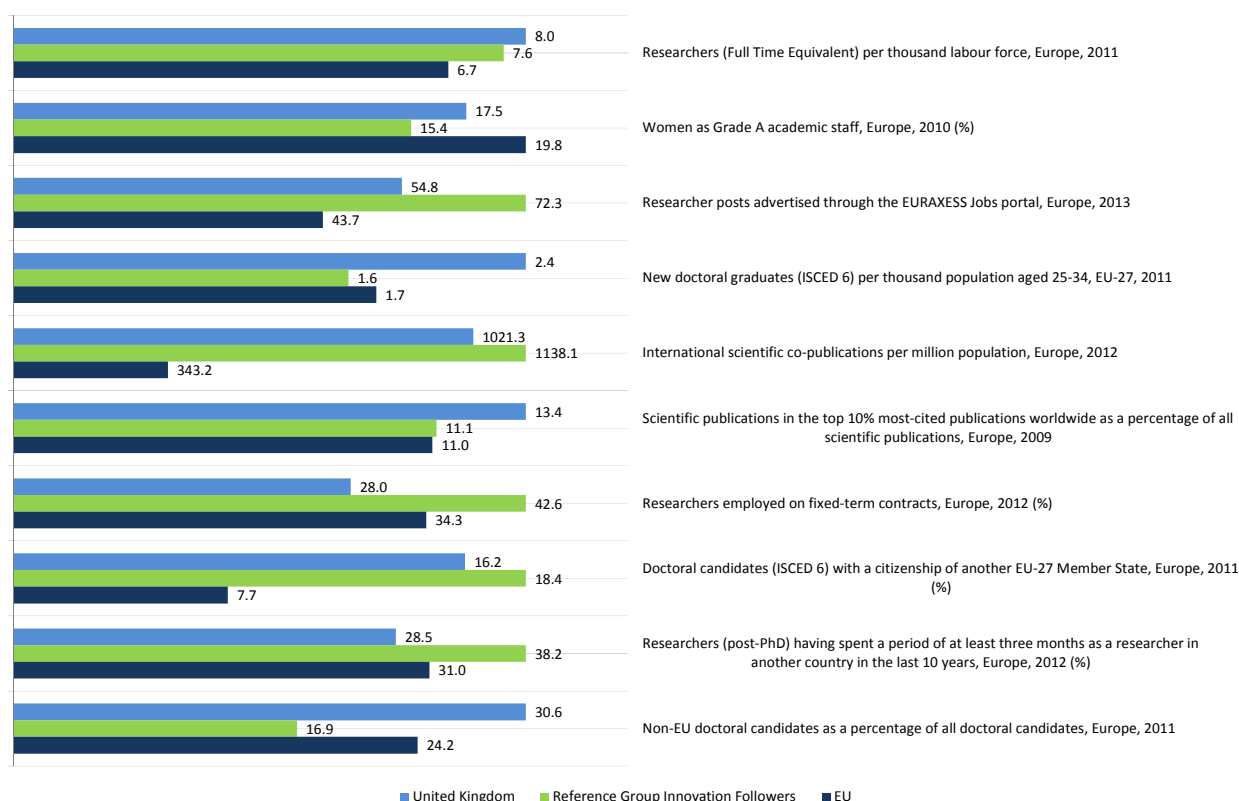
The figure below presents key indicators measuring the United Kingdom's performance on aspects of an open labour market for researchers against a reference group and the EU average³.

¹ In 2012, R&D expenditure was 1.72% (Eurostat, 2014).

² European Commission (2013), “Research and Innovation performance in EU Member States and Associated countries. Innovation Union progress at country level 2013”

³ The values refer to 2013 or the latest year available

Figure 1: Key indicators – United Kingdom



Source: Deloitte

Data: Eurostat, SHE Figures, EURAXESS Jobs Portal, UNESCO OECD Eurostat education survey, Innovation Union Scoreboard 2014, MORE2.

Notes: Based on their average innovation performance across 25 indicators, Austria, Belgium, Cyprus, Estonia, France, Ireland, Luxembourg, Netherlands, Slovenia and the UK show a performance above or close to that of the EU average. These countries are "Innovation followers"⁴.

Stock of researchers

The table below presents the stock of researchers by Head Count (HC) and Full Time Equivalent (FTE) and in relation to the active labour force.

Table 1: Human resources – Stock of researchers

Indicator	United Kingdom	EU Average/Total
Head Count per 1 000 active labour force (2011)	13.57	10.55
Head Count (2011)	429 009	2 545 346
FTE per 1 000 active labour force (2011)	7.95	6.75
Full time equivalent (FTE) (2011)	251 358	1 628 127

Source: Deloitte

Data: Eurostat

2. National strategies

The government of the United Kingdom has adopted a package of measures aimed at training enough researchers to meet its R&D targets and at promoting attractive employment conditions in public research institutions. The table below presents key programmes and initiatives intended to implement the strategic objectives to train enough researchers to reach the UK's R&D targets, to promote attractive working conditions, and to address gender and dual career aspects.

⁴ European Commission (2014), "Innovation Union Scoreboard 2014"

Table 2: National strategies

Measure	Description
Innovation and Research Strategy for Growth BIS (2011)⁵	In 2011 the Department for Business Innovation and Skills published the Government Innovation and Research Strategy. It sets out the government's plans to boost economic growth through investment in research and innovation across the UK.
The Research Councils UK Strategic Vision⁶ (2010)	Research Councils UK (RCUK) is the strategic partnership of the UK's seven Research Councils. RCUK promotes high level skills both for the sustainability of the UK research base and for the benefit of society and the economy. It also promotes engagement between research and young people by providing input to educational policy, encouraging young people to pursue research careers, and supporting the research base and economy. The Strategic Vision covers the period 2011-2015.
The UK National Action Plan⁷ on researcher mobility and careers within the European Research Area, December 2009, Department for Business, Innovation and Skills (BIS)	The National Action Plan presents the current situation in the UK educational system and suggests future initiatives. The Plan provides information on research staff's open recruitment, portability of grants, social security and pension schemes for mobile researchers, working conditions as well as training opportunities. It encourages research and higher education institutions to: – Use the EURAXESS portal regularly; – Review and implement the European Directive on “equal treatment in employment and occupation”⁸ in recruiting and employing researchers; – Increase the level of international experience and encourage UK researchers to undertake international mobility and collaboration; – Develop the coverage on pensions and social security issues available both to mobile researchers coming to the UK and mobile researchers from the UK moving abroad; – Develop recommendations on researcher career issues; and – Strengthen the focus on developing researcher skills.
Reports to the attention of the UK Government	
Encouraging a British Invention Revolution: Sir Andrew Witty's Review of Universities and Growth (2013)⁹	This independent review by Sir Andrew Witty investigates how universities can drive growth in their areas and for the benefit of the wider UK. It makes recommendations on simplifying complex funding streams, securing the potential of the technologies of the future, and giving universities a greater role in delivering economic growth.
Growing the best and brightest: the drivers of research excellence (2014)¹⁰	This report aims to understand what UK universities need to do to improve research excellence, excluding funding levels. It includes a literature review and a survey of 51 academics in 12 leading UK universities. It identifies six important factors contributing to research excellence: – recruitment practices – mentoring and appraisal – collaboration – research strategies – securing a mix of funding – competition.

⁵ Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/32450/11-1387-innovation-and-research-strategy-for-growth.pdf

⁶ Available at: <http://www.rcuk.ac.uk/documents/RCUKStrategicVision.pdf>

⁷ Available at: <http://www.bis.gov.uk/assets/biscore/corporate/migratedd/publications/r/researcher-uk-national-action-plan.pdf>

⁸ Commission Directive (EU) No 78/2000 of 27 November 2000 establishing a general framework for equal treatment in employment and occupation

⁹ Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/291911/bis-13-1241-encouraging-a-british-invention-revolution-andrew-witty-review-R1.pdf

¹⁰ Available at:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/298507/Growing_the_Best_and_Brightest._The_Drivers_of_Research_Excellence.pdf

Measure	Description
International Comparative Performance of the UK Research Base (2013)¹¹	This report examines how the UK research base compares internationally, and what trends may affect the UK's future standing as a world-leading research economy. It is the eighth report commissioned by BIS to assess the performance of the UK compared with seven other research-intensive countries (Canada, China, France, Germany, Italy, Japan, and the US). Where data is available, it also makes comparisons with the EU-27, OECD member countries' groups, and three other fast growing nations (Brazil, India and Russia).
One Step Beyond: Making the most of postgraduate education sector¹² (2010)	This review of postgraduate education applauded the UK's postgraduate system but still encouraged improvements in the competitiveness and excellence of the postgraduate system to match the world's best.

Source: Deloitte

3. Women in the research profession

Measures supporting women researchers in top-level positions

In 2010, the percentage of women grade A academic staff was 17.5% in the United Kingdom compared with 15.4% among the Innovation Union reference group and an EU average of 19.8%¹³.

The Equality Act 2010¹⁴ introduced positive action provisions, including voluntary positive action measures in recruitment and promotion. It is, therefore, up to higher education institutions to decide for themselves whether to exercise the option of taking measures to improve the representation of female researchers in top level positions and on decision making bodies.

Measures to ensure a representative gender balance

In the UK, the Equality Challenge Unit (ECU) supports gender equality and diversity of staff and students in higher education institutions. The ECU works closely with colleges and universities to build equality of opportunities and outcomes by providing them with expertise, research, advice and leadership.

The National Framework for the Modernisation of Higher Education Pay Structures was agreed with the Universities and Colleges Employers Association (UCEA) in 2004. A key plank was to foster more equality and to ensure delivery of equal pay for work of equal value. Subsequent negotiated pay settlements have included a continuing commitment on the part of all universities to monitor the gender pay gap and ensure equal pay is delivered for all staff groups. In 2011, UCEA and the recognised unions produced a comprehensive report with recommendations on the implementation of equal pay and a review of equal pay reviews within the sector.

The Higher Education Funding Council for England monitors the proportion of staff at different stages. For instance, the ratio of female, disabled and ethnic minority staff at senior levels is continuing to increase. Absolute numbers of all senior staff have dropped, but numbers of senior staff in the target groups have fallen by a proportionately smaller amount than in other groups. However, when comparing the overall senior management results to those observed for "professor and above" and "senior lecturer and above", only the proportion of ethnic minority staff has increased in all three groups. The proportions of female and disabled staff have both dropped slightly for the other two senior grade groups.

The UK's Research Excellence Framework (REF) 2014 also reflects the need to consider gender balance in all policies and procedures in higher education institutions. In 2011 at the request of the BIS, the Royal Society and Royal Academy of Engineering developed a new diversity strategy in science, technology, engineering and mathematics (STEM), including gender aspects.

RCUK have published a Statement of Expectations for Equality and Diversity which sets out that it expects those in receipt of Research Council funding to:

- promote and lead cultural change in relation to equality and diversity;
- engage staff at all levels in improving the promotion of equality and diversity;

¹¹ Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/263729/bis-13-1297-international-comparative-performance-of-the-UK-research-base-2013.pdf

¹² Available at: <http://www.bis.gov.uk/assets/BISCore/corporate/docs/P/10-704-one-step-beyond-postgraduate-education.pdf>

¹³ See Figure 1 "Key indicators – United Kingdom"

¹⁴ Available at: <http://www.legislation.gov.uk/ukpga/2010/15/contents>

- ensure all members of the research workforce are trained and supported to address disincentives and indirect obstacles to recruitment, retention and progression in research careers;
- provide evidence of ways in which equality and diversity issues are managed at both an institutional and department level.

Parental leave

In the UK, employment law accredits women who have been employed for 26 continuous weeks with the same employer with statutory maternity pay for up to 39 weeks (90% of their average gross weekly earnings for the first six weeks and GBP 135.45 (some EUR 160) per week for the remaining 33 weeks). Additionally, women are eligible to receive contractual maternity pay up to six months. Overall, women are entitled to 52 weeks of maternity leave.

Research Council-funded students also enjoy the right to receive six months' maternity leave on full stipend and a further six months' unpaid maternity leave.

Research Council grants may be extended for up to 12 months to cover periods of maternity leave by researchers employed on the grant and the research organisation will be compensated at the end of the grant to cover any additional net costs of paid maternity leave that cannot be met within the cash limit.

Finally, Research Council fellowships cover maternity leave (as well as paternity leave, adoption leave, parental leave, extended jury service or paid sick leave) for a Research Fellow in line with the terms and conditions of the Fellow's employment and the research organisation will be compensated at the end of the grant to cover any additional net costs of paid maternity leave that cannot be met within the cash limit.

4. Open, transparent and merit-based recruitment

Recruitment system

Higher education institutions in the UK are fully autonomous in designing and implementing their recruitment policy. They are required to publish all relevant policies on their websites. The procedure is time-consuming and costly, and as a result the advertising of posts is sometimes avoided. The UK higher education funding bodies have encouraged action to face this challenge. For instance, the Higher Education Funding Council for England (HEFCE) encourages the institutions to have formal human resources strategies and provides funding to support these strategies under the Rewarding and Developing Staff in HE initiative. HEFCE also encourages institutions to develop recruitment and retention schemes.

Open recruitment in institutions

The table below presents information on open recruitment in higher education and public research institutions.

Table 3: Open recruitment in higher education and public research institutions

Do institutions in the country currently have policies to ...?	Yes/No	Description
– publish job vacancies on relevant national online platforms	Yes	The Equality and Diversity policies' stated aim is to attract a diverse range of applicants to reflect the community and bring a range of experience, talent and backgrounds to the institution.
– publish job vacancies on relevant Europe-wide online platforms (e.g. EURAXESS)	Yes	In the UK, publicly-funded research jobs are always published online, either on higher education institutions' individual websites, or through other jobs portals (such as the New Scientist, NatureJobs, Science, jobs.ac.uk). Currently, all jobs advertised on NatureJobs are automatically published on EURAXESS Jobs.
– publish job vacancies in English	Yes	
– systematically establish selection panels	Yes	The recruitment and selection policies aim to secure a wide range of cultural, ethnic and gender representation on panels to provide checks and balances against potential partiality of decisions. In the event of disagreement, an odd number of panel

Do institutions in the country currently have policies to ...?	Yes/No	Description
		members could go to a vote.
– establish clear rules for the composition of selection panels (e.g. number and role of members, inclusion of foreign experts, gender balance, etc.)	Yes	See above.
– publish the composition of a selection panel (obliging the recruiting institution)	Yes/No	The composition of a selection panel is not routinely published but the applicants would most likely be informed before interview.
– publish the selection criteria together with job advert	Yes	The criteria/person specification is prepared at the time of planning for recruitment to the vacancy. The selection criteria may be published with the advert or may be available on application. The published criteria enable the candidates to demonstrate their suitability for the position and those responsible for shortlisting consistently compare candidates against the stated criteria.
– regulate a minimum time period between vacancy publication and the deadline for applying	Yes (subject to the urgency of the recruitment)	Recruitment and selection procedures normally set down minimum and maximum timescales for internal planning and preparation purposes and for candidates to have time to construct a comprehensive application.
– place the burden of proof on the employer to prove that the recruitment procedure was open and transparent	Yes	Potential candidates are free to challenge prospective employers on the fairness of the process through the tribunal system. Recruitment and Selection Policies and Procedures set down guidelines for managers on the importance of recording decisions and the reasons upon which they are based.
– offer applicants the right to receive adequate feedback	Yes	The Recruitment and Selection Policies and Procedures offer applicants the right to receive adequate feedback.
– offer applicants the right to appeal	No, not usually	Except formally through the courts if discrimination is alleged.

Source: Deloitte

EURAXESS Services Network

In 2013, the number of researcher posts advertised through the EURAXESS Jobs portal per thousand researchers in the public sector was 54.8 in the United Kingdom compared with 72.3 among the Innovation Union reference group and an EU average of 43.7¹⁵.

Information on entry conditions, transfer of social security and pension contributions, accommodation, administrative assistance etc. is available on the EURAXESS UK website. There is also a searchable database of international funding opportunities on the EURAXESS UK website (www.euraxess.org.uk). This covers various funding schemes (>200), ranging from conference attendance to longer term fellowships, for inward and outward mobility between the UK and countries worldwide. As of December 2013 there were 23 EURAXESS Local Contact Points hosted at Universities across the country, compared to 14 in 2012.

The UK is the top country in terms of jobs published on EURAXESS, and the total number of jobs posted was 8 668 over the whole of 2013, a slight decrease compared to 2012, when the total number of vacancies published was 9 354.

5. Education and training

Measures to attract and train people to become researchers

The Government of the United Kingdom works to ensure that national policies to attract students to science are coherent throughout their educational careers and consider the needs of both students and employers.

¹⁵ See Figure 1 “Key indicators – United Kingdom”

The Department for Business, Innovation and Skills and the Department for Education (DfE) work closely on the students' qualification agenda to ensure that the needs of the research market are met, the science curriculum is sufficiently challenging and attractive to young people, and that good enrichment and enhancement activities are part of science education in the UK.

The Government also funds the Science Technology Engineering and Mathematics network (STEMNET), a UK-wide organisation, whose purpose is to ensure that all young people, regardless of background, are encouraged to understand the importance of science. Over 25 000 Ambassadors in the wider UK territory act as role models for schoolchildren to attract them to opting for STEM disciplines.

In line with the government strategy, Research Councils UK (RCUK) are committed to a public engagement strategy which, as one of its aims, encourages links between schools and the UK research community in order to secure and sustain a supply of future UK researchers. RCUK also want to help ensure that more young people are aware of the wide range of career opportunities available to them through research, and collectively the Research Councils fund a range of activities, resources and schemes to inspire young people by bringing researchers with schools and young people together.

For instance, the RCUK School-University Partnerships Initiative (SUPI), a three-year initiative begun in 2013, is creating structured and strategic mechanisms for universities to work in partnership with secondary schools and further education colleges. The initiative, worth GBP £3.5 million (EUR 4.3 million), with half the funding from RCUK and matched funding from universities and their partners, supports 12 SUPI partnerships at Imperial College London, Queen's University Belfast, and the universities of Aberystwyth, Bristol, Cardiff, East Anglia, Exeter, Lancaster, Manchester, Southampton, Strathclyde, and the Open University, with coordination, support and dissemination provided by the National Coordinating Centre for Public Engagement (NCCPE). The SUPIs will support researchers' direct engagement with students and bring contemporary and inspirational research contexts into formal and informal learning to enhance and enrich the curriculum.

Furthermore, RCUK consider engagement with teachers to be a key route to reaching and inspiring the next generation of researchers and fund a programme of Teacher CPD entitled 'Bringing Cutting-edge Science into the Classroom'. The programme is designed to help secondary school teachers deliver some of the more challenging aspects of the curriculum in a way that captures and retains the interest of learners by bringing contemporary research into the classroom. The Teacher CPD courses have been developed and delivered by the Science Learning Centre Network in conjunction with leading RCUK researchers and are clearly linked to the science curriculum.

RCUK also have a suite of stories on their website providing an insight about life as a researcher and the different career paths which researchers take. The case studies are aimed at young people and highlight the opportunities research skills can open up, not only in academia but also in the wider world of business, industry and commerce. The skills gained from a research career are highly sought after by increasing numbers of national and international companies working with UK researchers.

Finally, RCUK also support the Nuffield Research Placement Scheme which offers up to 1 000 bursaries a year for students to work alongside professional scientists, technologists, engineers and mathematicians on their own research projects, many of which also receive the British Science Association's Gold CREST awards.

The UK Government recognises the importance of increasing the number of doctorates graduated in STEM. The Government (2011) asked the Royal Academy of Engineering to develop a diversity programme for the engineering industry. The aim of the Academy's Diversity Programme is to increase diversity and improve access to science, engineering and technology (SET) professions for candidates with low income backgrounds, disabled people, certain ethnic minorities and women, all of whom are currently under-represented within engineering. Since 2011, the Academy has received government funding (from the Department for Business, Innovation and Skills) and works closely with the Royal Society which has been charged with a parallel role for the sciences.

Additional STEM activities and wider societal programmes are also funded from the Science and Research budget to promote STEM studies. Amongst others, activities include the work of the National Academies and

their academic fellowships, Research Council UK's PhD and Fellowship Awards as well as the Big Bang Fair and the National Science and Engineering Competition. Women are also encouraged to pursue a STEM career through the Women into Science and Engineering (WISE) campaign.

Doctoral graduates by gender

The table below shows the number of doctoral graduates in the United Kingdom by gender as a ratio of the total population in the United Kingdom.

Table 4: Doctoral graduates by gender

Indicator	United Kingdom	EU Average
New doctoral graduates (ISCED 6) per 1 000 population aged 25-34 (2011)	2.4	1.7
Graduates (ISCED 6) per 1 000 of the female population aged 25-34 (2011)	2.2	1.6
Graduates (ISCED 6) per 1 000 of the male population aged 25-34 (2011)	2.6	1.8

Source: Deloitte

Data: Eurostat

Funding of doctoral candidates

The table below presents the different funding opportunities for UK, EU and international doctoral students during the academic year 2009-10.

Table 5: Full-time doctoral starters by major source of tuition fees (2012-2013)

Main source of tuition fees	UK	% of starters	EU	% of starters	International	% of starters
Research Council	3 775	35	620	20	145	2
Charity/British Academy	410	4	185	6	445	6
Institution	2 780	25	1 010	33	1 660	20
Government	680	6	80	3	80	1
UK industry	300	3	85	3	270	3
Overseas	230	2	125	4	2 175	27
Other	760	7	280	9	480	6
No financial backing	2 005	18	660	22	2850	35
Total	10 940	100	3 050	100	8 115	100

Source: HEFCE analysis of HESA data

Note: EU excludes those from the UK. Table uses HESA standard registration population at UK HEIs in 2012-13 restricted to entrants of full-time PhD courses. Students funded by the research council may have a different major source of funding for tuitions fees.

Measures to increase the quality of doctoral training

All UK Research Councils concentrate their funding for doctoral training on the basis of quality. This is a result of funding constraints and the policy objective of improving the quality of doctoral training in the UK and striving for excellence.

Research Councils UK have developed a Statement of Expectations for Doctoral Training¹⁶ which lays out common principles for the support of all Research Council students. They are aligned with the seven principles for Innovative Doctoral Training¹⁷.

¹⁶ <http://www.rcuk.ac.uk/researchcareers/postgrad/Pages/home.aspx>

¹⁷ http://ec.europa.eu/euraxess/pdf/research_policies/Principles_for_Innovative_Doctoral_Training.pdf

Table 6: Measures to increase the quality of doctoral training

Measure	Description
Centres for Doctoral Training and Doctoral Training Partnerships	
Centres for Doctoral Training (CDT)	These are centres to provide training for students within focused research areas, often defined strategically by the Research Council funder(s) from the outset. Centres can be focused on academic or industrially relevant research topics, or a mix of both EPSRC has set up 90 since 2009 Each CDT targets a specific area of research and also emphasises transferable skills training. Examples of EPSRC CDTs are the Chemical Biology Centre at Imperial College London, Statistics and Operational Research at Lancaster and Molecular Modelling and Materials Science at UCL. CDTs encompass a wide range of models including more industrially focused engineering doctorate-type models where students spend about 75% of their time working directly with a company. These centres provide high level training in close collaboration with the world of industry. NERC in January 2014 announced a Centre in Oil and Gas at a consortium of universities led by Heriot-Watt.
Doctoral Training Partnerships (ongoing)	Doctoral Training Partnerships provide training for students across a broad range of subjects determined by a Research Organisation or consortia of Research Organisations. Partnerships involve strategic engagement between the Research Organisation(s) and the Research Council funder(s) in developing the overall programme of training. Biotechnology and Biological Sciences Research Council (BBSRC) DTPs provide PhD training in research areas relevant to their remit and strategic priority areas. They also provide a breadth of professional development training opportunities to enhance students' capability and develop the world-class, highly skilled workforce the UK needs for its future. ESRC have established a national network of 21 institutional and consortia-level Doctoral Training Partnerships through which they deliver all studentship funding. They cover the full disciplinary range of the social sciences as well as areas of interdisciplinary research.
Research Councils	
Arts and Humanities Research Council (AHRC) (ongoing)	The AHRC supports world-class research on human culture and creativity. Every year it offers around 700 new research awards and 1 500 postgraduate awards totaling over GBP 60 million (EUR 73 million).
Biotechnology and Biological Sciences Research Council (BBSRC) (ongoing)	The BBSRC offers various funding opportunities, including postgraduate studentships and fellowships, and research grants, as well as running schemes to enable international collaboration. For 2012-13, the BBSRC allocated around GBP 467 million (some EUR 565 million) to support around 1 600 scientists and 2 000 research students in universities and institutes across the UK. The BBSRC Doctoral Training Partnership awards work to ensure PhD students are trained in areas aligning with the BBSRC Strategic Plan, and that strategically important skill areas are addressed. The current awards support a total of 220 four-year studentships annually, for three intakes from October 2012 and are awarded as single grant. The funding for each student's experimental costs has increased from GBP 1 000 (some EUR 1 180) to GBP 5 000 (some EUR 5 900) annually. Each student will take a three-month internship during their PhD, to experience working in an area not directly related to their PhD project.
Economic and Social Research Council (ESRC) (ongoing)	The ESRC is the UK's largest organisation for funding research on economic and social issues. It supports independent, high quality research which has an impact on business, the public sector and the third sector. Its total budget for 2012-13 was GBP 193 million (some EUR 235 million), supporting over 4 000 researchers and postgraduate students in academic institutions and independent research institutes.
Engineering and Physical Sciences Research Council (EPSRC) (ongoing)	The EPSRC is the main UK government agency for funding research and training in engineering and the physical sciences, investing more than GBP 850 million (some EUR 1 billion) a year in a broad range of subjects, from mathematics to materials science, and from information technology to structural engineering.

Measure	Description
Medical Research Council (MRC) (ongoing)	The MRC funds research through a range of grants, calls, highlight notices, studentships and fellowships and encourages collaboration with scientists based abroad. In 2012-13, the MRC awarded 303 research grants, 99 fellowships and it funds about 1700 studentships each year.
Natural Environment Research Council (NERC) (ongoing)	The NERC offers around 30 fellowships each year; it funds 1 100 postgraduate student and research grant schemes to provide financial support for environmental scientists to carry out research projects of international quality at UK universities and other approved institutions.
Science and Technology Facilities Council (STFC) (ongoing)	The STFC offers grants and support in Particle Physics, Astronomy, Nuclear Physics and Facility Development. It also provides support for research infrastructure, training, knowledge exchange and public engagement activities through a variety of funding schemes and activities.

Source: Deloitte

Skills agenda for researchers

The UK Government has a well-defined and long term skills agenda for researchers. UK Research Councils have allocated GBP 120 million (some EUR 141.3 million) in ring-fenced funding to this since 2003. Since March 2011, funding has been embedded in normal funding (PhD fees and indirect costs on research grants). The most recent survey, in 2013, shows significant progress has been made towards embedding implementation of the Researcher Development agenda and its funding into HEI processes.

Vitae, set up in 2008, works with the higher education sector providing professional and career development for researchers and building international competitiveness through research, innovation and knowledge exchange. Vitae leads improvements in the employability and impact of researchers, to ensure that researchers are equipped to address research challenges and enhance the UK's economic, social and cultural capital. The Vitae programme provides national leadership and strategic development, and works with higher education institutions, policy makers, stakeholders, employers and individual researchers. In 2010, Vitae launched the new Researcher Development Framework (RDF). This Framework has been endorsed by thirty major UK organisations (e.g. Funding Councils, Research Councils, Quality Assurance Agency, the unions and Universities UK) who are involved in knowledge exchange and the development of a strategic agenda to train and support high level researchers to further improve their skills competencies.

The RDF is currently being implemented in higher education institutions and underpins the professional development of researchers. Vitae have produced stakeholder briefings, an online RDF Planner for universities and researchers, and guidance on how to map training exercises, courses and programmes to the Framework. Vitae also possesses an exhaustive database of 400 best practice training examples and 120 examples of evaluation activities which link to an impact framework for measuring training and development outcomes. It also offers materials and courses on entrepreneurship, knowledge exchange, leadership, public engagement, information literacy, career development and teaching.

Among the key successes of the programme up to 2013 were:

- Vitae led the implementation of the Concordat to Support the Career Development of Researchers¹⁸, including two major surveys of research staff and research leaders, and managing the process which has enabled 89 UK organisations to gain the 'HR Excellence in Research Award' from the European Commission (see also below). Despite being a voluntary instrument, the Concordat is having a significant impact across the higher education sector. The intention to implement the principles of the Concordat is now widespread in institutions, and the corresponding infrastructure is increasingly in place. The extent and depth of implementation is greatest for the principles on recruitment and selection, recognition and value, and equality and diversity, all of which are themes where there is existing legislation or there are specific national guidelines for employment practice;
- A growing programme of international activities to build capacity for researcher development including strategic needs analysis, training and development and infrastructure.

¹⁸ Details of the impact of the Concordat to Support the Career Development of Researchers can be found in the Three Year Review of Progress available at www.vitae.ac.uk.

Higher education institutions in the UK can also develop their individual training and development programmes covering a range of domains included in the Researcher Development Framework, which has also been validated in Europe and the US.

6. Working conditions

Measures to improve researchers' funding opportunities

UK government investment in research has doubled since 2001. According to BIS report¹⁹ "The Allocation of Science and Research Funding 2011/12 to 2014/15", GBP 4.6 billion (some EUR 5.4 billion) per annum is being allocated to science and research funding. Despite the enormous pressure on public spending, funding for science and research programmes has been protected in cash terms for the period 2011/12 to 2015/16.

Remuneration

Following the recommendation of the 2002 *SET for Success* report on aligning PhD stipends with graduate salaries, the Research Council and other funding organisations monitor their stipends to meet expectations, where possible. The rates of pay in higher education are agreed annually at national level between UCEA and the recognised trade unions. The allocation of roles to grades, including researcher roles, and the grading model within each institution are unique to each institution and are locally determined through the application of their chosen job evaluation scheme. Most institutions have also put in place equal pay review processes to safeguard gender equality.

Higher education pay is based on the Framework Agreement for the Modernisation of HE Pay Structures in 2003 which was the outcome of major structural changes in the sector over the previous two decades and the need to reform the existing multi-employer bargaining machinery. The Agreement was also the result of growing concern about both equal pay in the sector and uncompetitive reward systems.

For further information, see the country profile on remuneration of researchers from the MORE2 study on the EURAXESS website.²⁰

Researchers' Statute

The Quality Assurance Agency (QAA) for Higher Education aims at "safeguarding standards and improving the quality of UK higher education".

The UK Quality Code for Higher Education (the Quality Code 2012/13) replaces the previous Code of Practice introduced in 2004. It is used to assure the standards and quality of higher education in the United Kingdom. The purpose of the Quality Code is to:

- Safeguard the academic standards of UK higher education;
- Assure the quality of the learning opportunities that UK higher education offers to students;
- Promote continuous and systematic improvement in UK higher education; and
- Ensure that information about UK higher education is publicly available, (including selection and admission criteria, skills development, etc.).

In addition, the Concordat to Support the Career Development of Researchers (2008) constitutes an agreement between the employers (universities) and research funders (Research Councils, funding councils, major charities, etc.) on good management and quality working conditions for research staff.

'European Charter for Researchers' & 'Code of Conduct for the Recruitment of Researchers'

The 'European Charter and Code for Researchers' is being implemented through both the Quality Assurance Agency and the Concordat to Support the Career Development of Researchers.

Vitae, which champions world-class support for researchers and research staff, leads in the implementation of the Concordat and assists UK higher institutions exchange knowledge and good practices. Vitae also supports them in gaining the European Commission's HR Excellence in Research Award. So far (at the beginning of

¹⁹ The Allocation of Science and Research Funding 2011/12 to 2014/15, Investing In World-Class Science And Research, December 2010, <http://www.bis.gov.uk/assets/biscore/science/docs/a/10-1356-allocation-of-science-and-research-funding-2011-2015.pdf>

²⁰ <http://ec.europa.eu/euraxess/index.cfm/services/researchPolicies>

2014), 89 UK organisations have received the award. Implementation of the Concordat is reviewed annually by the Concordat Strategy Group, and a report is also submitted to government .

A three-year review of the implementation of the Concordat was published in March 2012 and notes that “despite being a voluntary instrument, the Concordat is having a significant impact across the higher education sector”. The intention to implement the principles of the Concordat is now widespread in institutions, and the corresponding infrastructure is increasingly in place. The extent and depth of implementation is greatest for the principles on recruitment and selection, recognition and value, and equality and diversity.

Autonomy of institutions

In the UK, Higher Education Institutions (HEIs) and Public Sector Research Establishments (PSREs) enjoy high levels of autonomy in managing research careers, remuneration and mobility policies. Each institution in the UK is an autonomous employer and the contracts of employment are collectively negotiated at local level. The academic and academic-related roles are subject to local provisions and may focus to varying degrees on teaching, research, and management responsibilities. Both the QAA Quality Code (for doctoral candidates) and the Concordat (for research staff) are key instruments related to institutions’ academic staff.

Differentiation of researchers’ salaries depends on the outcome of the job evaluation process within the institution and whether there is a need to apply a market or recruitment and retention supplement to the salary, in which case this should be objectively justified by benchmark data and market analysis (i.e. supported by evidence). At national level, the framework agreements allow for local implementation of a contribution- (performance-) related pay scheme for all staff, including research staff and researchers. However, only a few institutions have adopted a scheme, but this is set to change over time.

Career development

In order to promote clear career development for researchers, most universities have included career provisions in their study schemes (for instance, specialist careers advice, courses, networking events, recruitment fairs, etc.). In addition, Vitae has a dedicated web portal on researchers’ career prospects and employment destinations by discipline and occupation (<http://www.vitae.ac.uk>).

Tenure track systems are not applicable in the UK and all academic staff are employed within the human resources framework of each individual institution.

Shift from core to project-based funding

Public funding for research in UK higher education is administered under a 'dual support' system. Under this system the four Funding Bodies for England, Scotland, Wales and Northern Ireland provide both block grant and competitive funding for institutions to support the research infrastructure and enable ground-breaking research in keeping with their own mission. The Research Councils, charities, the European Union and government departments (including the devolved administrations for the nations mentioned above) provide grants for specific research and innovation projects and programmes.

Social security benefits (sickness, unemployment, old-age)

Provisions on sickness benefits for researchers depend on the context of the grant agreement. Contractual arrangements defined as ‘employment’ provide researchers with sickness payments and other benefits, including maternity leave, paternity leave, adoptive leave, extended jury service and holidays. Additional funding may be granted by the Research Council. Each pension scheme includes different provisions.

7. Collaboration between academia and industry

In the UK, there are many examples of partnerships between universities/research institutions and the business sector. The partnership could range from collaboration in co-design and co-delivery of postgraduate courses to co-funding, and joint supervision and mentoring of students.

The UK Research Councils Delivery Plan²¹ has as a national target the exchange of skills in the research base and encouraging movement of highly skilled people between the research base and user communities at all career stages. In addition, the Government White paper Students at the Heart of the System²² focuses on fostering collaboration between universities and the business sector in two ways:

- i. Optimising high level skills provision for wealth-creating businesses; and
- ii. Exploitation of the university sector's capabilities in university-business collaborative research and innovation.

In response to the review of university-business collaboration in February 2012 by Professor Tim Wilson²³, the UK government has announced new plans to strengthen that collaboration. This will include promotion of a new framework for business and universities to work together and support the Council for Industry and Higher Education (CIHE) to create a National Centre for Universities and Business. The centre will focus on strengthening the strategic partnership between universities and business with a view to driving economic growth and recovery.

Research Councils UK have developed a Joint Vision for Collaborative Training²⁴ which sets out common objectives and benefits of collaborative training.

The following table summarises programmes designed to boost collaboration between academia and industry, and to foster doctoral training in cooperation with industry.

Table 7: Collaboration between academia and industry

Programme/initiative	Description
Collaborative Awards in Science and Engineering (CASE), sponsored by the Natural Environment Research Council (NERC) (ongoing)	CASE studentships promote collaboration between the research community and the end-users of research. The award allows a PhD student to spend 3-18 months with an industrial partner in a workplace outside the academic environment.
Innovation Vouchers for SMEs, sponsored by the European Regional Development Fund, Advantage West Midlands, the Economic and Social Research Council and the Engineering and Physical Sciences Research Council (ongoing)	National SMEs have the opportunity to apply for a GBP 3 000 voucher (some EUR 3 500) to purchase academic support by employing researchers in the field of technology and innovation.
Knowledge Transfer Partnerships (KTPs) sponsored by the European Regional Development Fund and the Technology Strategy Board (ongoing)	Recently qualified graduate students are employed by a business partner to support knowledge and expertise transfer via a strategic project launched together with the higher education or research institution.

Source: Deloitte

8. Mobility and international attractiveness

In 2011, the percentage of doctoral candidates (ISCED 6) who were citizens of another EU-27 Member State was 16.2% in the United Kingdom compared with 18.4% among the Innovation Union reference group and an EU average of 7.7%²⁵. In the same year, the percentage of non-EU doctoral candidates as a percentage of all doctoral candidates was 30.6% in the United Kingdom compared with 16.9% among the Innovation Union reference group and an EU average of 24.2%²⁶.

Measures aimed at attracting and retaining 'leading' national, EU and third country researchers

The UK opted out of the Scientific Visa Directive. See section on "Inward mobility (funding)" below.

²¹ RCUK Delivery Plan 2011/12-2014/15 Excellence, Impact and Efficiency, http://www.rcuk.ac.uk/documents/documents/RCUK_delivery_plan_2011_15.pdf

²² Available at: <http://c561635.r35.cf2.rackcdn.com/11-944-WP-students-at-heart.pdf>

²³ Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/32383/12-610-wilson-review-business-university-collaboration.pdf

²⁴ <http://www.rcuk.ac.uk/researchcareers/postgrad/Pages/home.aspx>

²⁵ See Figure 1 "Key indicators – United Kingdom"

²⁶ Ibid

Inward mobility (funding)

The UK National Action Plan on researcher mobility and careers within the European Research Area (2009) points out that the UK research base is already one of the most open in the world both as regards recruitment of researchers and scientific collaborations (over 40% of UK scientific papers now have one or more non-UK co-authors)²⁷ and the UK Government funds a number of dedicated fellowship schemes (Dorothy Hodgkin Fellowships, Newton International Fellowships,) which seek to attract the best early career researchers from around the world to UK institutions.

A survey of fellows' nationalities from an internal RCUK report suggests that, depending upon the discipline, between 20% and 50% of all Research Council fellows are from outside the UK. The table below summarises key measures in support of researchers' inward mobility.

Table 8: Measures supporting researchers' inward mobility

Programme/initiative	Description
British Council research and HE partnerships (ongoing)	A variety of schemes managed by the British Council (with various funding partners) aim to promote partnerships between UK and overseas researchers. These can include travel grants for postdoctoral researchers (e.g. between Scotland and Hong Kong) or funding for longer term international research partnerships, which include aspects of inward and outward mobility (e.g. BIRAX Regenerative Medicine initiative; UK-China Partnerships in Education). In 2013, the new 'Researcher Links' programme was launched. This covers 18 emerging economies, and provides funding for workshops and short research visits (inward and outward), with a focus on early career researchers (R2 level). The Global Innovation Initiative was also launched, to create trilateral research partnerships between the UK, US and third countries (currently China, Brazil, India and Indonesia).
Dorothy Hodgkin Fellowships (ongoing)	The Dorothy Hodgkin Fellowships scheme targets excellent scientists in the UK ²⁸ at an early stage of their career who require a flexible working pattern due to personal circumstances, such as parenting or caring responsibilities, or health issues. Female candidates are particularly invited to apply.
Newton International Fellowships (ongoing)	The Newton International Fellowship scheme targets the very best early stage post-doctoral researchers from all over the world, and offers support for two years at UK research institutions.
UK Research Councils (ongoing)	See chapter 5 "Education and training".

Source: Deloitte

The majority of the fellowships are open to UK and overseas candidates regardless of nationality, and candidates are assessed in competition with each other.

Outbound mobility

Many Research Council fellowships have a strong international element as international collaboration is actively encouraged as part of the process of building an international reputation. Many awards include the option of undertaking research training outside the UK. The table below presents measures aimed at encouraging researchers to spend some time in another country.

Table 9: Measures supporting researchers' outbound mobility

Measure	Description
British Council (ongoing)	See Table 8 above.
UK Research Council fellowships (ongoing)	See chapter 5 "Education and training".
Wellcome Trust (ongoing)	The Wellcome Trust is a global charitable foundation dedicated to achieving extraordinary improvements in human and animal health. It provides a range of funding opportunities, including fellowships to support researchers at key stages of their careers. All of these awards can incorporate visits to institutions outside the UK. The Sir Henry Wellcome Postdoctoral Fellowships in particular offer early career researchers the opportunity to spend time in the best overseas laboratories. The Wellcome Trust-National Institutes of Health PhD studentships, where the student is required to carry out their research training

²⁷ International Comparative performance of the UK research Base – Elsevier <http://www.bis.gov.uk/assets/biscore/science/docs/i/11-p123-international-comparative-performance-uk-research-base-2011>

²⁸ They must be hosted in the UK but can be from the EEA or Switzerland.

Measure	Description
	in both US and UK institutions, are another example. The Trust also funds researchers and their work in low and middle income countries, including through its bespoke Public Health and Tropical Medicine Fellowships and its Major Overseas Programmes.

Source: Deloitte

Promotion of 'dual careers'

The Dual Career issue affects all professions, including researchers, and mainly those early in their career on short term contracts. UK institutions act independently and provide the accompanying partner with support with networking and applying for openly advertised jobs.

Portability of national grants

Researchers of all nationalities, who have been appointed to an eligible research post at a UK University, can apply for a Research Council grant. Individual UK Research Councils have signed the EUROHORCS 'Money follows researcher' letter of intent, which allows them to create bilateral arrangements with foreign universities within Europe and beyond, and accept grant portability with homologous research funding bodies.

Access to cross-border grants

The majority of the fellowships are open to UK and overseas candidates regardless of their nationality and they are assessed in competition with each other.