

Promoting the UK doctorate: opportunities and challenges



This series of Research reports published by Universities UK will present the results of research that we have commissioned or undertaken in support of our policy development function. The series aims to disseminate project results in an accessible form and there will normally be a discussion of policy options arising from the work.

This report was produced for Universities UK by Faye Emery and Janet Metcalfe, on behalf of Vitae.

Vitae is a national organisation championing the personal, professional and career development of doctoral researchers.

Authors' note: Throughout this report we use the term doctoral researchers for those registered on doctoral degree programmes.

In describing the doctoral cohort, we have drawn heavily on two recent reports that have undertaken detailed analysis of the HESA data on doctoral researchers: *Higher degrees: postgraduate study in the UK 2000/01 to 2005/06*, DIUS (2008) and *PhD study: trends and profiles 1996/97 to 2004/05*, HEFCE (2009). We recommend both these reports for those readers who want to explore further the demographics of the doctoral cohort.



Incorporating the UK GRAD Programme and UKHERD

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The publication of this report coincides with news that the Government is expected to announce plans to develop a comprehensive policy for postgraduate study – encompassing both taught and research Masters as well as studies at doctorate level – as part of the forthcoming higher education framework. This report, together with Universities UK's previous study, *Taught postgraduate students: market trends and opportunities*, published earlier in 2009, is intended to inform and guide the debate.

While policy discussions in higher education have traditionally focused on the undergraduate degree, there has been increasing interest in all aspects of the UK doctorate in recent years, including its wider contribution to the economy; this development has been welcomed by the sector.

This report brings together issues arising from policy developments and their impact on doctoral study, the range and diversity of doctoral programmes, the nature of the doctoral researcher cohort in the UK and the development of the third cycle in the Bologna process. Through discussions with key stakeholders, we have identified the key challenges to the future development of postgraduate research education, which include the promotion of the UK doctorate, both within the UK and internationally, ensuring the sustainability of doctoral provision and working to improve the employability of doctoral graduates.

Recognising that doctoral programmes provide the next generation of researchers, continuing to invest in postgraduate research provision and enabling universities to build their research capacity is vital to maintaining the UK's world-class research base as we begin to rebuild our economy in a post-recession environment.

Universities UK therefore looks forward to working with government, the higher education funding councils and the research councils on the development of a clear and coherent strategy for postgraduate provision. Setting the scene for this debate, the report examines both current provision and future challenges. We hope that it will be of interest to all UK universities and among relevant policymakers within government and beyond.

This report has been produced by Janet Metcalfe and Faye Emery on behalf of Vitae and we are grateful to the authors for analysing the issues so clearly. We would also like to thank all the organisations and individuals who have provided input into the report, including the funding councils, Research Councils UK, the Quality Assurance Agency, the UK Council for Graduate Education, the Council for Industry and Higher Education and the Inter-Company Academic Relations Group of the CBI.

Professor Eric Thomas

Chair
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- The last decade has seen increased interest in various aspects of the UK doctorate. This report brings together issues arising from national policy developments, the doctoral researcher cohort, the diversification of doctoral level provision in the UK and the development of the third cycle in the Bologna process. Through discussions with key stakeholders, we have identified the most important themes relevant to the future development of postgraduate research education in the UK.
- The report examines current provision and future challenges including the reputation and attractiveness of the UK doctorate, the structure and provision of doctoral programmes and the impact of doctoral programmes and doctoral graduates.

Key themes

- Three themes emerged as key to the continued success of the UK's doctoral provision: the promotion of the UK doctorate, both within the UK and internationally; ensuring the sustainability of the doctoral provision, including improving the researcher experience; and working to improve the employability and impact of doctoral graduates.
- The issues raised in this report and the recommendations below should not be seen in isolation but as part of the process of developing the strategic UK policy on postgraduate researchers, which was announced in 2009 by Rt Hon John Denham MP, the former Secretary of State for Innovation, Universities and Skills.¹
- **Recommendation 1:** Universities UK should facilitate discussions with key stakeholders such as the Department for Business, Innovation and Skills, the funding councils and Research Councils UK (RCUK) in order to develop a strategy for postgraduate researchers.

Promoting the UK doctorate overseas

- **Recommendation 2:** Universities UK should, on behalf of the higher education sector, work with key stakeholders such as the British Council, the Europe Unit and the International Unit to promote the UK doctorate internationally.

Raising awareness of the UK doctorate in the UK

- **Recommendation 3:** Universities UK should facilitate discussion within the sector and with key stakeholders to clarify the purposes, definitions and advantages of different forms of the doctorate. This should include recognition of the distinctiveness of doctoral level skills compared to graduate skills.

Funding and sustainability

- **Recommendation 4:** The Department for Business, Innovation and Skills, the funding councils and Research Councils UK should work with Universities UK and the sector to develop a sustainable funding model for research degree provision. This work should take into account the potential impact of research funding models, universities' varying reasons for providing research degree programmes, the current income shortfall and projections of supply and demand.

Researcher experience

- **Recommendation 5:** Research Councils UK should work with the Higher Education Academy and the sector to undertake further research into the motivation and experiences of doctoral researchers to improve and promote the attractiveness of UK research degrees.
- **Recommendation 6:** Institutions should consider how to integrate doctoral researchers within the research community to improve the researcher experience, particularly for international doctoral researchers and those pursuing part-time study.

Employability and impact

- **Recommendation 7:** Key stakeholders, including the Department for Business, Innovation and Skills, Research Councils UK and Vitae, should develop strategies for engaging employers at a national level in discussions about research skills and raising public awareness about researchers and research training. This should include promotion of the distinctiveness of doctoral level skills compared to graduate skills.

- **Recommendation 8:** Research Councils UK should continue to provide 'Roberts' funding to universities beyond 2010/11 for the professional and career development of all researchers and to support the increasing emphasis on skills related to knowledge transfer, public engagement and working in an international context.
- **Recommendation 9:** Vitae and the Rugby Team (a sector-led working group) should work collaboratively with institutions and Research Councils UK to identify and understand researcher careers and to identify ways to demonstrate the impact of research training and researchers.

- 1 This report aims to raise awareness and understanding of the challenges for research degree programmes among policymakers and higher education institutions. It summarises recent developments and considers the key issues concerning doctoral training and the supply of doctoral researchers. It also considers the implications for institutions and for national policies.
- 2 Universities are increasingly viewed as important drivers of economic growth. As the Government recognises:

‘Britain can only succeed in a rapidly changing world if we develop the skills of our people to the fullest possible extent, carry out world class research and scholarship, and apply both knowledge and skills to create an innovative and competitive economy. [Our] mission is to work with our partners to meet these challenges’.²
- 3 The Government’s higher education debate has emphasised the importance of the UK research base and the supply of researchers to the future economic prosperity of the UK:

‘Research careers form a fundamental part of the supply and development of the next generation of world class skills that will be needed for the country to maintain its leading position in the global economy.’³
- 4 At a conference in February 2009, John Denham announced that the new framework for higher education, to be published in late 2009, would include ‘for the first time, the way to a clear strategy on postgraduate research, shared across the Higher Education Funding Council for England (HEFCE) and the research councils’.⁴
- 5 The UK has a world class research base. It has 1 per cent of the world’s population but undertakes 4.5 per cent of the world’s research and has an 8 per cent share of the world’s scientific publications.⁵ To ensure that the UK sustains and capitalises on its research base, it needs to maintain a supply of trained researchers. Doctoral programmes provide the next generation of researchers and the academics who will train the following generation. They also provide highly skilled professionals to a range of employment sectors.
- 6 The UK doctorate has been very successful to date. However, the UK faces increased competition from other countries as they invest in their research base and develop their doctoral programmes. For example, many European countries are developing doctoral programmes in English with the aim of attracting international researchers.⁶
- 7 This report examines the success of the doctorate and outlines future challenges in the following key areas: the quality and reputation of doctoral provision; the researcher experience; the composition of the doctoral cohort; the training and skills of doctoral graduates; and their mobility and employability.

Range of doctoral programmes

- 8 The most common research degree in the UK is the Doctor of Philosophy (PhD or DPhil), which is normally awarded on the basis of a thesis setting out the findings of the candidate's research project; it is examined in an oral examination, the *viva voce*. It is an internationally recognised qualification. Universities in the UK also offer a wide range of other doctorates⁷ including, for example, professional doctorates, PhD by practice, integrated or 'new route' doctorates and PhD by publication, although the latter are usually restricted to staff or alumni.⁸
- 9 Within the framework for higher education qualifications published by the Quality Assurance Agency for Higher Education (QAA), doctoral degrees are awarded to researchers who have demonstrated⁹:
- the creation and interpretation of new knowledge, through original research or other advanced scholarship, of a quality to satisfy peer review, extend the forefront of the discipline, and merit publication;
 - a systematic acquisition and understanding of a substantial body of knowledge which is at the forefront of an academic discipline or area of professional practice;
 - the general ability to conceptualise, design and implement a project for the generation of new knowledge, applications or understanding at the forefront of the discipline, and to adjust the project design in the light of unforeseen problems; and
 - a detailed understanding of applicable techniques for research and advanced academic enquiry.
- In addition, doctoral graduates will have 'the qualities and transferable skills necessary for employment...in professional or equivalent environments'. Within these criteria, each awarding institution defines its own requirements for the award of a doctorate and the precise arrangements for examination.

- 10 The QAA's qualifications framework has been confirmed as being compatible with the Bologna qualifications framework set up to facilitate the recognition of qualifications and mobility of staff and students within Europe.¹⁰

Summary of recent changes

- 11 During the period 2000/06, the UK has seen a 12 per cent increase in the number of researchers registered for doctoral degrees. Although the number of UK-domiciled doctoral researchers has been fairly static, the number of researchers from other EU countries and from outside the EU has grown considerably – at 27 per cent and 30 per cent respectively. In 2005/06, 40 per cent of the UK doctoral researcher population came from outside the UK.¹¹
- 12 In 2004/05 there were 21,500 new registrations to doctoral programmes, an increase of 15 per cent over a nine year period from 1996. The profile of doctoral researchers has also changed, with a gradual increase in the percentage of women, although there are some disciplinary differences. The proportion of doctoral researchers studying part-time has declined recently to around a fifth of the cohort. This is discussed in more detail later in the report.
- 13 We have seen a gradual increase in the mean age at registration for a doctorate over the last 10 years to 29.4 years in 2004/05: 48 per cent are 28 years or older. There is a 10 year difference in the mean age between full-time registrations at 27.3 years and part-time at 37.6 years. Of part-time registrations, 82 per cent are 28 years or older, compared to 33 per cent of full-time registrations. The youngest starters are in chemistry (mean of 24 years full-time, 30 years part-time), while the oldest starters are in education (mean of 34 years full-time, 42 years part-time) and the arts and humanities (30 years full-time; 42 years part-time).¹³

Table 1

Registered doctoral researchers
2000/01–2005/06 by domicile¹²

	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	5-year increase
UK	54,438	54,050	53,830	54,845	54,933	55,733	2.4%
Other EU	9,337	9,443	9,618	9,989	11,207	11,867	27.1%
Non-EU	20,386	21,275	22,758	24,544	25,467	26,580	30.4%
Total	84,161	84,768	86,206	89,378	91,607	94,180	11.9%
Percentage female	42.1%	42.9%	43.0%	43.9%	44.3%	44.6%	2.5%

- 14 It is increasingly unlikely that people registering for a doctoral degree come directly from completing a previous qualification at a UK university. In total only 23 per cent of all starters in 2004/05 came directly from this source, a 12 per cent decrease over a nine year period from 1996. To some extent this change reflects the growth in the number of international doctoral researchers. However, 65 per cent of UK-domiciled starters have also taken a gap after leaving university (or come from a previous qualification at a university outside the UK).¹⁴
- 15 Of the 35 per cent of UK-domiciled doctoral researchers in 2004/05 who completed a previous qualification immediately before beginning doctoral study, 30 per cent started with a Masters' degree (47 per cent increase over nine years) and 70 per cent with a first degree (25 per cent decrease over nine years). There is wide variation between subjects in terms of previous qualifications. More than 50 per cent of all UK-domiciled social sciences, arts and humanities starters have a Masters' or higher qualification. In the sciences, progression to a doctorate directly from a first degree¹⁵ is common, especially for full-time study where this group constitutes more than two-thirds of all starters.¹⁶
- 16 The funding landscape is also changing (Table 2). Research council funding has remained fairly constant. However, there has been a reduction in the number of UK-domiciled full-time researchers funded by charities and the British Academy and UK industry. Conversely, there has been a 24 per cent increase since 2001/02 in the number of doctoral researchers funded directly by UK universities from their own resources¹⁷.
- 17 In 2004/05, 20 per cent of all UK-domiciled full-time doctoral researchers had no financial backing, an increase of 6 per cent since 2001/02. Most of these were in the social sciences and arts and humanities, where at least a third had no funding source. Only 6 per cent of UK-domiciled full-time starters in chemistry and physics had no financial backing. Between 10 and 20 per cent of UK-domiciled full-time starters in other science subjects had no financial backing. Unsurprisingly, the lack of funding is more common for part-time study: 60 per cent of all UK-domiciled part-time researchers in 2004/05 had no funding source, slightly up from 55 per cent in 1996/97.¹⁸
- 18 The doctoral researcher cohort has therefore increased in size, largely because there are more international researchers undertaking doctoral study in the UK, rather than more UK-domiciled researchers. The cohort has also become more diverse in terms of age and previous qualifications; increasing numbers of researchers are either supported financially by universities or are funding their own studies.

Table 2

UK-domiciled starters to full-time doctoral courses between 1996/97 and 2004/05, by major source of funding¹⁹

Major source of tuition fees	1996/97	2000/01	Percentage change	2001/02	2004/05	Percentage change
Research council	3,248	3,299	2%	2,571	2,661	4%
Charity/British Academy	530	393	-26%	320	309	-3%
Institution	1,541	1,537	0%	1,591	1,973	24%
Government	550	577	5%	683	511	-25%
UK industry	646	430	-33%	378	370	-2%
Overseas	127	204	61%	164	73	-55%
Other	457	761	67%	843	904	7%
No financial backing	1,214	1,189	-2%	1,601	1,700	6%
Total	8,313	8,390	1%	8,151	8,501	4%

- 19 The quality and reputation of the UK doctorate are key factors in its contribution to the UK research base. The UK has a good reputation internationally and doctoral completion rates compare well to those of competitor countries. It has been very successful in attracting international doctoral researchers, currently holding 15 per cent of the global market.²⁰
- 20 Doctoral researchers generally give positive feedback about their experience of their degree programmes. In 2007 the Higher Education Academy launched the postgraduate research experience survey (PRES), a tailored questionnaire available to all UK universities which provides comparative and confidential information on researchers' views of their experiences.²¹ In 2008, 73 institutions participated in PRES and over 16,500 researchers responded. More than four out of five respondents rated their experience as having met or exceeded their expectations.
- 21 However, although the UK's performance to date has been strong, there is a number of areas where its position is threatened which are discussed later in this report. While the diversity of doctoral programmes is seen as a strength in meeting market needs, it has also led to a lack of understanding internationally of the UK doctoral model. Competition for international researchers is increasing, with universities in many European countries providing structured doctoral programmes in English, with low or no fees, particularly the Nordic countries. Recruitment of UK-domiciled doctoral researchers has been static over the last five years (see Table 1) and there are concerns about the general attractiveness of a research career and supply issues in several disciplines.
23. While the PhD continues to be by far the most popular doctoral level qualification, the UK has seen a growth in different types of doctoral programmes, not least in professional doctorates across a range of disciplines.

Professional doctorates

- 24 In 2005 a report for the UK Council for Graduate Education (UKCGE), based on a survey of its 129 members, identified 51 different professional doctorates, with the main areas of study being engineering, education and clinical psychology, nursing and business administration.²⁴
- 25 Professional doctorates are covered by the QAA's qualifications framework, which states that 'professional doctorates aim to develop an individual's professional practice and to support them in producing a contribution to (professional) knowledge'.²⁵ However, it is difficult to provide a clear definition of a professional doctorate that applies across the range of provision and distinguishes it clearly from a traditional research degree.
- 26 The purposes of professional doctorates and the level of involvement of professional bodies vary. Professional doctorates mostly include an individual research project within a professional context and a taught element. One of the best known and longest established programmes, the engineering doctorate, was originally set up by the Engineering and Physical Sciences Research Council (EPSRC) in 1992 to provide postgraduate engineers with a 'broadly based, research programme incorporating a taught component, relevant to the needs of and undertaken through sponsorship with industry'.²⁶ Other programmes are more tailored to the needs of experienced professionals, such as the doctorate in education and doctorate in business administration. Doctorates in clinical psychology are accredited by the British Psychological Society²⁷ as routes to chartered psychologist status and researchers are funded by the NHS.
- 27 Many universities offer a doctorate of medicine (MD), a long-established qualification open to those with a degree in medicine. This tends to be awarded on the basis of an original contribution to medical research. However the precise criteria vary between institutions.
- 22 In 2002 Sir Gareth Roberts concluded that 'a mixture of PhD provision, both in length and in content, is necessary to attract the full range of potential researchers into PhD training. Institutions should be funded and encouraged to develop a diversity of approaches to the PhD'.²² This was supported by the London communiqué, published in 2007 after a meeting of European higher education ministers as part of the Bologna process, that noted: 'We recognise the value of developing and maintaining a wide variety of doctoral programmes linked to the overarching qualifications framework for the European Higher Education Area, while avoiding over regulation'.²³

Diversity of doctoral programmes

Practice-based provision

- 28 Other examples of the diversity of provision in the UK include practice-based doctorates. Practice-based doctorates, for example in creative writing or performing arts, typically include an element of practice or performance as part of the assessment criteria, together with a written critical commentary that contextualises the work.

Collaborative programmes

- 29 Even within the 'traditional' PhD, the UK has developed a wide range of collaborative programmes with industry and businesses. This includes initiatives supported through the EPSRC's collaborative training accounts, soon to be replaced by knowledge transfer accounts.²⁸ CASE (Collaborative awards in science and engineering) awards, which support doctoral research projects involving partners outside higher education, are used by a number of research councils and extend across many disciplines.²⁹ For example, the Economic and Social Research Council (ESRC) supports CASE projects between universities and a range of organisations including charities, local and central government, the Museum of Science and Industry and the Metropolitan Police.³⁰ Similarly, the Arts and Humanities Research Council (AHRC) runs a collaborative doctoral awards scheme that funds a range of projects with partners from other sectors.³¹
30. There are other examples of innovative routes to doctoral degrees. Universities offer programmes whereby students can study at a distance through split-site schemes involving institutions overseas.³² There are also collaborations between universities including dual awards with institutions in other countries, for example a joint doctorate in economics between the University of Leicester³³ and the University of Milan and a range of cotutelle³⁴ programmes at the University of Kent³⁵. [Cotutelle programmes are research degrees jointly supervised by two institutions in different countries, leading to the award of a doctorate from both institutions.]
- 31 Integrated PhDs, such as those being developed by universities with EPSRC-funded doctoral training centres or offered by institutions participating in the new route PhD consortium³⁶, incorporate a PhD alongside formalised discipline-specific taught provision and training in research and transferable skills.
- 32 UK universities have therefore developed a range of provision, largely in response to demand. This is a sharp contrast to provision in other countries, where alternative models to the 'traditional' PhD are less common, although there are examples in some of the UK's competitors, for example in the United States³⁷ and Australia³⁸. With the exception of Ireland³⁹, this diversity of provision is unusual within the rest of the EU. However, there are examples of new, more professionally-oriented doctorates elsewhere.⁴⁰
- 33 One of the consequences of this increase in diversity is the challenge of promoting the 'UK doctorate' to potential researchers, particularly international researchers, and more generally to the international academic community. Outside the UK, there are suggestions that only the traditional PhD qualification is well understood. There is also evidence of a lack of understanding of the doctorate outside higher education, particularly with potential employers of doctoral graduates.⁴¹
- 34 To maintain the UK's competitive advantage, higher education needs to 'develop a clear and attractive UK doctoral brand'⁴², which describes the advantages of the different types of UK doctoral degrees to both the international market and employers outside the sector. In particular, a greater degree of consistency across the range of professional doctorate programmes might help to promote these programmes within and outside the UK as a different route to a doctoral qualification with the benefits of greater professional relevance and applicability.

The doctoral cohort

- 35 The UK has been very successful in recruiting to doctoral programmes. There has been a 10.9 per cent increase in doctoral researchers during the period 2000/01–2005/06. In 2005/06 there were 94,180 doctoral researchers in the UK. Around 60 per cent are UK-domiciled researchers.⁴³

- 36 The UK attracts 15 per cent of the total market of non UK-domiciled, or international, doctoral researchers.⁴⁴ At around 50,000, this accounts for 42 per cent of doctoral researchers in the UK in 2006/07, compared with 35 per cent in France and approximately 33 per cent in the United States.⁴⁵ Of the international doctoral researchers, a third came from the rest of the EU. Overall, about 25 per cent of international doctoral researchers studying in the UK currently come from three countries: China, the United States and Greece.⁴⁶ The UK's main competitor is the United States, which has approximately 40 per cent of the total market and an estimated 120,000 international doctoral researchers. The United States has also seen recent growth in the recruitment of international doctoral researchers.⁴⁷
- 37 The high proportion of international doctoral researchers studying in the UK brings many benefits to UK higher education and to the wider economy and society. However, there is a number of risks inherent in the current situation, including a reliance on particular markets and the increasing activity of competitors. There is strong evidence of over-reliance on specific markets in several disciplines but particularly in the arts and humanities (from the United States) and engineering and technology (from China).⁴⁸
- 38 Competition for international doctoral researchers is increasing as their contribution to economic growth is more widely acknowledged. Universities in many European countries, such as Germany and the Netherlands, provide a range of doctoral programmes in English.⁴⁹ Financial packages are often more attractive than those available in the UK, with countries such as Belgium, Finland and the Netherlands offering both grant packages and salaried positions for doctoral researchers. A report on *The UK's competitive advantage: the market for international research students*, published in 2008, looked at the increasing recruitment activity of other EU countries as well as the UK's main competitor, the United States, and developing countries. The report identified a number of areas to be addressed if the UK wished to maintain the competitiveness of its doctoral programmes, including strengthening and emphasising the UK brand, researcher funding, the quality of the international researcher experience, employment opportunities, immigration, and marketing and promotion at national and institutional levels.⁵⁰
- 39 Although the UK has seen an increase in the total number of researchers registered for a doctorate, there has been little change (0.9 per cent) in the number of UK-domiciled researchers over the period 2000/01–2005/06. This is in sharp contrast to the number of researchers recruited from other EU countries and elsewhere, which increased by 26.2 per cent and 30.2 per cent respectively (Table 1) over the same period.⁵¹
- 40 Concerns have been expressed that the lack of growth in UK-domiciled numbers may lead to a higher-level skills shortage in disciplines such as the STEM subjects (science, technology, engineering and mathematics) that have been identified as critical to the economy if doctoral graduates trained in the UK do not remain in the country.⁵² Between 1994/95 and 2004/05 the percentage of doctorates awarded in STEM subjects to UK-domiciled researchers fell from 65 per cent to 57 per cent. By 2004/05 less than 50 per cent of those undertaking doctorates in engineering and computer science subjects were UK-domiciled. In law, business, architecture and the social sciences, international researchers also make up more than half of the cohort.⁵³
- 41 There is little information about the demand for researchers in different employment sectors. A better understanding of demand, particularly about the need for researchers to sustain the UK research base, would inform discussions about the risk of a shortage in higher-level research skills in key areas and whether we need therefore to focus on recruiting more UK-domiciled students to doctoral programmes. The UK also needs to continue to recruit international researchers. As the former Secretary of State for Innovation, Universities and Skills said in 2009:
- ‘Our universities must not only be able to attract the world’s best postgraduate researchers but also ensure that research careers are attractive and attainable for a substantial number of home students’.⁵⁴

Widening participation

- 42 In the context of the UK's need to recruit the most talented researchers, the issue of equality of opportunity arises. Recent predictions suggest that in less than a decade most doctoral graduates 'and, ultimately, new academics' will be women.⁵⁵ In 2005/06, 46.3 per cent of the researchers undertaking a doctoral degree by research were women (Table 1).⁵⁶ In the social sciences, biological and biomedical sciences, female UK-domiciled doctoral graduates already outnumber males.⁵⁷ However, there are concerns about particular disciplines such as chemistry and physics which are 'male dominated at doctorate level relative to the undergraduate population'.⁵⁸
- 43 The number of students from all non-white ethnic groups has increased significantly.⁵⁹ Some 88 per cent of UK-domiciled full-time doctoral researchers who started their degree programme in 2004/05 were white, down from 91 per cent in 1996/97.⁶⁰ This compares to the UK-domiciled undergraduate population, which was 83.5 per cent white in 2005/06.⁶¹ Research in 2005 into the ethnic diversity of students following SET (science, engineering and technology) subjects has shown that 'the majority white population is over-represented in SET at doctoral level, which is not the case at all other levels of education'.⁶²
- 44 About 4 per cent of all doctoral researchers starting a course in 2004/05 reported a disability. For both full-time and part-time doctoral researchers, the numbers in this category have increased significantly since 1996/97, showing fairly steady growth throughout this period.⁶³
- 45 There is a lack of information on the socio-economic background of UK-domiciled doctoral researchers and its impact on the doctoral researcher population. Professor Nigel Thrift's contribution to the higher education debate, *Research careers in the UK: a review*, suggests several areas for further investigation, including diversity of social background and the influence of debt accumulated from previous study.⁶⁴ Such issues need to be addressed in proposals to raise the attractiveness of research careers within the UK, both in general terms and to those already in the system. There may also be broader implications for doctoral provision, in terms of funding, recruitment and student support.

Part-time study

- 46 Part-time doctoral study is fairly popular, with around a third of the total doctoral cohort (excluding those registered as 'writing up') studying part-time. However, there has been a decline in this group recently. While the number of full-time researchers registered for a doctorate increased by 19.7 per cent over the period 2000/01–2005/06, the number of part-time researchers declined by 8.5 per cent, from 22,494 to 20,576, with UK-domiciled part-time researchers declining by almost 10 per cent.⁶⁵

Table 3
Percentage of doctoral researchers by mode of study (2000/01–2005/06)⁶⁶

	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	5-year increase
Full-time	64.5%	64.9%	65.2%	65.9%	67.1%	70.4%	19.7%
Part-time	35.5%	35.1%	34.8%	34.1%	32.9%	29.6%	-8.5%

- 47 An analysis of the responses to the postgraduate researcher experience survey by part-time doctoral students shows that more part-time (10 per cent) than full-time doctoral researchers (1 per cent) are studying for a professional doctorate rather than a PhD.⁶⁷ The subjects of study also vary. Social studies are popular among both groups but more part-time doctoral researchers are likely to study education and medicine, whereas a higher percentage of full-time doctoral researchers study in the sciences. There are slightly more women than men studying part-time at this level. Part-time doctoral researchers also tend to be older than their full-time counterparts.⁶⁸
- 48 In discussions with key stakeholders, some people suggested that the distinction between part-time and full-time study is becoming increasingly blurred. Part-time researchers may be working full-time in a role that is directly relevant to their research, for example those registered for professional doctorates in higher education and medicine and related disciplines. Self-funded full-time researchers are likely to be working either full- or part-time to cover the cost of their programmes. Levels of full-time equivalence on part-time programmes may also vary considerably.

- 49 As we discuss later in the report, concerns have also been expressed about the challenges of supporting part-time researchers and the lower completion rates on part-time programmes, compared with full-time students. However, part-time study may become an increasingly important option in view of the changing demographics, the changing nature of employment and the growing emphasis on lifelong learning. For example, given the age range and subjects studied by this group, it appears that a significant proportion of part-time doctoral researchers are undertaking further study as a means of professional development, as well as for other reasons which include interest in the subject and personal fulfilment.⁶⁹
- 50 The part-time cohort is complex. Part-time students have expectations in terms of content, support, length of study and access to funding that differ from those of full-time students and a range of motivations for study. As a recent Vitae study⁷⁰ has shown, there is a need for further research to improve our understanding of how to support part-time researchers most effectively and help them complete their programmes within a reasonable period of time.
- 52 Motivation varied according to age and domicile of respondents and their choice of subject. UK-domiciled researchers were more likely to be motivated by interest in the subject (37 per cent) than international respondents (27 per cent) for whom the aim of improving prospects for a career in academia was the most important factor (45 per cent). Researchers aged 25 or younger and over 50 were more motivated by interest in the subject. For those between 31 and 40 years old, improving prospects for an academic or research career was more important than interest in the subject. Improving prospects for an academic or research career was the most important motivation for medicine and veterinary researchers; a research career outside academia was of greater importance for respondents in engineering and technology.⁷²
- 53 Information about the age and previous qualifications of doctoral researchers suggests that they are increasingly likely to begin doctoral study later in life and after a period outside education, rather than immediately after completing another degree. Out of the 2004/05 UK-domiciled full-time cohort, 44 per cent moved directly into doctoral study following an undergraduate or Masters' degree, compared to just over 50 per cent of the 1996/97 cohort.⁷³ The mean age of full-time doctoral researchers at registration has increased from 26.9 years in 1996/97 to 27.3 years in 2004/05. The mean age of part-time doctoral researchers at registration has increased from 35.8 years in 1996/97 to 37.6 years in 2004/05.⁷⁴

Motivation for doctoral study

- 51 The postgraduate researcher experience survey (PRES) in 2008 showed that there are many reasons for undertaking doctoral study. Foremost is interest in the subject (34.2 per cent), followed by aiming to improve prospects for an academic or research career (31.9 per cent); 13.4 per cent said 'it felt like a natural step for me'. Only 8.3 per cent of respondents said that their main motivation for pursuing doctoral study was to improve their career prospects outside academia or research.⁷¹
- 54 To sustain the future of the research base and the supply of recruits into doctoral programmes, the UK needs to ensure that doctoral study remains attractive to a diverse range of prospective students and takes account of their domicile, gender, mode of study and socio-economic origins. A better understanding of the motivation and expectations of doctoral researchers would inform strategies that aim to enhance the quality of the student experience. This would also support work to increase the attractiveness of researcher careers within the UK, such as providing vacation bursaries to undergraduate students so that they can experience the research environment in universities and research institutes.⁷⁵

Stipends for doctoral researchers

- 55 The availability of funding packages for doctoral researchers inevitably influences decisions on whether or not to pursue doctoral study. If the UK aims to attract the most talented researchers, funding is a key factor.

- 56 The implementation of the Roberts review⁷⁶ led to significant increases in the minimum stipend for research council-funded researchers and has led to an increase in the level of stipends overall.⁷⁷ Although the total percentage of doctoral researchers funded by the research councils has declined over the last 10 years to between 13 and 16 per cent of doctorates carried out in the UK⁷⁸, this continues to be a significant proportion of the total and is mainly concentrated in the research-intensive universities. Research council funding models have increasingly moved away from individual studentships to block allocations to universities, through initiatives such as the EPSRC's doctoral training centres and AHRC's new block grant partnership scheme (although the latter will retain a smaller studentship competition). Generally, these models give institutions greater flexibility in managing studentship allocations, although there has been criticism of some of the detailed requirements for doctoral training accounts. Overall, these block allocations also appear to be contributing to the further concentration of doctoral training in a smaller number of universities.
- 57 Individual universities now provide a significant amount of funding to support doctoral researchers, reflecting their views of the importance of doctoral researchers to research outputs and reputation. For the cohort starting doctoral degrees in 2004/05, universities collectively were the major source of tuition fee funding, supporting 23 per cent of all full-time doctoral researchers. 20 per cent of this cohort did not give a source of funding, suggesting that they were covering their own fees.⁷⁹
- 58 Funding is a particularly important issue for international researchers and the UK has a reputation as a relatively expensive place in which to study. About half the international doctoral researchers in the UK meet their costs from personal sources; 23.2 per cent receive funding of varying levels from universities. Less than 10 per cent are funded by the UK government, a relatively low level compared to competitor countries.⁸⁰ The UK research councils fund EU researcher fees but stipends are only available to EU researchers who meet the UK residency requirements.
- 59 The Dorothy Hodgkin scheme⁸¹, jointly funded by government and private companies with the aim of attracting top quality international researchers to PhDs in the UK, is popular and appears to be successful. However, numbers funded through this scheme are small and restricted to certain disciplines in departments scoring above a minimum threshold in the Research Assessment Exercise (RAE) and also to certain countries of domicile. From 2010/11 HEFCE is no longer funding the long-established Overseas Research Students Awards Scheme (ORSAS), which paid the difference between the level of the home and international student fee. The relatively low level of UK government funding for international doctoral researchers is in contrast to the increasing activity of competitors, including other EU countries where fees are not usually charged, for example Finland and Sweden.⁸²
- 60 It is difficult for research students in general (and international students in particular) to know how much their studies will cost overall. The National Student Forum commented in its annual report for 2008 on the lack of certainty over the level of tuition fees over the duration of the course and the extent of 'hidden costs' such as books and travel. While to some extent this might apply to other study destinations, the UK could perhaps provide clearer information than at present. The National Student Forum also noted a lack of information on how individual universities use student fee income.⁸³
- 61 Funding packages clearly have a role to play in enhancing the attractiveness of doctoral study. A better understanding of the importance of the funding available for different researcher cohorts and further research into demand for doctoral graduates across disciplines and sectors would inform the development of policy on funding for all doctoral researchers. This is particularly important for international researchers given increasing competitor activity and the relatively low level of government funding for international doctoral researchers.⁸⁴

62 For doctoral programmes to remain attractive to both UK-domiciled and international researchers, their quality must be maintained. Over the last five years, institutions have focused considerable attention on the organisation and structure of degree programmes, including the development of comprehensive training programmes to enhance the researcher experience and the role of graduate schools.

Funding of doctoral provision

63 Funding for research degree programmes in the UK is complex. Universities receive contributions towards supervision costs from the funding councils, which vary across the councils. The amount of funding is dependent on the eligibility of the researcher and the quality of the department, as determined by the Research Assessment Exercise. The funding councils fund an average of 3.5 years' full-time study, paid to institutions over three years, and six years' part-time study.

64 The other main source of funding is tuition fees. The principal sources of funding for fees are the research councils, charities, industry, overseas funding bodies and the universities themselves. Research council-funded researchers attract support for between three and four years, depending on the programme, although increasingly there is a move towards four-year funding. Full-time international researchers typically pay fees over a three-year period. Overall 29 per cent of doctoral researchers are self-funded: many of these may also have their fees waived by institutions.

Table 4

Full-time doctoral starters in 2004/05, by major source of tuition fees⁸⁵

Major source of tuition fees	UK	Percentage of starters	Other EU	Percentage of starters	Non-EU	Percentage of starters
Research Council	2,661	31%	243	10%	62	1%
Charity / British Academy	309	4%	131	5%	113	2%
Institution	1,973	23%	725	29%	1,389	23%
Government	511	6%	69	3%	106	2%
UK industry	370	4%	91	4%	204	3%
Overseas	73	1%	102	4%	1,309	22%
Other	904	11%	258	10%	480	8%
No financial support	1,700	20%	881	35%	2,255	38%

65 Doctoral researchers registered part-time are most likely to have no financial backing; about two-thirds of the part-time starters in 2004/05 have none. Institutions are the largest supporters of part-time doctoral researchers.

Table 5

Part-time PhD starters in 2004/05, by major source of tuition fees

Major source of tuition fees	UK	Percentage of starters	Other EU	Percentage of starters	Non-EU	Percentage of starters
Institution	486	15%	43	9%	63	9%
Government	178	5%	22	5%	38	5%
UK industry	406	12%				
Other	273	8%	47	10%	60	8%
No financial backing	2,005	60%	352	76%	552	77%
Total	3,348	100%	464	100%	713	100%

Note: Only sources with 100 starters or more are listed separately.

66 In 2005 a report commissioned by HEFCE on the costs of research degree provision used the transparent approach to costing (TRAC) model to estimate the costs of training and supervising research degree students.⁸⁶ The Higher Education Policy Institute (HEPI) undertook a further analysis of this data, considering the costs to universities and the income associated with research degrees. There was a significant shortfall, and thus a need to cross-subsidise, for all kinds of doctoral researcher, although the extent of the shortfall varied by discipline and type of student. The HEPI report did not set out to measure the precise size of the shortfall, but the estimate was significant: between £24,000 and £78,000 over the course of an individual student's research degree programme, with the largest shortfall occurring in laboratory-based subjects. In all subject areas the level of the shortfall was lowest for full-fee paying international students or those receiving a research council award who attract HEFCE funds. The shortfall increased significantly for researchers who were either eligible only for HEFCE funding or attracted no funding at all.⁸⁷

- 67 Despite this, many institutions have ambitious targets to increase doctoral researcher numbers. There is a range of benefits to universities in taking on doctoral researchers, which are difficult to quantify and are likely to vary by discipline. They include the contribution of the doctoral researcher to broader research projects, the wider research community and activity of a department. Research degrees are seen as an integral part of a department's research activity that cannot be easily disaggregated: '...the training and supervision of postgraduate research students is not considered by some academics to be a separate activity to which indirect and estates costs should be allocated. (Postgraduate research students are an input, contributing to research project outputs, not a separate activity)'⁸⁸. These benefits are likely to have an indirect influence on income through their contribution to the RAE, industrial links and other areas of activity.
- 68 The level of the shortfall for different types of doctoral researchers may have longer term implications for university policies on doctoral researcher recruitment, perhaps encouraging recruitment where the financial deficit is lower or the benefits are greater, for example fully-funded international doctoral researchers working in areas closely linked to a department's core research activity. This might make doctoral programmes in disciplines in the arts and social sciences, where postgraduate level research is driven by individual interest, less attractive to universities, with knock-on effects on the health of some disciplines and on preserving critical mass of research.⁸⁹
- 69 The evidence regarding the deficit associated with research degree provision raises questions about sustainability and the pros and cons of cross-subsidy. Do the benefits to universities of engaging in doctoral programmes outweigh the shortfall? Should universities review the fees they charge for doctoral programmes? The research councils stated in 2006 that doctoral researchers receiving research council funding should not be charged to make up any shortfall between the research council agreed fee and the fee set by an institution.⁹⁰ Thus, if universities raised the doctoral researcher fee above the research council level, they would effectively be subsidising research council-funded doctoral researchers.
- 70 In our interviews, stakeholders raised several concerns about funding for doctoral programmes, particularly the implications of any further concentration of research funding. A report on the diversity of research⁹¹ published by Universities UK in 2007 found that, following the use of the 2001 RAE results by the funding councils to determine the allocation of funding, there has been a measurable increase in research concentration, which could result in a loss of diversity.
- 71 The RAE in 2008 identified areas of research excellence across the sector. In England, the Secretary of State's annual funding letter to HEFCE in 2009 stated that he expected 'the Council to continue to recognise and reward the highest levels of research excellence wherever it is found' and 'to encourage collaboration between institutions with the largest volumes of world class research and those with smaller pockets of excellence'.⁹² HEFCE and the Higher Education Funding Council for Wales (HEFCW) have since announced that they would fund all research rated at grade 2* or above in the 2008 RAE, with activity rated at 3* or 4* attracting higher levels of funding.⁹³ The subsequent allocation of grant income by HEFCE showed a small but significant shift of funding away from some research-intensive universities and a larger allocation to areas of excellence within post-92 higher education institutions.⁹⁴ The Scottish Funding Council has announced that it will fund research rated at grade 1* and above.⁹⁵
- 72 Although the concentration of research funding itself lies outside the remit of this report, any consideration of research funding policy should consider the potential impact on doctoral level provision, specifically the quality of the research environment, the sustainability of pockets of high-quality research and research training, the size of the research community in different disciplines at institutional, regional and national levels and funding for both researchers and institutions.

Structure and organisation of doctoral programmes

- 73 The organisation of doctoral programmes in the UK has become increasingly formalised as external requirements have increased and the quality assurance framework has developed.⁹⁶ Doctoral-level qualifications are incorporated within the Quality Assurance Agency's (QAA) qualifications framework.⁹⁷

- 74 The quality assurance framework for doctoral level provision has undergone extensive review over the last five years, following a joint consultation by the funding councils in 2003, *Improving standards in postgraduate research degree programmes*⁹⁸. This consultation followed the recommendation of the 1996 Harris Report⁹⁹ that HEFCE research grant funding should be restricted to institutions that 'can deliver excellence in research education', which was supported by HEFCE's review of research in 2000.¹⁰⁰
- 75 One outcome of the 2003 consultation was the revision of section 1 of the QAA's code of practice on postgraduate research degree programmes in 2004. The code sets out detailed expectations for research degree programmes. This has encouraged the introduction of more formal procedures for supervision and regular reviews of progress within institutions. The code also incorporates requirements for skills development, as set out in the joint skills statement published by the research councils in 2001.¹⁰¹
- 76 In 2005/06 the QAA reviewed research degree programmes in England, Wales and Northern Ireland against the expectations set out in its code of practice. The review identified areas of good practice within all the precepts of the code as well as points for development. It concluded that 'the overall picture emerging from the outcomes of this review is highly positive'.¹⁰²
- 77 Since the 1990s most UK universities have structured their doctoral provision around graduate schools, although the nature and remit of these vary widely.¹⁰³ The doctoral cycle of the Bologna process¹⁰⁴ endorses the development of: 'appropriate organisational structures in the form of doctoral, research or graduate schools. Organisational structures chosen must demonstrate added value for the institution, in particular in seeking to:
- counteract the isolation of the young researcher from other disciplines, or from the larger peer group, or the larger scientific community;
 - establish transparency of expectations, quality and assessment standards (supervision etc); and
- create synergies regarding generic skills training (at institutional or at inter-institutional level)'.¹⁰⁵
- 78 There is a range of models of graduate schools in the UK and other European countries. In the UK, graduate schools tend to be a governance structure that spans the institution or individual faculties and schools. They facilitate the strategic management and coordination of postgraduate provision and provide a means of representing postgraduate interests at an institutional level. In many cases, graduate schools cover both doctoral researchers and taught postgraduate students. Other models within Europe include 'doctoral' or 'research' schools focusing on specific research themes, often across a number of institutions, where membership and access to facilities or resources might be restricted to select groups of doctoral candidates, such as the German 'excellence initiative'¹⁰⁵. At a European level, the European University Association's Council for Doctoral Education, launched in 2008, was set up to support discussion among European universities about the development of doctoral programmes.¹⁰⁶
- 79 Within the UK, cross-institutional models have started to emerge. The Scottish Funding Council is increasingly funding collaborative research activity through its 'research pooling' scheme, introduced to strengthen the research base and sustain critical mass for doctoral education in Scotland. A number of pools has been funded, including the Scottish universities life sciences alliance (SULSA) and the Scottish universities physics alliance (SUPA), both involving six institutions. Reviews of the impact of research pooling in Scotland have highlighted its 'considerable success in recruitment and in PhD training'.¹⁰⁷ HEFCE has also announced a number of collaborative schemes in science subjects.¹⁰⁸ Some research council initiatives have also promoted collaboration, such as several of the EPSRC's doctoral training centres which involve collaboration between institutions. These include, for example, the Centre in Regenerative Medicine, a joint venture between three universities in the Midlands¹⁰⁹ and also the White Rose Doctoral Training Centre¹¹⁰. The ESRC's proposals for the development of its postgraduate framework allow bids to establish collaborative doctoral training centres across institutions. The AHRC's new block grant partnership scheme for allocating studentships contains similar provisions.¹¹¹

80 Given the importance of maintaining the research base and the costs to institutions of providing research degree programmes, the higher education sector may need to find other innovative structures to provide cost-effective programmes, such as regional collaborations. Sector-led collaborative ventures, supported by the funding councils, may help the UK to meet some of the challenges associated with sustaining leading research in some disciplines and managing the costs of research degree programmes.

Development and training

81 Another sign of the increasing formalisation of doctoral programmes is the introduction of the structured delivery of research training and support for broader skills development. Alongside the increasing diversity of doctoral provision, the scope of the traditional PhD programme has broadened. Although the assessment criteria for most doctoral programmes continue to focus primarily on the achievement of an original contribution to knowledge, there has been increasing emphasis on the development of the researchers themselves, including transferable skills and employability as well as research techniques.

82 The research councils' joint skills statement set out the skills and attributes that researchers are expected to develop over the course of studying for a doctorate in seven areas: research skills and techniques; the research environment; research management; personal effectiveness; communication skills; networking and teamworking; and career management.¹¹² Universities use a range of methods to support these aspects of the researcher experience, including analysis of individual training needs, personal development planning, formal accredited courses and workshops.

83 One of the key influences behind this development has been Sir Gareth Roberts' report *SET for success*¹¹³, published in 2002. In 2001 Sir Gareth was commissioned by the Government to review the supply of science, engineering, technology (SET) and mathematics skills throughout the education system. The report and others¹¹⁴ placed a stronger emphasis than previously on the process of doctoral study and the importance of the role of doctoral graduates within the wider economy. In particular they raised concerns about the effectiveness of doctoral programmes in preparing researchers for careers both within and outside academia. Sir Gareth Roberts commented as follows:

'The product that the PhD researcher creates is not the thesis – vital though that is to their subject area through the creation of original knowledge – no, the product of their study is the development of themselves'¹¹⁵.

84 The funding associated with the Roberts recommendations has also supported the setting up of Vitae¹¹⁶, which is funded by RCUK to promote the personal and career development of researchers, both doctoral researchers and research staff. Vitae provides a forum in which institutions can share good practice and experience, while promoting the development of innovative and high-quality provision. Vitae also provides doctoral researchers with independent advice and guidance, primarily through its website and publications but also through face-to-face provision including careers events and workshops.

85 Universities are increasingly engaging in collaborative activity in researcher development through the work of Vitae, as well as in research degree provision more broadly. Vitae includes eight regional hubs that provide a means of promoting researcher development, supporting regional networks, encouraging discussion and sharing practice.¹¹⁷ Using resources developed by Vitae, institutions are also collaborating to deliver training to doctoral researchers through national programmes such as GRADschools¹¹⁸ or the 'effective researcher'¹¹⁹.

86 Key stakeholders interviewed for this report commented on the improvements made to skills development provision as a result of the 'Roberts' funding made available to universities with research council-funded students, which is currently only confirmed until 2010/11. In their reports for the higher education debate in 2008, both Thrift and Wellings recommended continuation of this funding. Thrift recommends the long-term continuation of the funding 'to ensure that high-quality researcher development programmes become embedded across the sector', noting that a cultural change over the long term is required.¹²⁰

- 87 Wellings argues that there is scope for an increased focus on the skills associated with the commercialisation of research and proposes that the funds should be extended to cover all doctoral researchers¹²¹, as originally recommended by Roberts¹²², rather than only those funded by the research councils. As well as this emphasis on the exploitation of research for the benefit of society, the UK should consider strengthening its international position by supporting the development of the skills and cultural awareness of doctoral researchers to equip them to work within an international context. With these aims in mind, arguably the UK should invest in such development for all doctoral researchers.
- 88 The shift of emphasis in doctoral programmes towards the more holistic development of the researcher has also raised questions as to whether the assessment criteria for awarding the doctoral degree are still appropriate or whether they should take account of the increased breadth of doctoral programmes.¹²³

Length of doctoral courses

- 89 Traditionally, the UK PhD has had a three-year full-time equivalent funded period of study, followed by an extension of up to 12 months. The QAA's qualifications framework states that 'achievement of outcomes consistent with the qualification descriptor for the doctoral degree normally requires study equivalent to three full-time calendar years'.¹²⁴
- 90 Since the publication of the Roberts report in 2002 there has been increasing diversity in the duration of funding for doctoral study. Roberts recommended a move to an average period of full-time study of 3.5 years for the PhD, in line with HEFCE funding. There has been a move towards a longer period of study in the sciences for research council-funded researchers, where graduates are more likely to enter a PhD directly from undergraduate study. EPSRC's doctoral training centres, for example, provide four years of funding and other EPSRC researchers receive support for 3.5 years. More recently, the ESRC has announced a new postgraduate training framework which includes an element of flexibility over the length of the PhD.¹²⁵ A growing number of universities now has regulations that allow researchers following a PhD to register for up to four years' full-time study.

- 91 The Royal Society has suggested that, in the STEM subjects, the UK should move to a longer cycle of higher education of eight years, extending from the undergraduate level to the completion of a PhD within the Bologna process model, while retaining flexibility over the length of different components of the structure. Its rationale is that UK qualifications, particularly the doctorate, may be perceived as lacking in breadth if they do not move in this direction, thus becoming less portable and ultimately less attractive internationally.¹²⁶ Conversely, many international researchers are attracted by the shorter period of study, and hence lower costs.
- 92 During the development of the doctoral cycle within the Bologna process, there has been some debate about the UK model and its capacity to reach the same level of achievement within the shorter time scale, when compared to the longer doctoral programmes common in other EU countries, although many of these programmes in reality are 'part-time'. The UK has continued to emphasise the need to focus on the quality of outputs rather than the length of study, and the Salzburg principles¹²⁷ specifically recognise the value of the UK model for the doctoral cycle of the Bologna process: 'Doctoral programmes should operate within an appropriate time duration (three to four years full-time as a rule)'. Many European countries are now moving to shorter doctoral programmes.
- 93 Since the early 1990s the research councils have required institutions to monitor submission rates and have set minimum targets to qualify for future funding. Around 75 per cent of research council-funded researchers submit their thesis within four years of beginning their doctoral programme.¹²⁸ In 2005 HEFCE published completion rates for the full cohort who began a doctoral degree in England in 1996/97: 57 per cent of those following a full-time course completed within five years and 71 per cent within seven years. The publication of completion rates as a performance indicator for all doctoral researchers raises issues about the factors that affect completion and, in particular, the lack of detailed understanding of the issues affecting part-time researchers' completion rates. HEFCE's research showed that doctoral researchers with financial support, particularly from the research councils, international researchers and those based in the natural sciences were likely to complete more quickly than the others.¹²⁹

- 94 Information on completion rates in international competitor countries shows that the UK PhD compares favourably in terms of the length of study. Doctoral programmes in the United States typically average between 6.4 and 10.9 years depending on the discipline, 'a significantly longer average time than for research students in the UK'.¹³⁰

The experience of doctoral researchers

- 95 Overall, doctoral researchers are positive about their experience in UK universities. The postgraduate research experience survey (PRES)¹³¹ asks respondents – doctoral researchers at participating universities – which aspects of provision are particularly important to them, as well as seeking views on their experience. Doctoral researchers rate all elements of the researcher experience as important to their successful completion, from academic supervision to skills development, researcher support and broader issues around integration and isolation.
- 96 In the PRES survey in 2008, supervisory support and guidance was seen as the most important item for successful completion: 71.2 per cent of respondents indicated that they were very satisfied with the supervision received and 79 per cent said that it had met or exceeded expectations. While feedback was generally very positive, researchers were less satisfied with their experience of the 'intellectual climate', which explores the integration of doctoral researchers within the broader research culture of a department. While 87.3 per cent of respondents agreed that it was an important factor in successful completion, only 57.4 per cent said they were satisfied with the research environment.¹³² Similar surveys in Australia have found much the same¹³³ which might imply a general perception among doctoral students that they are not well integrated within the research community. Institutions in the UK, however, need to consider this feedback.
- 97 Almost 40 per cent of PRES respondents in 2008 were international researchers. Although specific analysis of the responses from this cohort has not been undertaken, the overall results do provide some indication that the UK is offering good quality support to its international researchers. However, a specific analysis of their PRES responses would be a useful step to a better understanding of this group, given the importance to the UK research base.
- 98 Sir Drummond Bone's contribution to the higher education debate in 2008 points to a number of areas where provision for international students in general would benefit from review, including careers advice in a global market and welfare support.¹³⁴ He comments on the low level of investment in university infrastructure in the UK as a proportion of the sector's income when compared to competitors, and suggests that this may lie behind the relatively low ratings given to facilities by international students.¹³⁵ The National Student Forum's annual report for 2008 mentions inadequate facilities generally for international students with families, especially accommodation and facilities for children.¹³⁶ These issues are just as important for doctoral researchers.¹³⁷
- 99 Other issues that affect the experience of international doctoral researchers include immigration requirements and employment opportunities in the UK after graduation. Some of the UK's competitors have reviewed their immigration policies for highly skilled individuals such as doctoral graduates and are encouraging them to remain in the country after studying.¹³⁸ This opportunity is also available in the UK and about 40 per cent of international doctoral researchers wish to remain here after completing their doctorate.¹³⁹ However, recent reports mention the perceived complexity of the UK immigration system.¹⁴⁰ In the light of this, employment opportunities and immigration policy could be presented in a more coherent way at a national level. It is difficult to assess the implications of the new points-based immigration system¹⁴¹ at this stage of its implementation, but the importance of the international researcher cohort and the retention of high-quality, well-trained researchers after doctoral study should be considered as national policy in this area develops. It is not clear that current immigration policies support the mobility of international researchers to the UK and engagement between relevant parts of government and the Home Office has been limited as the UK's immigration policy has developed.

- 100 There are concerns about the experience of part-time researchers. As we highlighted earlier, part-time doctoral registrations are declining and completion rates are significantly lower than those for full-time students (34 per cent within seven years in England¹⁴²). A recent report on the experience of part-time doctoral researchers following a project by the Vitae Midlands hub and 19 institutions¹⁴³ provides an insight into some of the difficulties that part-time researchers encounter. As well as work-life balance, these difficulties included isolation, lack of integration into the research community and concern about access to and relevance of training. Part-time researchers in the PRES survey in 2008 echoed these views.¹⁴⁴
- 101 From what is known about the age range and subjects studied by this group, it seems that a significant proportion of part-time doctoral researchers is undertaking further study as a means of professional development. As with part-time students at all levels, they are likely to have a complex work-life balance. Generally there has been a lack of focus on part-time doctoral provision and the researcher cohort, and as a result we do not have a clear understanding about the motivation and needs of this group, the role of doctoral studies as a means of continuing professional development and the importance of this route to developing higher level skills both within and outside the higher education sector.
- 102 Universities are generally providing effective research degree programmes, have good quality assurance mechanisms and, through participation in PRES, have systems to listen and respond to researcher feedback. Because of the pressures on funding and the concentration of the research base, however, there are important issues for institutions and for national stakeholders to address, particularly the future sustainability of research degree programmes.

- 103 Doctoral graduates are highly skilled and capable of contributing to the UK economy and society in many ways. Not only are doctoral graduates critical to the sustainability of the research base, but research degree programmes also have a role to play in developing senior managers of the future, as well as researchers and academic staff.
- Employability**
- 104 The data available on the employment destinations of doctoral graduates provide useful information on the wide range of first destinations, highlighting the importance of the broader skills and experience of doctoral graduates. Doctoral graduates are highly employable in all sectors of the economy.
- 105 Overall, employment rates for UK-domiciled doctoral graduates are good compared to those for other graduates from higher education.¹⁴⁵ Outcomes as shown by first destination data collected six months after graduation have been stable in terms of overall employment and unemployment rates over the period 2002/03–2005/06.¹⁴⁶ Direct salary comparison with other groups is difficult but the median salary for doctoral graduates has consistently been slightly higher than for Masters' graduates, at £27,000 as opposed to £26,000, six months after graduation in 2006.¹⁴⁷ We lack comparative data on the employment destinations of non-EU researchers.
- 106 In 2006 about 50 per cent of UK-domiciled doctoral graduates moved into a post in education or academic research. Health and social work was the next most popular sector. The overall proportion employed as researchers across all employment sectors was stable at just over one-third over the period 2003/05.¹⁴⁸
- 107 However, there is significant variance in employment destinations across disciplines, with arts and humanities doctoral graduates the most likely to move into a post in the education sector and biomedical scientists the least likely. Biological scientists were the most likely to be employed as researchers both in general and specifically as postdoctoral researchers.¹⁴⁹
- 108 The EU's Lisbon strategy (2000) set a target of recruiting 700,000 new researchers by 2010.¹⁵¹ However, the proportion of researchers per thousand total employed in the UK is below that of competitor countries and has shown a slower rate of increase. Demographic projections predict a decline in UK full-time undergraduate numbers¹⁵² and this may lead to falls in the recruitment of UK-domiciled researchers into doctoral degrees. The RCUK 'health of disciplines' report¹⁵³ (2008) highlights concern over the supply of researchers in subjects such as engineering, chemistry, physics, economics, modern languages and others. The UK has an ageing academic staff population in several disciplines. For example, in the next ten years 31 per cent of social scientists are due to retire and the recruitment and retention of new researchers is not keeping pace.
- 109 From the evidence available, few doctoral graduates appear to be working in roles that do not require a first degree.¹⁵⁴ However we lack a means of evaluating whether doctoral skills are being well used. The current destination data is restricted to information on employment six months after graduation and is therefore not helpful in terms of understanding longer-term career paths.

Table 6

Summary of first destinations for UK-domiciled doctoral graduates 2006/07¹⁵⁰

	Education sector	Postdoctoral researchers in higher education	Higher education lecturer	Research (all sectors)	Other main employment sectors	
All UK-domiciled	49%	23%	14%	35%	17%	Health and social work
Arts and humanities	69%	14%	27%	20%	14%	Other sectors, including media and culture
Biological sciences	50%	36%	5%	64%	21%	Manufacturing
Biomedical sciences	36%	22%	10%	31%	50%	Health and social work
Physical sciences and engineering	42%	28%	7%	43%	25%	Manufacturing
Social sciences	71%	18%	34%	24%	10%	Finance, business and IT

- 110 RCUK is undertaking research into researcher career profiles. In 2009 specific questions for doctoral graduates were added to the Higher Education Statistics Agency (HESA) longitudinal survey of destinations of leavers from higher education (DLHE)¹⁵⁵, thus following up UK- and EU-domiciled doctoral graduates three years after graduation (2003/04). RCUK intends to seek more detailed information on career profiles from a subset of respondents and maintain contact with them over a ten year period. This will build up a longer-term picture of career paths and attempt to assess the impact of doctoral graduates.¹⁵⁶
- 111 Vitae also recognises the importance of understanding the career paths of researchers. Together with the Rugby Team¹⁵⁷, a sector-led group supported by Vitae, whose aim is 'to propose meaningful and workable ways of evaluating skills development in early career researchers', Vitae is creating a framework and database of career profiles of researchers to illustrate the variety of doctoral careers.
- 112 At present we lack information on the level of demand for researchers from all sectors of the economy: 'It is a stark reality that almost all of the work on research careers over the last decade has focused solely on issues of supply'.¹⁵⁸ Predicting demand for researchers is difficult as it will depend on a range of complex factors, including demands from different sectors for discipline-specific research skills, generic research skills and the generic competences of researchers valued by a wide range of employers both at entry level and as professional development.
- 114 Research since 2002 into the perceptions of employers outside higher education suggests that this continues to be the case and it has also highlighted employers' lack of understanding of the doctoral qualification and the skills of doctoral graduates.¹⁶⁰ It also raises issues of language, specifically researchers' ability to explain their skills in a way that employers outside education can understand.¹⁶¹ There are rarely clear routes into employment outside higher education for doctoral graduates.¹⁶²
- 115 There are suggestions that employers might favour overseas researchers over their UK counterparts because of their demonstrable international experience.¹⁶³ This was reinforced by comments received from employer organisations during this project. International researchers studying in this country have already demonstrated initiative and mobility and are likely to have a better cultural understanding than UK-domiciled researchers who have not studied or worked overseas.¹⁶⁴
- 116 The Quality Assurance Agency's consultation¹⁶⁵ with universities on the doctoral qualification descriptor in 2007 included a question about the extent of influence that employers' views should have on the doctoral qualification. The replies varied widely but most respondents said that the descriptor should continue to focus on academic criteria. It was noted that the descriptor already refers to transferable skills and that further detail is given in the research councils' joint skills statement.¹⁶⁶ There were comments on the difficulty of consulting employers as a group and defining a collective view. It was also noted that academic institutions are a major employer of doctoral graduates.¹⁶⁷

Employer views

- 113 In his report *SET for success* (2002), Sir Gareth Roberts, commenting on the needs of different types of employers, concluded that '...PhDs do not prepare people adequately for careers in business or academia'. Employers contributing to his review felt that PhD training focused on the requirements of academic employment rather than the needs of non-higher education employers and, while the technical and research skills of doctoral graduates were well-developed, they lacked interpersonal skills.¹⁵⁹
- 117 Alongside the perceptions of the doctorate and doctoral graduates held by employers, the views of doctoral researchers on career opportunities are also a matter for concern. As Nigel Thrift highlighted in his 2008 review: 'Many early career researchers and those graduating from PhDs do not attach the same kudos to a research career outside of academia and shun the commercially driven nature of research in industry'. Thrift notes that researchers may not in fact be aware of the range of careers open to them and he makes several proposals to improve understanding and increase collaboration and the transferability of researchers between sectors.¹⁶⁸

Impact of doctoral graduates

- 118 The Innovation Nation White Paper (2008) states that the UK 'must invest more strongly than in the past in its knowledge base and translate this knowledge more effectively into business and public service innovation'.¹⁶⁹ Doctoral programmes have an obvious role in terms of training the next generation of researchers. However, as the available data on employability shows, doctoral graduates have a far wider impact through their employment in a range of sectors. The Research Council Economic Impact Group report published in 2006 noted that a flow of PhD graduates with experience of 'the cutting edge of international research' from universities into other sectors is 'the most effective knowledge transfer mechanism'.¹⁷⁰
- 119 As John Neilson, Director, Research Base, DIUS, said at the Vitae Roberts Policy Forum in 2009, 'even in an economic downturn the fundamental case for investing in research and researchers remains the same. Having a supply of highly skilled people is vital for our international competitiveness'.¹⁷¹
- 120 Doctoral researchers also contribute to the research base during their studies: through their research projects, their involvement in the research community and to society more broadly. Many collaborate on projects with non-higher education organisations and engage in enterprise and public engagement activities.
- 121 Recently there has been increasing focus on developing skills relevant to enterprise and innovation, reflecting the emphasis in Whitehall on the importance of the effective exploitation of research, not only within industry but also in terms of influencing public policy.¹⁷² EPSRC, for example, has made further funding available to support the development of enterprise skills. There is also a growing interest in the role of doctoral researchers in a range of projects to increase public engagement with research, currently best known through CASE studentships and broader programmes such as 'researchers in residence'¹⁷³, which places science doctoral researchers in schools, and 'beacons for public engagement'¹⁷⁴, both run by RCUK's Science in Society Unit.
- 122 Institutions recognise both the importance and the difficulty of gathering evidence of the impact of doctoral graduates. In terms of the impact of the development of transferable skills provision, through implementation of the Roberts recommendations, the Rugby Team has developed 'an evaluation model for training and development activity specifically tailored to the context of training and development of researchers in higher education'¹⁷⁵. There is evidence of growing evaluation activity across the sector using the Rugby Team impact framework¹⁷⁶ but much more work needs to be done.

123 The UK doctorate has been very successful to date, particularly in attracting a large global market share of doctoral researchers. Both doctoral provision and the cohort of doctoral researchers are increasingly diverse. The quality of provision is high and feedback from doctoral researchers on their experience is positive. Government shows increasing recognition of the importance of the UK's research base and the role of doctoral programmes and research careers in this context. If the UK is to build on its success, there is a range of issues that require consideration.

124. The issues raised in this report and the recommendations below should not be seen in isolation but as part of developing the strategic UK policy on postgraduate researchers announced by Rt Hon John Denham MP.¹⁷⁷

- **Recommendation 1:** Universities UK should facilitate discussions with key stakeholders such as the Department for Business, Innovation and Skills, the funding councils and RCUK in order to develop a UK strategy for postgraduate researchers.

Promoting the UK doctorate overseas

125 One of the main challenges for the UK in maintaining its success in recruiting international researchers in the face of increasing international competition is the effective promotion of the UK doctorate. Recent work on the UK's position in terms of recruiting international researchers argues that we need to develop a doctoral 'brand'.¹⁷⁸ This requires tackling a range of issues: funding; the researcher experience; diversity of doctoral provision; and employability.

126 The lack of a coherent national policy on the funding for international doctoral researchers is a key concern given that cost is 'probably the largest single factor likely to undermine the UK's global market share'.¹⁷⁹ The related issues of immigration requirements and employment opportunities for international researchers within the UK are also important.

127 The development of a clear message about the UK's doctoral provision is an important component of a UK doctoral 'brand'. Outside the UK, there are suggestions that only the traditional PhD is well understood.¹⁸⁰ The reputation and understanding of all forms of UK doctorate have implications for the continued mobility of our doctoral graduates in international employment markets.

- **Recommendation 2:** Universities UK should, on behalf of the higher education sector, work with key stakeholders such as the British Council, the Europe Unit and the International Unit to promote the UK doctorate internationally.

Raising awareness of the doctorate in the UK

128 The UK provides high quality research degree programmes. Over the last five years there has been an increasingly structured approach to the delivery of research training and support for the broader development of researchers. However, there is evidence still of a lack of understanding of the doctorate outside the higher education sector. A coherent and accessible message about the value of a doctoral qualification and the skills of doctoral graduates would support efforts to raise awareness of the advantages of these programmes to a wide range of potential non-higher education employers of doctoral graduates.

129 While the increased diversity of doctoral provision in the UK is generally seen as positive, more clarity on the purpose of and consistency across the range of professional doctorate programmes would help promote these programmes both within and outside the UK.

- **Recommendation 3:** Universities UK should facilitate discussion within the sector and with key stakeholders to clarify the purposes, definitions and advantages of different forms of the doctorate. This should include recognition of the distinctiveness of doctoral level skills compared to graduate skills.

Funding and sustainability

130 A consideration of the funding arrangements for doctoral programmes raises a number of issues. One concern is the long-term sustainability of the current model and implications for the researcher experience, given the apparent extent of the shortfall between the costs and income associated with research degree provision. Overall, there is a need to examine the appropriateness of stipends, fees and institutional funding. Government has recently recognised the need for a more strategic approach to funding across the various agencies, aiming for 'a clear strategy on postgraduate research, shared across HEFCE and the research councils'.¹⁸¹ This discussion would benefit from the involvement of the sector and a review of the available evidence on the costs and benefits for universities in offering doctoral programmes.

131 Although predicting demand for researchers will be fraught with difficulty, a better understanding of demand from all sectors for researchers, or highly skilled professionals who have received training in research, would help to inform the development of national strategies for the funding of research degree provision. How many researchers does the UK need and how should this provision be funded to ensure high quality research training and the continued strength of the UK research base?

132 Future funding models for research will have implications, and perhaps unintended consequences, for research degree provision. For example the potential long-term risks and implications for research degree provision of a policy of further concentration of research funding would benefit from careful consideration. National stakeholders and institutions may need to explore more innovative ways to sustain cost-effective research degree programmes.

- **Recommendation 4:** The Department for Business, Innovation and Skills, the funding councils and RCUK should work with Universities UK and the sector to develop a sustainable funding model for research degree provision. This work should take into account the potential impact of research funding models, universities' varying reasons for providing research degree programmes, the current evidence concerning the shortfall between costs and income, and projections of supply and demand.

Researcher experience

133 The UK is very successful in providing an excellent experience to doctoral researchers and this is reflected in the results of the PRES survey. However, PRES also highlights aspects where universities can work to improve provision, specifically around integration within the research community.

134 We have highlighted evidence on particular issues relating to the experience of part-time researchers and international researchers.¹⁸² Generally, little is known about the motivations for undertaking doctoral study, particularly those of part-time researchers. More research into the motivations and experiences of doctoral researchers would enable institutions to improve further provision for all researchers, encourage widening participation, usefully inform consideration of completion rates, and provide insight into improving the attractiveness of research degrees and consequently the flow into research careers.

- **Recommendation 5:** RCUK should work with the Higher Education Academy and the sector to undertake further research into the motivation and experiences of doctoral researchers to improve and promote the attractiveness of UK research degrees.

- **Recommendation 6:** Institutions should consider how to integrate doctoral researchers within the research community to improve the researcher experience, particularly for international doctoral researchers and those pursuing part-time study.

Employability and impact

135 Doctoral graduates from UK universities are highly employable in all sectors of the economy. However, it appears that some doctoral researchers, and academics, still regard non-higher education careers as 'second best'. Among non-higher education employers, there is evidence of a continued lack of understanding of the doctorate and awareness of the skills of doctoral graduates. The development of a national message about doctoral provision, supported by information on the impact and career paths of doctoral graduates, might begin to address this. Individual universities should continue to develop strategies to engage employers in research degree provision and raise awareness of the skills of doctoral graduates.

136 Significant progress has been made in improving the employability of doctoral researchers through the implementation of the Roberts recommendations and the work of Vitae. Given the importance of researchers to future economic competitiveness, it is critical to sustain, broaden and develop this agenda. Further evaluation is needed to compile convincing evidence to support the continuation and/or extension of the associated funding.

137 Universities UK, government and individual universities could do more to recognise and promote the contribution of the 'higher level research skills' of doctoral graduates and their importance for society through their economic impact as identified in the Research Council Economic Impact Group report.¹⁸³

- **Recommendation 7:** Key stakeholders, including the Department for Business, Innovation and Skills, RCUK and Vitae, should develop strategies for engaging employers at a national level in discussions about research skills and raising public awareness about researchers and research training. This should include promotion of the distinctiveness of doctoral level skills compared to graduate skills.
- **Recommendation 8:** RCUK should continue to provide 'Roberts' funding to universities beyond 2010/11 for the professional and career development of all researchers and to support the increasing emphasis on skills related to knowledge transfer, public engagement and working in an international context.
- **Recommendation 9:** Vitae and the Rugby Team should work collaboratively with institutions and RCUK to identify and understand researcher careers and to identify ways to demonstrate the impact of research training and researchers.

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