

Review of the PhD in Social Sciences

Rapid Evidence Assessment

Interim report by CFE Research and University of York for the ESRC Review of
the PhD in Social Sciences

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Executive Summary

CFE Research, in partnership with the University of York, is undertaking a review of UK social sciences doctoral training provision on behalf of the ESRC. The findings will inform recommendations on potential new structures, funding and content for doctoral training provision to ensure it effectively equips graduates with the skills they need for a career within or outside academia. The review is addressing two overarching questions:

- What are the skills needed by social science PhD graduates to prepare them for careers both within and beyond academia?
- What are the optimum ways to develop these skills for a diverse student population while also safeguarding student health and well-being?

Aims and approach of the rapid evidence assessment (REA)

This rapid evidence assessment (REA) is the first stage in the review which will engage a wide range of stakeholders, including leading academics, PhD supervisors, students, graduates and employers. The REA will contribute to the achievement of the aims of the review by seeking to identify the skills that UK social science PhD graduates need to compete in a global economy and the relative effectiveness of different approaches to PhD training and support. The REA sets out to answer two research questions: *what PhDs in social science are* (in terms of structure, funding and assessment) and *what they do* (in terms of developing employability skills). This systematic REA of academic, peer-reviewed sources and 'grey literature' sources shows that there is limited robust data available, highlighting the importance of seeking to address these gaps through the various other elements of the review.

The REA method is systematic but focused. It prioritises academic and 'grey literature' relating to the social sciences, but also includes evidence relating to science, technology, engineering and mathematics (STEM), and arts and humanities. It includes examples of innovative practice and different models of provision that point towards positive outcomes, such as increased completion rates, improved mental health and wellbeing and successful progression to employment. It draws on evidence from the UK and three comparator countries: USA, Germany and The Netherlands. Evidence from Europe, China and the developed English-speaking world is also considered. There are, however, very few comparative studies available on the matters explored in this report. In total, 92 sources are included.

Key findings

Funding, teaching and assessment

- Most doctoral programmes in Europe are subsidised by public funding through government and research bodies. There is some evidence that **the approach to funding taken in different countries is diverging**. While some countries continue to publicly invest in higher education, others have

experienced a decline. Across our case-study countries, **doctoral study in the UK and the US is relatively high cost.**

- **Funding for doctoral programmes is underpinned by a complex set of arrangements.** Many of the mechanisms for funding doctoral programmes cross-cut national systems. There are also variations within, as well as across, countries.
- **Literature outlining specific teaching methods and modes of assessment for doctorates is limited.** It is likely that the specific methods of teaching PhDs are embedded within the curriculum at individual institutions and that there are high levels of variability across different disciplines and doctoral pathways. The lack of evidence on teaching methods in social science doctorates constitutes a gap in current knowledge that will be explored through primary data collection with students, graduates and supervisors as part of the current review.
- Group working is rarely found in social sciences doctorates, which can result in candidates feeling isolated. **Structured cohort programmes**, which have traditionally been associated with US doctoral programmes, are reviewed favourably in the literature for remedying isolation. They are also recognised for improving completion rates and decreasing pressure on students, supervisors, administrators and academics. The success of cohort programmes is, however, likely to strongly depend on the local context in terms of research culture and funding structures.
- **Collaborative doctoral training models**, involving universities and external partners, **are increasing both internationally and in the UK.** Collaborative doctoral training programmes often involve coursework and internships or placements, with research projects directed to meeting the needs of both academic and external partners. However, it is surprising that **many of the ‘extra’ competences that funders and employers value are not formally assessed during doctoral training.**
- The evidence on doctoral assessment is more abundant than that on teaching methods. A varied range of approaches to assessing the PhD are uncovered, including differing understandings of ‘originality’ and a ‘contribution to knowledge’. There is, however, **minimal evidence about the relative effectiveness of different doctoral assessment methods** both within and between countries. Small-scale studies have considered student and supervisor perspectives on assessment, but these are typically not generalisable.
- **A disconnect between the skills and competences that doctoral candidates need and mode of assessment is also evident.** Doctoral assessment, together with the extent to which this is fit for purpose to assess the required skills of doctoral candidates, will be further explored through the survey and depth-interviews with students and graduates and interviews with supervisors. **Selection processes used to recruit PhD examiners may also differ** and call into question the objectivity of this process which may, in

turn, impact on the assessment experience. Field work with supervisors will seek to explore this in more depth.

Completion time and rate

- There are few explicit comparisons of programme length in recent scholarship on doctoral study. While the norm for countries that have adopted the Bologna system of standardising higher-education qualifications is three years full time, in practice this varies from country to country and often within country, depending on funding arrangements.¹ Across our case-study countries, **considerable variation in the length of doctoral study is observed.**
- A consistent finding internationally is that **actual completion times are, on average, longer than expected completion times.** In all of the literature reviewed, concerns about completion rates and lengthening times to completion were prominent. Attrition and lengthening times to completion are commonly associated with poor student satisfaction and wellbeing. We found no examples of calls for the length of doctoral training to be increased. The recent innovations by some UK funders to slightly lengthen the funding period for their students should be understood in the context of **the UK being at the shortest end of the international distribution** of length of doctoral programme.
- Completion rates also vary across countries. The UK is one of a set of countries with doctoral completion rates of around 75%. Considering both average duration and completion rates, the **UK PhD certainly looks efficient by international standards.**

Inclusion, diversity and wellbeing

- Questions of inclusion and diversity, and of the mental health and wellbeing of doctoral researchers, have risen to prominence in recent public debate within higher education. There is **prima facie evidence of a lack of diversity and unequal access** to doctoral education for certain disadvantaged groups. There is also evidence of **significant numbers of doctoral students reporting poor mental health.**
- There are **concerning indicators of poorer than average mental health** for those on doctoral programmes. However, there is scant evidence on causality and on the effectiveness of interventions, and it is not clear to what extent social science doctoral candidates are particularly affected. Based on current evidence, it is not possible to recommend changes to the structure of the social science PhD to address mental health and wellbeing concerns.

¹ The Bologna Process, launched in 1999, aims to standardise educational qualifications across Europe. With regard to higher education, the Bologna model stipulates a '3+2+3' duration for bachelor's, master's and doctoral degrees, meaning the master's and doctoral phase are five years in total.

These issues will be explored further through the primary research to help address gaps in the knowledge base.

- Although there is growing evidence about the extent of **inequalities by gender, ethnicity and socio-economic background** at doctoral level, there is no systematic comparative scholarship on how diversity and inclusion are affected by the form of doctoral education. At earlier educational levels, the form and structure of educational systems are found to have relatively little impact on educational inequalities.
- The **mechanisms by which inequalities in access to doctoral study arise are under-researched**. There are significant shortcomings in available data for understanding trajectories into, through and beyond doctoral study. As such, it is not possible to know whether graduates from certain backgrounds do not apply for doctoral study in the first place, or rather that they do but are not successful in their applications.
- There is also a **paucity of evidence on the efficacy of interventions to improve inclusion and diversity at doctoral level**. In fact, to the best of our knowledge, there are very few such initiatives in existence in the UK, and those which do exist are at too early a stage for evaluation.

Skills and employability

- Many of the studies examining **doctoral skills and employability** are responding to a context of global expansion. Across all fields, PhD holders are **increasingly finding work in non-academic sectors**. These developments have prompted debate around the purpose of the contemporary doctorate, and whether training sufficiently prepares students for their diverse futures.
- The expansion of doctoral education has heralded **a multiplication of stakeholders to the PhD**, each of which bring unique and, at times, contradictory views of its value and purpose.
- Approaches to reforming doctoral education with a view to better preparing students for non-academic careers are divergent across Europe. In the UK, social science training policies have frequently followed a **'science' model** focused on cohort building and transferable skills training. Encouraging collaboration with non-academic partners, and inter-disciplinarity, have also been prioritised in the UK and in other European countries.
- While there is evidence that transferable skills are enhanced during the doctorate, **formal training courses are not always positively received** by students. Courses are often characterised as generic, lacking disciplinary relevance, time-consuming, of poor quality and lacking supervisor support.
- In the UK and internationally, **a higher proportion of social scientists remain in academia compared to other subject areas**. Nevertheless, the number of graduates entering non-academic careers is considerable, and

their needs – as well of those of employers – are the subject of extensive debate.

- Across several national contexts and disciplinary fields, **doctoral training is perceived as less useful by graduates entering non-academic employment**. A stronger articulation of the value of doctoral training to the broader economy may enhance the attractiveness of non-academic roles. Longitudinal data on doctoral careers, across all disciplines and nations, is not collected.
- Direct research with employers is limited, but it appears that while the skills of social science PhD students are valued, the PhD qualification itself is rarely sought. The **skills sought by employers varied by occupational sector**: academic employers valued **critical thinking** and skills in the interpretation and presentation **of quantitative and qualitative data**; while non-academic employers valued critical thinking, and the ability to **specify research problems** and apply a range of methods and tools.
- A number of studies with social science graduates and employers suggest that skills in **teamwork, communication, inter-disciplinarity, project management and leadership could be enhanced** during doctoral training in order to better equip graduates for a career in the non-academic sector.
- Opportunities to enhance training to better prepare social science graduates and meet employer needs may be found through enhanced collaborative programmes, which may develop from the existing contacts of students. There is consensus that **transferable skills training ought to be more firmly embedded into doctoral projects and disciplinary cultures**; and that training should be informed by **individual needs analyses** which are regularly reviewed. Follow-up interviews with students, graduates and supervisors could also explore whether **doctoral assessment** might better incorporate the development of skills beyond academic subject expertise.

01. Introduction

The section introduces the context for the rapid evidence assessment within the wider review of the UK social sciences doctoral provision and describes its aims and objectives.

Through its network of doctoral training partnerships and centres, the Economic and Social Research Council (ESRC) makes a significant investment in PhD studentships to support the development of the next generation of social scientists and ensure the UK remains a world leader in this field. It is therefore essential that the ESRC training keeps pace with provision offered by international competitors and is agile to changes in the research landscape.

The ESRC has commissioned CFE Research, in partnership with associates from the University of York, to undertake a review of the PhD in social sciences to assess the ESRC's doctoral training provision in light of the current and future skills needs of employers of social science PhD graduates and to make recommendations on potential revisions to structures and content to optimise the value of ESRC graduates to employers in a global economy.

This rapid evidence assessment (REA) forms the first stage of a wider review that will engage a range of stakeholders including leading academics, PhD supervisors, students, graduates and employers. The REA seeks to identify the skills that social science PhD graduates need to successfully compete in a global economy in terms of the perceived value of graduates' skills to employers and progression in the labour market, and to find evidence of the relative effectiveness of different approaches to PhD training and support. It includes examples of innovative practice and different models of provision that point towards positive outcomes such as increased completion rates, improved mental health and wellbeing and successful progression to employment. The REA sets out to answer two research questions: **what PhDs in social science are** (in terms of structure, funding and assessment) and **what they do** (in terms of developing employability skills). The REA draws on evidence from the UK and three comparator countries: USA, Germany and The Netherlands. Evidence from Europe, China and the developed English-speaking world is also considered where relevant.

This report is structured in four main sections: chapter 2 describes the method for this evidence review. Drawing on the UK and international evidence, chapter 3 explores current approaches to the structure and funding of doctoral training in the social sciences. The skills developed by social science doctoral training, together with employer requirements for, and perceptions of, these skills are reviewed in chapter 4. Overarching conclusions, evidence gaps and recommendations are discussed in chapter 5.

02. Method

This section provides an overview of the approach adopted for the rapid evidence assessment.

Our approach to answering the research questions was to use the rapid evidence assessment (REA) method. This approach, while highly systematic, applies more stringent search criteria and screening methods than a fully systematic review. In this way, it is possible to deliver robust results and useful insight within more limited time (and budget) constraints (Thomas, Newman & Oliver, 2013).

Scope

A key requirement of the REA is to undertake an international comparison of different funding structures and models adopted for the provision of social science PhDs and to identify areas of innovative practice. It was agreed with the steering group that the principal comparator countries for the review would be the USA, Germany and The Netherlands. These countries were selected to enable European and international comparisons of different PhD structures and funding models to enable insights to be extracted for the UK model. Other relevant international evidence from Europe and the developed English-speaking world, including countries such as Australia and Canada, has also been included. China is also considered within the broader review, particularly in relation to demand for UK social science PhD graduates. The REA prioritises literature relating to the social sciences, but also includes relevant evidence relating to science, technology, engineering and mathematics (STEM), and the arts and humanities.

The parameters for this rapid evidence review were restricted to evidence written in English language and published within the last 10 years. However, some highly relevant research published earlier has been included in the final analysis.

Research Questions

Two primary research questions guide this REA. In summary, they focus on *what PhDs in Social Science are* (in terms of structure and funding) and *what they do* (in terms of developing employability skills). These are supplemented with more specific secondary questions to ensure that the review identifies relevant evidence where available. To assist the literature search and analysis, we structured and numbered the questions as set out in Table 1.

Primary research questions	Secondary research questions
1: How are social science PhD degrees structured and funded in different countries and social science disciplines?	1a: What are the strengths and limitations of different PhD structures and funding models? 1b: How are social science PhDs taught and assessed? 1c: To what extent does the duration of social science PhDs differ and what is the impact of this on students? 1d: What are the inclusion and diversity, mental health and wellbeing implications of different PhD models?
2.1: What skills are included in social science PhD training? 2.2: How do these meet (or not) the requirements of academic and non-academic employers?	2a: What processes are in place to support the progression of social science PhD students and what progression pathways are in place? 2b: What are the destinations of social science PhD students? 2c: How do employment outcomes vary by discipline, country and PhD model? 2d: What skills do employers seek in social science PhD graduates? 2e: How are social science PhD graduates regarded by employers and how does this vary across countries and disciplines? 2f: What are the optimum ways to develop the skills requirements of social science PhD students for academic and non-academic careers?

Table 1: Research questions

Search

Before conducting structured searches, we first located any material that was likely to be useful by searching our own resources, including reports and articles that we had collected in relation to other projects. This provided a starting point and informed the development of the search criteria by identifying the key terms most likely to produce relevant results.

A list of primary and secondary search terms was drawn up. From this initial list, we developed search strings to use in the databases. The full list of search terms and the search strings can be found in [Appendix 1](#).

Both academic, peer-reviewed sources and ‘grey literature’, i.e. material in the public domain such as organisational reports and websites, were included. For this purpose, we conducted two sets of searches. To identify the academic literature, we used selected databases (Web of Science, ERIC, Google Scholar and the University of York Education e-resource); we searched for ‘grey literature’ using Google. Both methods return thousands of results. However, within the time available for the REA, it was

not possible to review them all. For the academic literature search, we screened the first ten pages of the results of each search, and for the ‘grey literature’ we screened the first 100 results. In total, the searches identified 337 sources for further screening and sorting: 194 academic articles and 143 ‘grey literature’ reports.

Screening and Sorting

The screening process involved recording the bibliographic details for each source, and scanning each one to identify which research questions and countries it related to. This information was captured in a spreadsheet along with our assessment of the relevance and strength of the evidence. When the screening was complete, the results were sorted by score and a cut-off was applied, so that only the most relevant and useful sources were selected for detailed review. The screening resulted in a shortlist of 106 for full review, comprising 59 academic and 47 ‘grey literature’ sources.

Review

To review the selected sources in depth, an annotated bibliography was used. This comprised a summary of each source, including the most important findings and selected quotations. As each source was reviewed in greater depth, the scores were adjusted where necessary. Any sources that fell below the cut-off were excluded.

Summary of Literature Selection

The number of sources cited in this REA is 92. A total of 46 sources are relevant to RQ1 and 73 sources are relevant to RQ2 (21 sources are relevant to both); 51 sources are focused on doctorates in the UK, 27 on the US, 13 on Germany and 10 on The Netherlands. The charts below summarise the numbers of sources per research question (Figure 1) and per country (Figure 2).

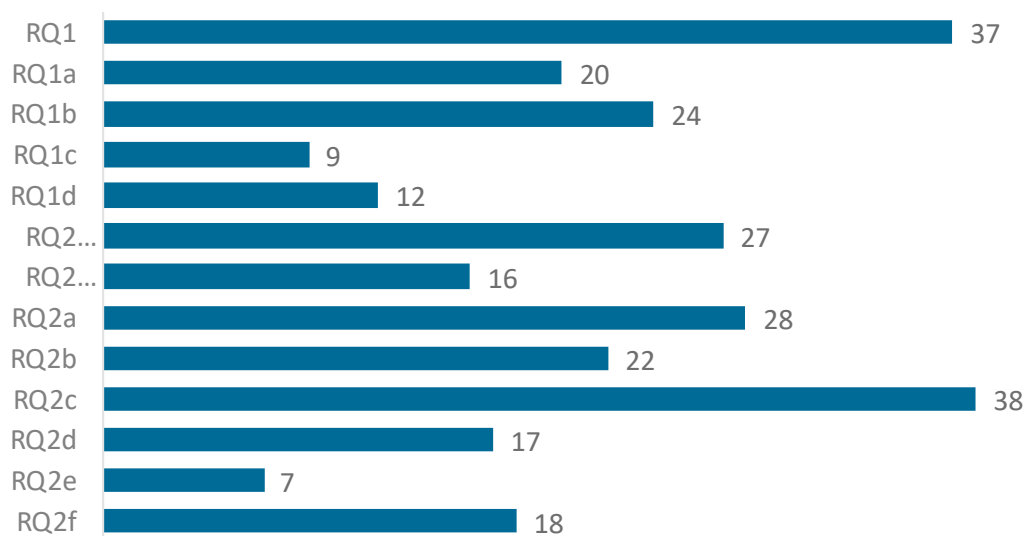


Figure 1: Number of sources of evidence per research question.

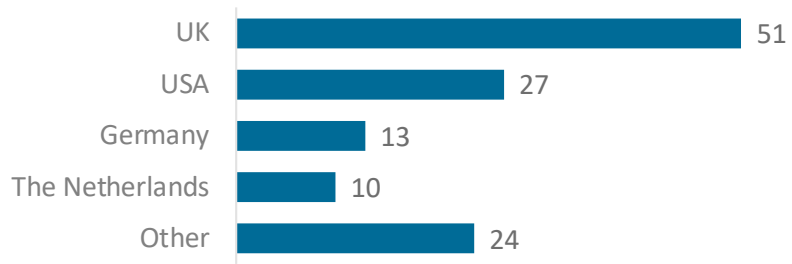


Figure 2: Number of sources of evidence per country.

03. Structure and funding

Drawing on the UK and international evidence, this chapter explores current approaches to the funding and structure of doctoral training in the social sciences, including approaches to teaching and assessment and the duration of PhDs. The implications of different PhD models on inclusion and diversity and mental wellbeing are also considered.

Key findings

- Most doctoral programmes in Europe are subsidised by public funding through government and research bodies. There is some evidence to suggest that in some countries, public investment in higher education has declined.
- The cost of doctoral study in the UK and US may present a barrier to some doctoral candidates. This contrasts with the German and Dutch models that have no tuition fees.
- Details of specific teaching methods and modes of assessment for doctorates in social sciences are limited. In particular, there is minimal evidence about the relative effectiveness of different doctoral assessment methods.
- Available findings suggest that collaborative doctoral training models, involving universities and external partners, are increasing internationally and in the UK. Such programmes often involve coursework and internships or placements, which can help to ensure research projects meet the needs of both academic and external partners.
- Considerable variation in the length and completion rates of doctoral study is observed across our case-study countries. *Actual* completion times are, on average, longer than *expected* completion times. The UK completion rates look efficient by international standards.
- There is evidence of a lack of diversity and unequal access to doctoral education for certain disadvantaged groups and concerning indicators of poorer than average mental health. More research is required to understand the mechanisms by which inequalities in access to doctoral study arise and the effectiveness of different interventions to improve equality and wellbeing.
- It is challenging to draw conclusions about the potential strengths and limitations of different PhD structures and funding to inform the UK PhD in social sciences. This is due to a lack of comparative studies that focus specifically on the social sciences, likely due to the complexity of different models.

RQ1: How are social science PhD degrees structured and funded in different countries and social science disciplines?

The PhD structures and funding models in the UK and three case-study countries (Germany, The Netherlands and the US) highlight both comparable and distinct features. Data from Education at a Glance (OECD, 2019) provides an overview of the distribution of graduates by field of study. This shows that the proportion of social sciences graduates in the UK and the selected countries is relatively comparable, with the exception of Germany, which has a lower than average proportion (Table 2).

Country	% of graduates in Social Sciences	% of international graduates in Social Sciences
Germany	6	6
Netherlands	10	[data unavailable]
United Kingdom	9	11
United States	14	9
OECD average	10	10
EU23 average	10	10

Table 2: Proportion of Social Sciences in doctoral programmes in selected countries (OECD, 2019, p.258).

Table 3 (overleaf) sets out the main features of the UK and case-study countries' doctoral systems. It attempts to capture the most salient features and report the most common arrangements. However, it should be noted that there is variation within, as well as between, systems. Features of one system appear in others: for instance, UK PhD students can sometimes be employees of the school or department in which they are studying (e.g. as a research assistant), but this is not the dominant doctoral mode, as it is in Germany and the Netherlands. Furthermore, the distinction between different models of doctoral programme within countries is not always clear cut. There are even some arrangements shared across countries, such as EU Marie Curie training awards which fund students in Germany, the Netherlands and the UK.

	UK	Germany	The Netherlands	US
Length (studying full-time)	— 3-4 years	— 3-4 years	— 4 years	— 4-6 years — (1-4 years involves coursework, 2-4 years involves a dissertation)
Types	<p>Three main types:</p> <ol style="list-style-type: none"> 1) Traditional PhD route focused on research and thesis 2) Professional or practice-based doctorate (e.g. EdD, DBA, DProf, DSocSci) located in the work environment and with a shorter thesis element 3) New Route PhD (4-year course) offered by 30 institutions. Involves one-year MRES before doing 3-year PhD. Contains taught and independent research elements 	<p>Two main types:</p> <ol style="list-style-type: none"> 1) Traditional PhD route focused on carrying out independent research that is flexible. No compulsory attendance, deadlines or curriculum. The focus is principally on completed research and thesis. 2) Structured Doctoral programme involves completing compulsory lectures, seminars, interim assessment and transferable skills training. <p>There is also a higher doctorate – the <i>habilitation</i> – which is required for entry to a full professorship</p>	<p>Three main types:</p> <ol style="list-style-type: none"> 1) Employee of the university and conduct research within faculty school or institute 2) PhD Training Programme – candidate enrolls within graduate school at a research institute that offers taught courses in addition to independent research 3) Externally-funded PhD – candidates obtain external funding and pitch their idea to a particular graduate school/research institute 	<p>The US PhD is almost never a pure research degree and involves taught and coursework elements before a candidate can commence original research.</p> <p>Professional doctorates exist in the US (e.g. DBA, EdB, Doctors of Law – JD)</p>

	UK	Germany	The Netherlands	US
Structure/Model	<ul style="list-style-type: none"> — Third-cycle qualification, but it is still possible to enter without a master's degree (although this route is not available for ESRC-funded doctoral candidates) — Traditional PhD route based on student-supervisor relationship. Mentoring is supplemented by training. Many UK universities adopt a Graduate Schools model that provides training in research skills — Structural Doctoral Training Partnerships (DTPs) are available for research funded by UK Research Councils. Most follow a 2-stage approach including a taught phase and then a formal transition to the research and thesis stage 	<ul style="list-style-type: none"> — Third-cycle qualification in accordance with European Qualification Framework adopted as part of Bologna process — Very individual in nature as Germany does not view the PhD purely as third phase course. Instead, it is viewed as a separate research achievement — Candidates work both individually and collaboratively on wider research projects with students and teams of academics — Majority of candidates follow traditional PhD route but Structured Doctoral Programme route is becoming more popular 	<ul style="list-style-type: none"> — Third-cycle qualification — Research carried out on a specific topic and documented in a thesis — Majority of PhD candidates are employed as professional researchers and paid a salary. Expectation that candidates contribute to institution's academic work (e.g. teaching) 	<ul style="list-style-type: none"> — Doctoral programme begins with taught classes and assessments resulting in a comprehensive exam. Candidate confirms his or her dissertation topic and commences research upon successfully passing the exam — Coursework element involves taught classes comprised of both core and elective elements — All But Dissertation (ABD) stage reached once mandatory taught classes/assessments and exam successfully completed

<p>Assessment</p>	<ul style="list-style-type: none"> — A final doctoral assessment includes a thorough review of the submitted thesis (or written materials), followed by an oral examination (viva/viva voce) where the candidate defends the thesis — Closed oral examination (viva) usually involves two examiners (sometimes three) – one of whom is external — Formal progress reviews are usually held at defined points in the programme to ensure adequate progress and milestones are met 	<ul style="list-style-type: none"> — Traditional PhD involves submission of doctoral thesis; examination involves an oral presentation and defence (Rigorsorum). At least two professors in a related field are present — In some cases, oral exams are replaced by defence of the thesis (Disputation) where there is a stronger emphasis on the research conducted and the rationale for carrying it out. The oral examination tests the candidate's wider knowledge in the field — Structured Dissertation Programmes involve the successful completion of several compulsory units. Assessed on knowledge of course content in lectures/seminars. Still submit a thesis and complete and oral examination 	<ul style="list-style-type: none"> — Essentially ceremonial public thesis defence, candidate is accompanied by two supporters (moral and practical assistance) — During thesis defence, candidate is assessed by doctoral committee of at least three academics — Doctoral committee have to provide their decision within five weeks of receiving the thesis. Decision is usually received ahead of thesis defence, which is why it is mostly ceremonial — Normally expected to have published some of the thesis prior to submission and examination (e.g. three or four journal articles for a social science PhD) 	<ul style="list-style-type: none"> — Similar to taught degrees; taught and coursework elements have to be successfully passed before being able to eventually defend dissertation — Dissertation prospectus involving a candidate's topic and plan is orally examined before being able to proceed with research — Dissertation defence involves a presentation and oral examination which is similar to the viva voce in the UK — Dissertations are usually a little shorter than those in the UK
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	UK	Germany	The Netherlands	US
Cost of tuition fees (per annum)	<ul style="list-style-type: none"> — £4,327 (UK & EU) fee mandated by UKRI (institutions can charge different amounts but rarely do) — £15-25,000 (International) — Professional doctorate fees differ 	<ul style="list-style-type: none"> — €150-200 (£130-£150) semester contribution towards administrative costs, student services, student governance 	<ul style="list-style-type: none"> — No tuition fees, majority of candidates are doctoral employees 	<p>Differs according to institution type. Reported averages:</p> <ul style="list-style-type: none"> — Public institutions \$12,737 (£10,175) — Private institutions \$43,300 (£34,590)
Funding	<ul style="list-style-type: none"> — Around two-thirds of UK-domiciled doctoral students are sponsored — PhD sponsors include the UK research councils, universities, charities and private companies, sometimes in partnership — A significant minority of students fund themselves, and a doctoral loan is now available for this, although it does not cover full fee and living costs — Universities receive some direct funding for enrolled students through ‘QR’ 	<ul style="list-style-type: none"> — Around two-thirds of German PhDs are employed by their institution. This may be on a specific research project or from general funds. — Around a further quarter are funded by scholarships, mainly provided by the government (e.g. DAAD), or sometimes by independent foundations — The remainder may be self-funded, sometimes through work in the private sector, or through international sources 	<ul style="list-style-type: none"> — Most PhD students are employed to work on a specific project, funded through a research grant. Funding is typically associated with a research grant — Dutch universities are incentivised for PhD completion with an award of about €90k per completion 	<ul style="list-style-type: none"> — Doctorates are not offered by all universities. A relatively small set of institutions awards them — Students are often funded by a complex mix of sources, which can vary across years and between subjects. Funding typically carries teaching and/or research assistant obligations with the host school

Table 3: Main features of the UK and case-study countries’ doctoral systems

RQ1a: What are the strengths and limitations of different PhD structures and funding models?

In this section, we compare the structure and funding of PhDs from our international comparison to evaluate the relative strengths and limitations and to extract examples of innovative practice for the UK PhD in the Social Sciences. Our review highlighted that there are relatively few comparative studies and no studies that specifically focus on PhDs in the social sciences.

PhD Structures

Clark and Lunt (2014) identify that the strong position in international rankings; strong doctoral training in research council and university initiatives; and international recognition of research and alignment with international standards are key strengths of postgraduate education in England.

The US PhD is also highly esteemed internationally and offers the most distinct structure compared to the UK, Germany and the Netherlands structures. The US model is almost never a pure research degree and involves both taught and coursework elements. Candidates have to pass a series of comprehensive exams before they reach the All But Dissertation (ABD) stage. It is at this stage that students can confirm their dissertation topic and commence a programme of research. One potential drawback of the US model is that it does not afford the same level of flexibility offered by traditional PhD routes in the UK, Germany and the Netherlands (FindaPhD.com, 2020). The autonomy and independent control offered to PhD students in the UK, Germany and The Netherlands is attractive to many students, but may not suit all learning styles. In fact, structured cohort programmes, a key feature of the US model, have been associated with improved completion rates as they can help alleviate isolation and decrease time pressures felt by students, supervisors, administrators and supervisors (Govender & Dhunpath, 2011).

In the advent of the Bologna Process, which aimed to reform education including higher education, 'structured doctoral programs' (SDPs) have become more commonplace in Germany. SDPs were largely motivated in response to the view that young German researchers were not internationally competitive (Ambrasat & Tesch, 2017). The increased emphasis on transparency and efficiency, as well as transferable skills, are suggested to be a key strength of the SDP model:

“the programs were expected to provide formalised training conditions, improve the quality of supervision and reduce the time to degree for doctoral candidates while qualifying them for occupations in research and beyond” (Ambrasat & Tesch, 2017, p.295).

Ambrasat & Tesch (2017) considered the potential benefits of SDPs with five different groups of PhD students with varying degrees of status (e.g. research assistants, research aides, scholarship students with external funding). Findings showed that students in SDPs tended to have more frequent contact with their supervisor and interdisciplinary courses and transferable skill courses were more common in SDPs than outside of them. They concluded that while the growing

number and diversity of SDPs has changed the overall landscape for doctoral training in Germany, the effects of SDPs on different groups of students still need to be more fully understood.

The idea of a doctoral thesis being a ‘project’ completed within 3 years is a further recent addition to the PhD structure in Germany. PhD students typically apply having already defined a project they can realistically accomplish within this timeframe. Torka (2018) analysed the impact of this new funding process by comparing social sciences and physics. Two field-level qualitative studies found that the social sciences adopted the project-based PhD model very quickly, suggesting that this may be a beneficial model. In contrast, physics tended to reject this model:

“The individualistic epistemic and social conditions of the social sciences, by contrast, promote the early creation of individual PhD projects but obstruct the precise planning of doctoral research” (Torka, 2018, p. 78).

Clarke and Wynne (2015) outline notable differences in the doctoral assessment criteria between countries and doctoral pathways. They highlight that Germany uses a grading system for PhD assessment and that professional doctorates are not acknowledged as a concept. An equivalent system is adopted in The Netherlands, whereas they are acknowledged in the US. In the US and the UK, the professional doctorate is designed to prepare individuals for leadership roles in the world of practice, while the PhD is designed to prepare scholars who will develop new knowledge in a field.

To understand the potential strengths and limitations of different doctoral models, it is worth noting the distinguishing features of the professional doctorate compared to the traditional PhD. Some would argue that the professional doctorate in the UK has largely been developed to meet business and government demands and a need for greater knowledge exchange between industry and academia (Boud et al., 2018; Jones, 2018). Professional doctorates are designed to offer higher-level skills and expertise relevant to the needs of businesses and the growth of the economy beyond academia (Jones, 2018). This is likely to be a growing need, and the contribution to professional practice that candidates pursuing a professional doctorate must demonstrate is considered to be a key strength by employers. Jones (2018) emphasises that:

The PhD, in particular, is seen as lacking comparative relevance in today’s market and is described as being insular and enabling universities to serve their own agenda. However, the professional doctorate overcomes these issues by being very relevant to market needs and remaining so. (Jones, 2018, p.823)

Professional doctorate candidates usually study part time, while working at the same time, enabling them to undertake relevant work experience that can contribute to the unique contribution towards professional practice. The creation of original work-based practices, new products and processes through research are a central feature of the professional doctorate. This contrasts with the traditional PhD that requires

candidates to provide an original contribution to knowledge within academic settings and beyond, which can often have a narrow focus (Boud et al., 2018; Mellor-Bourn, Robinson and Metcalfe, 2016).

Funding

Funding structures highlight further differences between the UK and case-study comparison countries. Most PhDs in Europe are subsidised by public funding through government and research bodies, but the approaches taken in different countries is diverging. A 2018 survey of European higher-education institutions highlights that while some countries continue to publicly invest in higher education (e.g. Austria, Germany and Luxembourg), others have experienced a decline in funding (e.g. Ireland and Spain) (Hasgall, Saenen & Borrell-Damian, 2019).

A key feature of the PhD model in the Netherlands is that the majority of doctoral students are employed as professional researchers and paid a salary. In Dutch universities, 'internal' PhD students are employed by the university to do their doctorate and receive the same employee benefits that other non-PhD employees receive, and there are 'external' PhD students who are not employees of the university and not funded by the university. These 'externals' tend to be funded by government scholarships from other countries or organisations. This internal/external distinction is rare outside of The Netherlands. This funding structure may offer several benefits in terms of fully integrating students into academic life and, crucially, can help to mitigate against accruing debt. This is emphasised in a survey-based study by Waaijer *et al.* (2016), which indicated that while most internal students at Dutch institutions had enough money to cover research expenditures (90% of respondents), most external students did not (only 30% indicated they had enough money).

Similarly, PhD students in Germany do not have to pay tuition fees (FindAPhD.com, 2020). Instead, they make a minimal semester contribution towards administrative costs. However, Germany faces challenges in terms of the variable quality between institutions and level inflation of higher-education qualifications (Clark & Lunt, 2014).

This contrasts with the UK and US models that are characterised by much higher costs (OECD, 2019). Indeed, Clarke and Lunt (2014) identify that uncertainty around funding and high tuition fees are a key issue for doctoral students in the UK and US. They also highlight that there is less funding available for social sciences and arts and humanities compared to STEM programmes (with the exception of advanced quantitative studies in economics). Most PhD students in the US fund their degrees through a combination of federal loans, working at the university, and graduate assistantships (Clark & Lunt, 2014). Findings from their review suggest that PsyD students have less opportunities to access work and assistantships and are consequently more likely to fund their studies through federal loans. Consequently, nearly 80% of their schooling debt came from PhD costs (only tuition and fees, not living expenses) (Clark & Lunt, 2014).

Findings from UK studies concur with the above. For example, a recent survey of over 1,000 prospective students reported that 90% were 'concerned' about covering

the costs of PhD study, with over two-thirds of them stating they were ‘very concerned’ (FindAPhD, 2020). In a further study by Doran *et al.* (2016), respondents indicated that the rising cost of tuition for the UK PhD in psychology had added to the student debt accumulated during undergraduate and masters level studies. A reduction in the number of training grants since the 1970s has exacerbated this problem.

Scholarships and grants (from the UK research councils, charities, trusts and universities themselves), government loans, and private funding are the main sources of funding available to PhD students in the UK². Conventionally, the specified length of the UK PhD is three years full time (longer if studied part time). UKRI funding has, until recently, been provided on that basis. ESRC Doctoral Training Partnerships and Centres for Doctoral Training (DTPs/CDTs) now have some flexibility in being able to offer longer periods of funding (e.g. for three-and-a-half or four years), although this reduces the number of awards which can be made. This extends to other Research Councils (e.g. AHRC CDT, EPSRC) and a small number of other UK funders, mainly outside of the social sciences, who also offer similar flexibility (e.g. The Wellcome Trust).

A postgraduate doctoral loan was introduced for students starting from 2018/19 and is available to UK and EU students undertaking a first PhD who are not funded via a research council and are aged under 60.³ £25,700 is available for courses starting after 1st August 2019, and is meant to cover costs for the duration of doctoral studies. After the cost of fees for home students is deducted, students are left with £2,000–£3,000 per year to cover their living expenses.

It is still relatively early to fully understand the impact of postgraduate loans on the number of PhD students and differences by discipline. However, one study has reported that doctoral entrants have increased by just 3% since those loans were introduced in 2016/17 (Bennett, 2020). There are some early indications that the doctoral loan may assist students to pursue a PhD in the Humanities and Social Sciences compared to STEM disciplines. Students wishing to pursue a STEM PhD expect to secure a full studentship to a greater extent than Social Sciences students (FindAPhD, 2020).

While the UK remains in the transition period, EU students may still be funded through doctoral loans, but the future post-Brexit is unknown. In the current context of the COVID-19 pandemic, the stability of the UK’s higher-education sector is threatened, particularly its funding. In response, Universities UK (UUK) has proposed a package of measures to stabilise the sector, which require government funding. This includes measures aimed at supporting the UK’s research base: a doubling of the Quality-related Research (QR) funding allocation to maintain the capacity to train PhD students; provision of the full cost of research funded through

² <https://www.gov.uk/funding-for-postgraduate-study>

³ <https://www.gov.uk/doctoral-loan/eligibility>

government grants including from UKRI and NIHR; and an increase in innovation funding to support growth and reskilling (UUK, 2020, p.3).

Q1b: How are social science PhDs taught and assessed?

A more detailed review of PhD structures is considered in this section, focusing on the range of teaching and assessment methods used for social science PhDs, and the extent to which different methods may enhance or impede the doctorate experience. While our review has uncovered relatively extensive academic and ‘grey literature’ about different PhD models and funding structures, literature outlining specific teaching methods and modes of assessment appears to be relatively limited. Available sources tend to be generic, with minimal content specific to PhDs in the social sciences.

Methods of teaching PhDs

The specific methods of teaching PhDs are likely to be embedded within the curriculum at individual institutions and there will be high levels of variability across different disciplines and doctoral pathways. The QAA (2015) highlights the different methods of teaching required depending on the pathway followed. Professional, Statutory or Regulatory bodies (PSRB) external to higher-education institutions may also contribute to the teaching, skills training and assessment criteria, especially for professional doctorates. This is an area that we can explore in more detail via the student and supervisor depth interviews as part of this review.

Although there is limited content about the range of PhD teaching methods employed in the UK and comparison countries, the evaluation report of the PhD in Norway by Thune *et al.* (2012) enquired about which PhD courses and other activities are mandatory for social science doctoral students. They found that philosophy of science courses were mandatory in the majority of units, followed by courses in research ethics. Research methodology and theoretical courses also frequently featured as mandatory courses. Other common teaching activities mentioned included participation in internal seminars, conference participation, courses in academic writing and teaching/pedagogy teaching courses.

Coursework and *placements* feature as teaching methods of PhDs and there is evidence to suggest that these methods are advantageous for PhD routes that involve collaborative and academic partnerships. For example, findings from a case study approach involving representation from STEM and social science disciplines in different European countries (including the UK) reported that the increasing number of strategic collaborative partnerships between academic and industry partners in doctoral education has resulted in a growth in structured ‘*coursework*’ elements, the use of *placements* and ‘*co-supervision*’ (Borrell-Domain *et al.*, 2010). It is suggested that excellent research is at the centre of effective doctoral programmes and that collaborative partnerships with industry may offer several benefits for the teaching and assessment of social science PhDs, provided there is a strategic commitment on both sides (Borrell-Domain *et al.*, 2010). A structured and closely-supervised

research project with certification of the qualification by the university is also considered an effective method for joint programmes:

The added benefits of collaborative programmes come from candidates' exposure to, and understanding of, different priorities and ways of working in different research environments. (Borrell-Domain et al., 2010, p. 507)

Graduate teaching and training in the social and behavioural sciences was a topic explored at a workshop hosted by the National Academy of Sciences (2017) and reflects the findings reported by Borrell-Domain *et al.* (2010) that university and industry collaborations are perceived to be beneficial. Other teaching initiatives including annual seminars and internship opportunities enable doctoral students to learn and work with business partners from non-academic organisations. They conclude that innovation should be at the heart of social behavioural sciences' teaching and training.

A report published by the UK Council for Graduate Education (McGloin & Wynne, 2015) considered the structural changes in doctoral education in the UK and found a trend towards greater structure. This included more taught elements and a growing variation in the mode of delivery, such as blended learning. This reflects previous findings that e-learning provision and virtual learning environments create wider opportunities to engage in doctoral studies, particularly for part-time and distance learners.

Taught components, as well as supervised and cohort-based experiences, were at one time considered to be unique features of the professional doctorate. However, this distinction is thought to be reducing with the development of other structured doctoral programmes that have structured training components (Mellors-Bourne, Robinson and Metcalfe, 2016). Some aspects of training for structured PhD programmes are considered to be similar, but are rarely integrated. This could be in part because of departmental autonomy and the difficulties in aligning the provision for different programmes. In contrast, the researcher development training is frequently offered to all doctoral candidates, irrespective of the doctoral programme being followed (Mellors-Bourne, Robinson and Metcalfe, 2016). A potential caveat of this generic provision is that professional doctorate candidates may not require the transferable skills training, which can be achieved via work-based experience.

As noted, the distinct status of the North American PhD programme is characterised by several years of *coursework* and *passing comprehensive examinations*, after which PhD students advance to a phase of 'candidacy' and 'all but dissertation' (ABD) (Kelley and Salisbury-Glenn, 2016). Comprehensive exams are the bridge between coursework completion and commencing a doctoral dissertation/thesis (Guloy *et al.*, 2020). During this final phase, the two remaining elements are conducting and

writing up of research. Findings from the study carried out by Kelley and Salisbury-Glenn (2016) to explore high drop-out rates of PhD candidates suggest that individual differences may be an important consideration in PhD teaching methods. ‘Self-regulated’ learning strategies predicted the elapsed time between comprehensive examinations and dissertation completion, with lower levels of self-regulation associated with higher drop-out rates. Other countries, such as the UK, tend not to have coursework elements as part of the teaching and assessment model. Future research may wish to consider the potential merits and barriers to coursework leading up to the dissertation phase of the doctorate.

Modes of assessing PhDs

In the UK, a student’s acquisition of generic skills and subject-specific research skills are generally assessed and monitored via an annual progress review (QAA, 2015). Gaps in knowledge or skills are identified during the annual review to ensure that candidates are on schedule to meet the required milestones and are able to progress to the next stage of their programme of study. The final assessment in the UK is characterised by a detailed examination of the thesis, followed by a closed oral (viva) examination, where the doctoral student defends their thesis. At least one external examiner is required at the oral examination. To promote consistency and fairness, an increasing number of UK institutions are using an independent chair in oral examinations (QAA, 2015).

The remainder of this section outlines some of the differences in the mode of assessment between the UK, US, Norwegian and Swedish systems. Perceptions about the effectiveness of the assessment process are also detailed from the viewpoint of both the student and examiner.

As previously outlined, *comprehensive examinations* comprise a unique feature of the North American PhD model and are the bridge between completing coursework and beginning a doctoral dissertation or thesis. The UK system differs as, although some doctoral students may have to pass taught elements - in particular those following a professional doctorate route - the overall assessment is based on a satisfactory thesis (or equivalent). The professional doctorate is considered less standardised than the traditional PhD in the assessment and learning outcomes, which may be viewed by some as offering greater flexibility and less rigid structures (Jones, 2018). Shorter theses, more individualised supervision and the input from professional bodies/organisations may be considered further strengths of the assessment of professional doctorates (Jones, 2018).

In the US system, examinations, which include both take-home written and oral presentation elements, are highly contentious and have been under reform since the 1960s/70s, in an attempt to increase alignment with the PhD learning outcomes thesis (Guloy *et al.*, 2020). The effectiveness of the comprehensive examinations was considered in a small-scale study involving interviews with faculty and PhD students (Guloy *et al.*, 2020), which elicited conflicting views about the purpose of comprehensive examinations. Faculty staff members perceived the examinations were providing a gatekeeping function to assess student comprehension of

coursework, to prepare candidates to teach and to offer an induction process into academia. However, candidates who had completed the examinations disagreed that the examinations had prepared them for academia and teaching.

Assessment processes were investigated in a comparative international study carried out by Kyvik (2014). Foreign members of Norwegian PhD committees across all academic disciplines were surveyed to explore perceptions of the PhD assessment process. The responses received enabled a comparison of UK and US assessment processes against Norwegian and Swedish models. Clear differences in evaluation committee structures were found, with five internal members only in the US, yet only two (one internal and one external) in the UK. The US model is the only country that exclusively has internal examiners:

“[h]ence, seen from an international context, it is the American system that is peculiar” (Kyvik, 2014, p. 150)

This is also commonplace in Germany, where the PhD student’s supervisor also acts as an examiner (Clarke & Wynne, 2016). The *status of the thesis upon submission to the committee* is also processed differently, with the UK and US allowing students to undertake revisions after the viva/examination and before publication/approval. Norway and Sweden, in contrast, only permit pass or fail on the thesis examination. A *written report by the committee* is provided individually by examiners in the UK in advance of the viva, which is followed by a joint report following the viva examination. In the US and Sweden, however, only a joint report is submitted to the university after the examination. The actual *process of examination* can be public in the US and other countries, while the viva examination is held privately between examiners and student in the UK. Clarke and Wynne’s (2016) comparative study found that in The Netherlands, the supervisor routinely attends the viva, but does not contribute to the final assessment judgement. This contrasts with the UK, where supervisors may attend with the candidate’s permission, but they cannot contribute to the process (Clarke & Wynne, 2016).

According to the UK Quality Code for Higher Education, there is no regulation about who can serve as a PhD supervisor or external examiner (Smith & Urquhart, 2018). To investigate the consistency of assessing the PhD across UK academic institutions, Smith and Urquhart (2018) carried out a survey and follow-up interviews with academic staff and recently-graduated doctorate students in the field of accounting and finance. Although the selection of external examiners is to some extent controlled by institutional guidelines, ‘social capital’ (connections among examiners’ social networks) was found to play a large role in the selection of external examiners. The authors report that this can make independent and objective evaluations of the thesis difficult. Findings also highlighted that there was a tendency for supervisors to choose colleagues who they thought would pass their weaker students or, conversely, high-calibre examiners to advance more able student’s careers, suggesting that:

“The external examiner function can be used to provide favourable outcomes for supervisor/student, and that this function in some cases takes precedence over an independent assessment of quality standards” (Smith and Urquhart, 2018, p.178)

‘Originality’ is a significant criterion in the assessment of PhDs and is used to convey creativity and/or a new contribution in knowledge. It is relevant across all disciplines; but can be subject to different interpretations. Clark and Lunt (2014) draw on findings from two studies to elucidate how examiners define ‘originality’ in the PhD thesis in the UK. The first study carried out by the UK Quality Assurance Agency for Higher Education (QAA) in 2006/7 explored how academics defined originality in the context of doctoral study, and the second study considered how examiners assessed candidates during the doctoral viva. Common themes from the QAA study included understanding originality as a ‘*contribution to knowledge*’, originality as ‘*work worthy of publication*’, and the importance of enabling academic disciplines to decide what constitutes ‘originality’ for their own field. Findings also demonstrated that many institutions were using the descriptors outlined in the UK Frameworks for Higher Education Qualification (FHEQ), about the creation of ‘*new knowledge*’ and ‘*original research*’ to inform their assessment criteria (England, Wales and Northern Ireland; and Scotland (QAA 2001, 2008)).

The second interview-based study involved PhD candidates, examiners, supervisors and independent chairs, and argued that ‘originality’ and ‘contribution to knowledge’ are separate criteria, and a PhD must meet other internal university requirements beyond ‘originality’ to pass (Clark & Lunt, 2014). Disciplinary comparisons were mentioned by one respondent, suggesting that ‘originality’ in STEM subjects is often defined as publication, while in arts and humanities and social sciences there is more emphasis on intellectual originality. Respondents’ responses were classified by Clark and Lunt (2014) and compared with prior findings published by Lovitt (2007), whose survey-based study carried out in the US also explored ‘originality’. Lovitt (2007) argues that:

‘Originality’ and ‘a contribution to knowledge’ should not be conflated as they may have different meanings in different contexts. (Lovitt, 2007, in Clarke and Lunt, 2014, p. 2015)

The authors conclude that the findings of this study call into question the objectivity of selection processes for PhD examiners.

The experience of the PhD viva through the students’ lens was explored in Share’s (2016) study. Irish social science graduates were surveyed about their experience pre, post and during their PhD viva. Academic literature holds up mock vivas as a beneficial form of preparation for the actual viva, but only a minority of students in this study had the opportunity for a mock viva. Instead, the most common forms of viva preparation were following supervisor advice, giving oral presentations at conferences, internal work-in-progress updates, and reading about vivas.

Unsurprisingly, students who received ‘major revisions’ experienced strong negative feelings, while there were few differences in perceptions about the viva experience among students who received ‘no’ or ‘minor’ corrections for their theses. The location of, and comfort in, the viva room were important factors for PhD students; a lack of privacy and small spaces tended to contribute to feelings of discomfort. Half of respondents felt that the viva added no value to the quality of their thesis, while one-fifth said it added a lot of value. This demonstrates the conflicting ideas about what, if anything, a viva adds to the doctoral experience.

RQ1c: To what extent does the duration of social science PhDs differ and what is the impact of this on students?

It is difficult to find explicit comparisons of the length of doctoral programmes in recent scholarship on doctoral study. While the standard for doctoral study by the countries that have adopted the Bologna system of standardising higher-education qualifications is three years full time; in practice this varies from country to country, and often within country, depending on funding arrangements. The Bologna model stipulates a ‘3+2+3’ duration for bachelor’s, master’s and doctoral degrees, meaning the master’s and doctoral phase are five years in total. In the UK, however, social science PhD students proceeding via a master’s degree (the ‘1+3’ model) will take four years. A master’s is not necessarily a requirement for entry to the doctorate, although for all ESRC-funded students it will be (Clarke & Lunt, 2014). Most UK universities allow for a one year writing up period at a significantly reduced fee, but in the absence of ESRC (Research Council) financial support. Many students routinely use this additional year, which cannot be exceeded. Therefore, the length of the PhD in the UK is longer in practice but with very few examples beyond 4 years for those undertaking full time programmes. In many UK universities, extension is atypical, whilst in the US a more liberal position is frequently taken on the number of years to completion (www.ukcge.ac.uk, 2018).

In our case-study countries, there is variation in the length of doctoral study. In the Netherlands and Germany, doctoral study typically takes between three and five years full time. The duration varies partly according to the ‘status group’ to which a doctoral candidate belongs. In both countries, the majority of doctoral candidates, including in the social sciences, are employed as a doctoral research assistant on a specific project of a fixed duration. Other students may be funded by an independent scholarship or be ‘external’ students (self-funded or with an international sponsor, for instance). While some projects are funded for three years, others can be longer (Ambrasat & Tesch, 2017; Torka, 2018; van de Schoot *et al.*, 2013). As noted, study length is somewhat more fluid in the USA, with students proceeding through a series of qualifying exams in an initial taught phase of the doctorate, before moving on to the dissertation phase, which may be as short as two years, but is typically much longer (Clarke & Lunt, 2014; Torka, 2018).

A consistent finding internationally is that *actual* completion times are, on average, longer than *expected* completion times (Kohl *et al.*, 2019). In all of the literature we reviewed, concerns about completion rates and lengthening times to completion were prominent. We found no examples of calls for the length of doctoral training to

be increased. Here it should be noted that the recent innovations by some UK funders to slightly lengthen the funding period for their students are outliers, and should be understood in the context of the UK being at the shortest end of the international distribution of length of doctoral programme.

There are numerous studies which examine factors associated with time-to-completion for doctoral candidates. Supportive factors include adequate funding, good-quality supervision, studying full time and the absence of caring responsibilities. The omission of these tends to predict longer time to completion or drop out (van de Schoot *et al.*, 2013). Similarly, Sverdlik *et al.* (2018), focusing on the doctoral experience rather than on completion *per se*, identify sets of 'external' and 'internal' factors which co-vary with doctoral student satisfaction and wellbeing. These include quality and fit of supervisor, personal and social life, departmental structure and socialisation and finances among external factors; with motivation, writing skills, self-efficacy, self-worth and academic identity as internal factors. However, these are micro- and meso-level factors which tend to apply cross-nationally; researchers have not explicitly compared the features of different systems to identify which of those – potentially including conventional length of programme – are associated with efficient completion or quality.

It is certainly the case that completion rates vary across countries and making international comparisons can be a challenge due to the calculation of completion rates over different time periods. The UK is one of a set of countries with doctoral completion rates of around 75%, a figure based on students finishing with seven years full-time, or ten years part-time (Clarke & Lunt, 2014). The Netherlands has a very similar rate to the UK and although no specific timeframe is provided, Dutch PhD projects usually have specified durations of between three and five years (van de Schoot *et al.*, 2013). Norway also have comparable completion rates, but only by the ninth year of study: after five years, completions among Norwegian scholarship holders are at around 60% (Thune *et al.*, 2012). A higher non-completion rate among females was also reported by Thune *et al.*, (2012), with only 46% of the 60% of females who made up social science PhDs completing. Completion rates by subject area are difficult to come by. In the USA, the Council of Graduate Schools (2012) reports that only just over one third of US doctoral candidates in the social and behavioural sciences complete within six years, and just over half in ten years.

In this context, the UK PhD certainly looks efficient by international standards. A further question is whether it is long enough to be effective. This is a difficult judgement to make on the basis of the extant international research evidence, because of the different balances of initial selectivity, attrition and quality of eventual graduates which applies across countries. Thune *et al.* (2012) conclude that Norwegian doctoral graduates are high quality, but they take longer to complete and are hence somewhat older on average than British doctoral graduates. US doctoral graduates have a strong reputation in many social science disciplines, but attrition at the end of the coursework stage is high (Kelley & Salisbury-Glenn, 2016).

On the basis of the evidence collected, it is not possible to give a definitive, objectively substantiated view on the impact of the duration of doctoral degrees in

the social sciences. There is an absence of systematic comparison of different contributing factors, including length of programme, on doctoral programme quality and outcomes. To the best of our knowledge, the limited innovations to introduce changes to length of funding by certain doctoral funders have not been evaluated by any kind of pre/post intervention comparison.

RQ1d: What are the inclusion and diversity, mental health and wellbeing implications of different PhD models?

Questions of inclusion and diversity at doctoral level, and of the mental health and wellbeing of doctoral researchers, have risen to prominence in recent public debate within higher education. There is *prima facie* evidence of a lack of diversity and unequal access to doctoral education for certain disadvantaged groups. There is also evidence of significant numbers of doctoral students reporting poor mental health (Levecque *et al.*, 2017; Sverdlik *et al.*, 2018, Woolston, 2019). While there is now a developing body of research in both areas, this tends not to include comparative work – and indeed, much discussion tends to take a relatively parochial view of such problems. We therefore lack systemic comparisons to ascertain which doctoral systems or forms of organisation are relatively better or worse for nurturing inclusion, diversity and wellbeing, let alone which specific features of high- or low-performing systems might be salient.

In considering mental health and wellbeing, we draw on a recent scoping review of the area (Mackie & Bates, 2019). Doctoral candidates report a higher incidence of poor mental health and wellbeing than comparable groups although, it is important to note, that no studies appear to have examined whether this is a causal relationship or the result of the selection of certain sets of individuals into doctoral study who may be predisposed to poorer mental health. A range of risk factors are identified, and there is some overlap with the factors which shape the overall doctoral experience identified by Sverdlik *et al.* (2018), above. The quality of the supervisory relationship is prominent, as are financial issues, labour market uncertainty, role conflict (e.g. between family and work), and excessive workload. There is no mention in the review as to whether social science doctoral researchers are more or less exposed to these issues, nor how their mental health and wellbeing compare to their peers in other disciplines. In the largest study of its type ($n=3,659$) among Flemish PhD students, social scientists were less likely to report psychological distress or common psychiatric disorders than those in other disciplines, except for the biomedical sciences, controlling for other relevant factors (Levecque, 2017).

Mackie and Bates (2019) note that the evidence they reviewed suggests that single-factor solutions for addressing mental health and wellbeing are unlikely to be sufficient. They observe that very little is known about the effectiveness of various proposed or actual interventions for improving the mental health and wellbeing of those on doctoral programmes, finding only five trials of interventions, none of which appears to include comparison of intervention and control groups.

They identify four main conclusions from their review:

Firstly, issues affecting the mental health of PhD candidates are likely to be multifaceted and interrelated. Secondly, there is a need for interventions that are better aligned to the range of stressors indicated by the literature. Thirdly, there is also a need for better-designed and more standardised instruments to validate stressors and to evaluate interventions. Finally, to move forward, the field will need updated typologies with categories encompassing the complete range of known stressors, to allow for more secure comparisons and more robust generalisations. (Mackie & Bates, 2019, p.567)

Summarising the evidence on mental health and wellbeing, while there are concerning indicators of poorer than average outcomes for those on doctoral programmes, it is not clear to what extent social science doctoral candidates are particularly affected here. Since there is scant evidence on causality, nor on the effectiveness of interventions, there is thus no evidential basis from this review on which to recommend changes to the structure of the social science PhD to address mental health and wellbeing concerns.

Although there is growing evidence about the extent of apparent inequalities at doctoral level, there is no systematic comparative scholarship on how diversity and inclusion are affected by the form of doctoral education. At earlier educational levels, a recent major study suggests that the form and structure of educational systems has relatively little impact on educational inequalities, which are consistent across a variety of differently designed systems (Triventi *et al.*, 2019). Nor is there much evidence on which, if any, interventions are effective in increasing doctoral diversity and inclusion.

We know that certain groups are less likely to enrol at doctoral level than others. Lower likelihoods of enrolling are associated with coming from a disadvantaged socio-economic background, being female and belonging to racial minority groups (Posselt & Grodsky, 2017; Wakeling & Kyriacou, 2010). In the British case, there is little published evidence on the extent to which these patterns vary across subject disciplines. Within the UK, while about 1-in-25 male UK-domiciled graduates from a higher professional/managerial background progresses immediately from a first degree to a PhD; for female graduates from working-class occupational backgrounds, this falls to about 1 in 100 (Wakeling, 2017). While the extent of the disadvantage varies, similar overall patterns are evident in Germany (Blome *et al.*, 2019) and the USA (Torche, 2018). A shortcoming with British data is that there is almost none available on the socio-economic background of those who do not enter doctoral study immediately following a first degree. This covers most social science doctoral students, who have typically completed a master's degree before entry, and frequently have experience in the graduate labour market (Wakeling, 2016).

Turning to ethnicity, while UK-domiciled students from black, Asian and minority ethnic (BAME) backgrounds are statistically over-represented compared to the majority white British group among first-degree and taught postgraduate master's students, they are under-represented at doctoral level. This under-representation is stark for certain groups. In 2010/11, Wakeling and Hampden-Thompson (2013)

found that 2 in every 100 white British graduates, and nearly 3 in every 100 UK Chinese graduates, progressed immediately from a first degree to a higher degree. However, for UK students of black African, Indian, Pakistani and Bangladeshi heritage, less than 1 in every 100 graduates made the same transition. For those of black Caribbean heritage, the rate was just 3 in every 1,000 graduates. These patterns are similar among registered doctoral students, and are reflected in a striking under-representation of racial minority students among UKRI studentship holders (Williams *et al.*, 2019). Again, there is little published evidence looking at disciplinary differences, although the UKRI publish data on student equality, diversity and inclusion across all Research Council remits and the latest release is due very soon (UKRI, 2018). In a thematic bibliography on the topic, Iqbal (2019) notes several gaps in the current evidence base. Many studies use small samples to focus on the doctoral experience of black female doctoral students in the USA. She points to a lack of studies on initiatives to include racial minority students, and on factors predicting success on UK doctoral programmes. In the limited number of UK studies of BAME doctoral students, two themes are prominent. First, BAME doctoral students report similar sets of issues as other doctoral students (in terms of financial insecurity, supervision issues, etc.), but these tend to be experienced more acutely, and as part of intersectional disadvantage (Arday, 2017; Mattocks & Briscoe-Palmer, 2016). They also report experiencing the ‘institutionalised whiteness’ of the academy, in common with the recurrent testimony of BAME academic staff (e.g. Bhopal *et al.*, 2015).

Regarding gender, women are known to be under-represented at doctoral level and, in the UK, are in a minority of doctoral students. Part of the explanation for this under-representation is the differential distribution of students across subjects at doctoral level in comparison to undergraduates. Disciplines with large male majorities, such as physics, make up a larger proportion of doctoral than undergraduate students, and the reverse is true as well. However, while women are in the majority among social science PhD students as a whole in the UK and elsewhere, including Norway, female social science graduates are less likely to proceed to a research degree than males (Wakeling & Hampden-Thompson, 2013).

The *mechanisms* by which these inequalities arise are under-researched. It is known that some of the socio-economic inequalities are explained by prior attainment; there is also clear evidence of institutional tracking, whereby graduates of lower-status institutions are less likely to proceed to doctoral study. Such institutions tend to have an over-representation of students from BAME and lower socio-economic groups (Wakeling, 2017; Wakeling & Hampden-Thompson, 2013). As will be discussed, these institutions are also less likely to host ESRC DTPs (Budd *et al.*, 2018). There are significant shortcomings in available data for understanding trajectories into, through and beyond doctoral study, such that it is not possible to know whether graduates from certain backgrounds do not apply for doctoral study in the first place, or rather that they do but are not successful in their applications. Differential success rates by socio-demographic characteristics are poorly understood, sometimes because such characteristics are not recorded (e.g. socio-economic background), but more often because where data exists, they are not analysed, and not longitudinally

tracked (Hancock *et al.*, 2019; Wakeling, 2016). A rare exception is Posselt's (2016) study of decision-making by graduate school selectors in research-intensive US universities. Here she shows how admissions committees undermined their own intentions for increasing diversity of intake by adopting criteria which had the effect of excluding most of the under-represented candidates at a preliminary stage, only adopting a more nuanced and holistic approach at the later shortlist stage.

There is also a paucity of evidence on the efficacy of interventions to improve inclusion and diversity at doctoral level. In fact, to the best of our knowledge, there are very few such initiatives in existence in the UK, and those which do exist (such as the University of Oxford's UNIQ+) are at too early a stage for evaluation.⁴ Some evaluations have been undertaken in the US, where there is a longer tradition of interventions. Results are mixed for the different structured programmes available and targeted at under-represented groups. Participants are typically likely to enrol as doctoral students. However, an evaluation of the large Mellon Mays Undergraduate Fellowship programme found that many participants are likely to have made such a transition in any case (Prenovitz *et al.*, 2016). Recent efforts funded by the National Science Foundation in the US have focused on the physical rather than social sciences. Key findings from those studies make the case for reducing or removing reliance on Graduate Record Examinations (GRE), since these do not accurately predict doctoral success and disadvantage under-represented groups (e.g. Miller *et al.*, 2019).

⁴<https://www.uniq.ox.ac.uk>

04. The development of, and demand for, skills in social science PhD training

Drawing on the UK and international evidence, this chapter explores the skills developed by social science doctoral training, and employer requirements for, and perceptions of, these skills.

Key findings

- Many of the studies examining doctoral skills and employability respond to a context of global doctoral expansion. Across all fields, PhD holders are increasingly finding work in non-academic sectors.
- These developments have prompted debate on the purpose and effectiveness of the contemporary doctorate. Expansion has brought a greater number of stakeholders to the PhD, with unique and, at times, contradictory views of its value and purpose.
- Approaches to reforming doctoral education to better prepare students for non-academic careers vary across Europe. In the UK, social science training has frequently followed a 'science' model focused on cohort-building and transferable skills courses. Collaborations across disciplines and with non-academic partners have also been encouraged.
- There is evidence that transferable skills are enhanced during doctoral training, but formal skills courses are not always positively received by students. They are often characterised as generic, lacking disciplinary relevance, time-consuming, of poor quality, and lacking supervisor support.
- While the skills of social science PhDs students are valued by employers, few seek the PhD qualification explicitly. Doctoral training is generally perceived as less useful by graduates entering non-academic employment. Teamwork, communication, inter-disciplinarity, project management and leadership skills could be enhanced during doctoral training.

The second primary research question focuses on how social science PhD training develops employability skills. There are two parts to this question: firstly, we ask what skills are included in social science PhD training? (RQ2.1); before exploring the demand for and perceived usefulness of these skills: how do these meet (or not) the requirements of academic and non-academic employers? (RQ2.2). The evidence in relation to these questions is set out across five sub-questions, which span skills development, employment destinations, employer perceptions and models for optimum skills development.

Many of the studies reviewed respond to the context of global doctoral expansion. The number of doctoral graduates has grown considerably in recent decades (Cyranoski *et al.*, 2011). This is true internationally, and for the UK sector and the social sciences more specifically. The expansion of doctoral education has not been matched by a commensurate rise in academic career opportunities, meaning that across all fields, PhD holders are increasingly finding work in other sectors. These developments have prompted debate around the purpose of the contemporary doctorate, and whether training sufficiently prepares students for their diverse futures. While policymakers across the world have stressed the need for PhD holders in the knowledge-based economy, discourse surrounding the doctorate is often critical: there are references to ‘over-supply’, ‘skills deficits’ and mismatched career intentions (Cuthbert & Molla, 2015). This review of the evidence attempts a more nuanced perspective on the skills developed by social sciences and their broader value. Nevertheless, the dynamics of ‘supply and demand’ are far from straightforward. The expansion of doctoral education has brought a multiplication of stakeholders to the PhD, each of which project unique and, at times, contradictory views of its value and purpose. Thus, the evidence on the skills and contributions of social science PhD holders needs to be considered with these differing agendas in mind.

RQ2a: What processes are in place to support the progression of social science PhD students and what progression pathways are in place?

Concerns around the career progression of doctoral graduates are shared internationally, as are the introduction of formal training courses to enhance employability skills during doctoral study. Bao, Kehm and Ma (2018) suggest that reforms to address doctoral expansion, increasing internationalisation, and preparation for non-academic careers, are ‘most progressed’ in the United Kingdom (p.530). However, rather than these shared concerns leading to a convergence in training approaches, variety characterises Europe, with at least nine different routes to a PhD across Europe (Bao *et al.*, 2018). Moreover, Deem, Barnes and Clarke (2015) note that admiration for the UK policy in this area could be based upon ‘a rather sketchy understanding of what actually happens’ (p. 140). In the UK context, the publication of the Roberts report in 2002 ‘heralded a step change in doctoral skills training’, with a focus on ensuring that STEM PhD graduates were well prepared for a range of careers (Hancock & Walsh, 2016, p. 38). The introduction of transferable skills training courses – compulsory for those in receipt of research council funding – has since endured and influenced current approaches in social science programmes.

A number of the reviewed sources focused specifically on the ESRC’s approach to supporting the skills development and progression of doctoral students’ over the last decade. For several decades, postgraduate training policy is conceived to have followed ‘a science model’ that rarely took into account the unique characteristics of the social sciences (Deem *et al.*, 2015, p. 139). The establishment of the ESRC’s Doctoral Training Centres (DTCs) from 2011-17 is seen as an example of this trend, having followed a model first introduced in the natural and physical sciences (Deem in Budd, O’Connell, Yuan & Ververi, 2018, p.4). Encouraging collaboration with non-

academic partners and inter-disciplinarity have also been prioritised in the ESRC approach (Deem *et al.*, 2015; Lunt, McAlpine & Mills, 2014).

Drawing on a year-long study of postgraduate research provision with stakeholders ‘within and outside the ESRC fold’ at the time of the DTC arrangement, Budd *et al.* reported that the ESRC’s then approach to doctoral training had created an insider/outsider distinction across the university sector (p.2). Budd *et al.* suggested that the support available to social science PhD students *differed* depending on whether the student or their institution were in receipt of ESRC DTC funding. The consequences of being excluded from ESRC funding were considered to be significant. From Lunt, McAlpine and Mills’ interviews with DTC directors, it appears that the consequences of not securing ESRC funding were anticipated, with directors stressing the importance of submitting a collaborative bid to heighten their chances of success, and of the high-risk strategy of ‘going it alone’ (p.158)

Examining provision at the University of Cambridge affords some insight into the many benefits ESRC-funded students continue to receive. These students are supported to develop a broad portfolio of research and professional skills relevant to research and future employment, through training that includes:

Qualitative and quantitative skills training; internships or placements; a period of registration at an overseas institution; collaborative activities with external, non-academic partners; and access to an annual £300 Research Training Support Grant. Students further benefit from an annual programme of events including workshops, seminars and lectures which cover skills and career development, policy and impact and provide networking and social opportunities (University of Cambridge, 2018).

The extent to which these opportunities are available to students without ESRC funding varies across the sector; as does the perceived quality of training provided by individual institutions (Budd *et al.*, 2018, p.35-6). Such inconsistency in provision necessitates a better understanding of who benefits from ESRC funding, and whether the distribution of support processes may exacerbate pre-existing inequalities in the higher-education system (Budd *et al.*, 2018). As has been noted, when disadvantaged students progress to doctoral study, they are more likely to enrol at post-1992 institutions, many of which remain excluded from the ESRC’s current network of Doctoral Training Partnerships (Wakeling & Hampden-Thompson, 2013; Pásztor & Wakeling, 2018).

This is not to say that forms of skills training, when received, are unanimously welcomed by social scientists. Budd and colleagues reported that training tended to be concentrated into the first year of doctoral study, and very rarely proceeded from an individual-needs analysis. In many accounts, training was seen to represent little more than a ‘tick-box’ exercise. Furthermore, ownership of the training – whether by the DTC, an academic department or the university – was often unclear to students (Budd *et al.*, 2018, p.35-6). The lack of clarity over DTCs and their role observed among research students may, however, reflect differing approaches to administration which were, in fact, encouraged by the ESRC. Some DTCs had

obvious physical presences, while others were embedded within existing Graduate Schools (Lunt, McAlpine & Mills, 2014). Regardless of funding status, the availability of working spaces, desks and computers was criticised widely by the research students in Budd *et al.*'s study (p.35). Part-time and distance students were especially critical of the support and training provided (Budd *et al.*, p.37). This experience is mirrored in The Netherlands, where 'external' students often report they have less access to office space on campus, free printing and computers compared to 'internal' students, and, as a result, were less satisfied with their experience (Waijjer *et al.*, 2016).

It is important to note that a number of the issues raised by Budd *et al.* in 2018 were identified by an earlier, independent review of the DTC network commissioned by the ESRC in 2015 (Bartholomew *et al.*, 2015). Furthermore, in 2016, the ESRC launched a national network of 14 institutional and consortia-level Doctoral Training Partnerships (DTPs) to replace the DTCs. The commissioning of the DTPs explicitly sought to address many of the concerns highlighted by the independent review, and later by Budd and colleagues. In order to enhance the inclusivity of the doctoral training structure, collaborations with smaller 'pockets of excellence' were encouraged. As a result, the number of institutions funded by the ESRC has increased from under fifty in the DTC phase to over seventy in the DTP network. Additionally, individual training needs analyses are prioritised in the DTP approach, as a redress to concerns about the more generic nature of skills training in the DTC era. At the time of writing, ESRC doctoral training continues to be delivered through the DTPs and two collaborative, interdisciplinary Centres for Doctoral Training (CDTs).

Criticism of current approaches to skills development and training were evident across the literature and were certainly not specific to the ESRC's approach. Drawing on a small-scale, mixed-method study into how doctoral graduates' careers developed following the implementation of Roberts transferable skills training, Crossouard (2013) reported that PhD holders did not rate the 'generic' training they received. Rather, it was seen as patronising and difficult to apply. Moreover, many PhD graduates, including those from the social sciences, resisted an agenda that was seen as instrumentally directed, and against the purpose of university research. Concluding their ESRC-commissioned, large-scale, mixed-method study of early career social scientists, Locke, Freeman and Rose (2018) asked whether

'It is time to reconsider the traditional research doctorate as sufficient preparation for an academic career, let alone a career outside higher education'
(p. 65).

This reflection followed extensive data collection involving an online survey of over 1,000 early-career social science researchers, 35 telephone interviews and 9 face-to-face interviews with experts, in order to inform the ESRC's review of its support for early career researchers. Across this sample, many respondents related the view that social science doctoral training insufficiently equips students for employment in both academic and other sectors. Training in how to apply for competitive bids and write

publications were considered to be particularly lacking; while the limited availability of post-doctoral funding was perceived to hinder advanced skills development and subsequent progression into academic employment (Locke, Freeman & Rose, 2018).

A small-scale qualitative study with final-year social science doctoral students, supervisors and researcher developers in Scotland yielded similar criticisms (Golovushkina & Milligan, 2013). The majority of students wished to remain in academia; and narrowly understood skills and employability training as directed towards academic careers. This view was apparently reinforced by supervisors, who prioritised the development of skills most relevant to academia. Very few students reported awareness of policy frameworks such as the Joint Skills Statement or the Researcher Development Framework, which set out the skills that doctoral students ought to develop⁵. Perhaps unsurprisingly, the researcher developers interviewed lamented the lack of student and supervisor engagement. In contrast, Åkerlind and McAlpine's (2017) qualitative study of doctoral supervisors across all academic fields reported a broader range of perspectives on doctoral purpose. Nevertheless, they too observed that supervisors placed limited emphasis on broader purposes of developing skilled workers and meeting the wider needs of the economy as a legitimate concern for doctoral training.

Perhaps more positively, there is evidence that engagement with doctoral skills training is associated with successful outcomes. In their analysis of Arts, Humanities and Social Science doctoral students at one UK institution, Humphrey, Marshall and Leonard (2012) found that engagement with research training was significantly associated with timely thesis submission. Walsh *et al.*'s (2010) evaluation of a STEM transferable skills programme at a research-intensive institution in the UK, found participation was associated with an improvement in skills and confidence. Female, international and those students motivated to undertake a PhD for career-related reasons attached the greatest importance to skills training. While these findings are encouraging, both studies are likely to suffer selection effects, since those students who actively participate in training courses are likely to differ from the larger doctoral population. This makes it difficult to infer cause and effect. Across the literature, we did not find any studies that had tested the effectiveness of training and support mechanisms using pre/post or randomised trial research design.

Beyond the UK, a number of studies examined processes to support doctoral students in relation to career preparation. Across Europe, and consistent to the ESRC's approach, collaborative doctoral programmes with industry partners are growing (Borrell-Domain *et al.*, 2010). In their study of social science PhD graduates in the United States ($n=3,025$; RR=45%), Morrison *et al.* (2011) found that fewer than half rated their doctoral training as 'excellent'. Support for academic career preparation was rated most favourably, while support for non-academic careers was rated least. Nature's 2019 international survey of PhD students found that nearly 40% of respondents across all fields said that their programme didn't meet their original expectations. Only 26% felt that their programme was preparing them 'very

⁵ <https://www.vitae.ac.uk/vitae-publications/rdf-related/researcher-development-framework-rdf-vitae.pdf/view>

well' for a satisfying career. In Norway, Thune *et al.*'s (2012) evaluation of the PhD similarly concluded that advice on non-academic career trajectories needed to be strengthened in all subject areas, including the social sciences (p.92). Thus, while the issue of supporting doctoral students for progression into a wide range of careers is common across the international literature, there are few examples of training that is judged to be effective by students and graduates.

RQ 2b: What are the destinations of social science PhD students?

In contrast to the wealth of evidence on the occupational outcomes of first-degree holders, research into the employment destinations of doctoral graduates in the UK is comparatively under-developed. Vitae's series of 'What do doctoral graduates do?' reports have led to understanding of doctoral employment destinations over the last decade. These reports relate a secondary analysis of data from the Higher Education Statistics Agency's Destinations of Leavers of Higher Education (DLHE) survey, which records graduate activity at six months and then three-and-a-half years after graduation. The DLHE has since been replaced by the Graduate Outcomes survey, which may make monitoring trends in doctoral employment over time more difficult in the future.⁶ It should further be noted that both surveys were developed principally to capture the destinations of first-degree holders and, as such, many of the questions do not explore the conditions and experiences specific to PhD graduates.

The most recent published data from Vitae (2020) show that across all fields, just over half of all PhD holders have moved out of higher education six months after graduation. The proportion of social scientists staying in academia is slightly higher than that reported for all other subject areas (58%). These observations are consistent with CFE's 2014 analysis of DLHE data which also reported that, compared to other subject areas, a higher proportion of social science PhDs remained in academia (65% compared with 50%; CFE, 2014, p.23). For social scientists leaving academia, Vitae reports that only 3% are employed in a research position; well below the rates reported for STEM. This probably reflects structural differences in labour market opportunities. It should, however, be noted that unlike the analytical consensus around the notion of a 'graduate job' (e.g. Elias & Purcell, 2013), there is currently no agreed definition of doctoral-level work. This makes comparison of PhDs in non-academic employment across studies and countries particularly challenging, and likely underplays the research and knowledge exchange activities of social scientists in non-academic occupations (Hancock *et al.*, 2019).

Although Locke, Freeman and Rose (2018) caution that their survey of social sciences doctoral graduates is not nationally representative, they find that social scientists employed in academia are more likely than physical scientists to be found in fixed-term, part-time and specialist (e.g. teaching or research only) contracts for 4 years or more after their doctorate. Within the social sciences, female researchers are employed in unstable, precarious positions for longer, despite being in the majority. Post-doctoral international mobility is reported to be low, with just 5% of

⁶<https://www.graduateoutcomes.ac.uk>

respondents having worked abroad since completing their doctorate, and those doing so being employed exclusively in the higher-education sector (p. 26).

Published in 2006, Purcell *et al.*'s comprehensive examination of the employment of social science PhDs, prepared for the ESRC Training and Development Board, is worthy of inclusion since it foregrounds many of the findings of more recent UK studies. This analysis included the DLHE survey, the national Labour Force Survey, re-analysis of previous studies on employment outcomes, and longitudinal surveys of UK graduates who completed in 1995 and 1999. This review similarly noted that social scientists are more likely to remain in academia compared to other subject areas, but that the proportion entering non-academic jobs was growing and was expected to increase further. Consistent with Locke *et al.*'s analysis, Purcell and colleagues reported that social science doctoral graduates were more likely to be in part-time employment (11.9% compared with 2.5%); a finding that may be partly explained by the fact that social science PhDs are a more demographically diverse group (CFE, 2014; Budd *et al.*, 2018).

In terms of employment destinations outside academia, CFE's 2014 analysis found that, compared to other fields, slightly higher proportions of social science doctoral graduates enter finance, business, IT and legal jobs (31%, compared with the 20% average for doctoral graduates, p.33). Around one-fifth were employed in charitable or voluntary work. Observing a similar range of destinations, Purcell *et al.* strongly rebutted the claim that these social scientists were simply 'frustrated academics'; concluding that there was no evidence of 'over-supply' (p.40). On the contrary, Purcell *et al.* found that social science graduates were making good use of their skills and training in non-academic jobs; while CFE's later analysis reported that social scientists in non-academic roles were significantly more satisfied with their prospects for promotion and job security (CFE, 2014, p. 36).

These studies offer a broad overview of the employment destinations of social science PhDs in the UK, but a number of important knowledge gaps remain. As early as 2009, Raddon and Sung noted the lack of longitudinal data on doctoral careers, and the absence of large-scale contextual information into factors shaping 'choice and opportunity' for PhD graduates (p.4). Similar reflections on the dearth of data on doctoral access, experiences and outcomes have been more recently articulated in the UK context by Hancock *et al.* (2019). Developing a richer insight into the career aspirations and decision-making of doctoral graduates is particularly important for understanding whether transitions to non-academic occupations are a matter of choice or necessity. There is some evidence that social science PhDs are foremost intrinsically motivated – citing the pursuit of specialist skills and knowledge as the main reason for undertaking doctoral study (Purcell *et al.*, 2006). More recently, Bennett (2020) suggests that prospective doctoral students are primarily motivated by interest in their subject. Furthermore, Locke *et al.* found that academic careers were favoured by the majority of survey respondents, with transitions out associated with too few positions, low salaries and short-term contracts (p. 24).

RQ 2c: How do employment outcomes vary by discipline, country and PhD model?

A number of international studies have examined the employment outcomes of PhD holders and the correlates associated with particular outcomes. In addition to the single-country analyses which will shortly be presented, two sources examined the evidence from a comparative perspective.

Considering data across OECD member states, Skovgaard Pedersen (2014) reflected that while PhD holders enjoyed a higher than average rate of employment when compared to all other educational groups, there was an acute lack of knowledge on the returns to doctoral expansion. Internationally, it is clear that most doctoral growth is observed in the scientific fields, reflecting both funding and political biases towards the perceived economic importance of STEM. Somewhat undermining the policy emphasis on knowledge exchange, Skovgaard Pedersen finds limited evidence for intersectoral mobility among PhD holders; reporting that once doctoral graduates leave academia, they rarely return. Auriol, Misu and Freeman's (2013) analysis emerged from the Careers of Doctorate Holders (CDH) dataset – an initiative of the OECD, the UNESCO Institute for Statistics and Eurostat. The CDH dataset collates information on doctoral holders from OECD member states and presents broad international trends, such as the increasing tendency for PhD holders to be employed outside academia. While higher education remains the largest single employer of PhD holders, the share employed by business and government is growing in most nations. That is consistent with Skovgaard Pedersen and Auriol et al.'s findings that employment rates for doctoral graduates are generally high, and higher than those observed for less educated groups. Across most nations, doctorate holders are employed in 'professional' roles. Natural scientists and engineers are more likely to be employed in research, while social scientists find more opportunities in non-research occupations. Salaries are highest among doctorate holders in the medical and health sciences, and those employed in the business sector. Women and younger doctoral graduates fare relatively worse in terms of employment rates, but these differences are less marked than they are for lower degree holders.

A number of national studies have investigated PhD employment destinations, but the approach of these analyses – for example, considering outcomes by demographic characteristics, subject area, institution or programme – lacks consistency. These studies typically focus on countries with well-developed research systems. Though they consistently document the growth of PhDs in non-academic employment, there is national variation in the precise ratio of those within and outside the academic sector. In Norway, Thune *et al.*'s (2012) evaluation reported an increase in PhD graduates employed outside of research and academia and highlighted the need for enhanced careers advice during doctoral training. In the same year, Kyvik and Olsen's survey of Norwegian PhD holders confirmed that the majority – 60% – were employed outside academia ($n=1027$; RR=67%). As with the UK analyses, Kyvik and Olsen observed that, compared to other subject areas, a higher proportion of social science PhDs remain in the academic system (58%).

The employment outcomes of PhD graduates in The Netherlands were considered by van de Schoot, Yerkes and Sonneveld (2012). They presented findings from an online

survey involving four universities selected to be ‘representative’ of national sector. PhD holders were found to have an above-average employment rate of 86%, but only around one-third of PhD graduates were employed in universities. Temporary contracts were more frequently reported by university employees – but this is not unexpected for postdoctoral training. Male doctoral holders were more likely to be employed outside academia. In accord with the impressions of Skovgaard Pedersen and Hancock *et al.*, van de Schoot and colleagues identified a lack of insight into the career choices of PhD holders and advised that large-scale longitudinal studies were needed.

In the United States, PhD graduates working outside academia have started to outnumber those remaining in the higher-education sector over the last decade (McCarthy & Wienk, 2019, p.7). Analysis from the National Academy of Sciences (2017) suggested that 60% of new PhDs would not pursue academic careers, despite graduate training focusing ‘almost exclusively’ on preparation for such positions. Across the social sciences, employment outcomes were seen to differ. Economics doctorates were more likely to work in the business, non-profit and government sectors, and attracted the highest salaries. Psychology graduates were more likely to be self-employed in a clinical position. Social and behavioural sciences PhDs received lower pay than those from the physical and engineering sciences.

Two highly-cited studies of PhD students’ employment *preferences* emerge from the US context. Sauermann and Roach’s (2012) study of natural science PhDs in 39 ‘tier-one’ US research universities ($n=4,109$), found that the attractiveness of academic careers declined over the course of doctoral study. Nevertheless, around half of all late-stage students sought a faculty career – a preference reportedly encouraged by academic supervisors. Only a minority of PhD students stated an interest in other kinds of work, despite the growing likelihood of this outcome. An earlier study by the same authors found that students with a ‘*strong taste for science*’ – i.e. a desire for independence, publishing, peer recognition, and to conduct basic research – were most likely to favour faculty careers (Roach & Sauermann, 2010, p.422). By contrast, those with a weak taste for science, and a greater concern for salary, preferred industry careers. Though these studies dealt with preferences rather than outcomes, they highlighted the diverse aims, expectations and values that students bring to the doctorate and - consistent with Hancock’s (2019) study of doctoral scientists in the UK – suggest that doctoral career planning is not entirely or rationally responsive to data on employment destinations.

In Australia, 48% of doctorate holders are employed in the private and public sectors (McCarthy & Wienk, 2019). Consistent with the other national contexts reported, McGagh *et al.* (2016) suggested that social science PhD graduates were among those most likely to be working in higher education. From their analysis of employees on LinkedIn, McCarthy and Wienk estimated that, over the last decade, around 2,500 doctorate holders had entered the public and private sectors each year. However, they also observed that the profiles of sociologists and anthropologists on LinkedIn overwhelmingly referred to academic jobs. Drawing on a national survey of PhD graduates across all fields (2011: $n=2,761$; 2012: $n=3,181$), Jackson and Michelson (2015) found that the following variables affected entry into full-time employment:

previous work experience, attendance at a research-intensive university, part-time and distance study, the use of certain job search strategies, and access to research culture and networking opportunities. Graduates from the prestigious Group of Eight institutions are, for example, almost 30% more likely to attain a full-time job (Jackson & Michelson, 2015, p.1668). Arts, humanities, social sciences and education graduates report the lowest rate of full-time employment (of 54.3%; p.1669). Drawing from sixteen depth-interviews with humanities, arts and social science graduates, Barnacle, Cuthbert, Schmidt and Batty (2020) suggested that the number of students who brought pre-existing industry contacts to doctoral study is under-acknowledged by institutions. Furthermore, they found that those students who sustained their industry engagement during the doctorate were more likely to enter academic employment.

Observing that only about one-quarter of German doctoral graduates in all fields found academic positions one year after graduation, Hauss *et al.* (2015) sought to better understand how PhDs' career aspirations mapped onto this reality. Data was taken from the 'ProFile' panel survey of doctoral candidates, and included all subjects in eight German universities, and from three funding organisations (RR=21%). Just under half of all respondents reported an intention for an academic career, but this was higher among those in the humanities and social sciences. As Sauermann and Roach found, students with a strong interest in academic research were more likely to desire an academic career. Hottenrott and Lawson (2017) provided further evidence of how doctoral research culture may be associated with career preferences and outcomes. Examining the career paths of German doctoral researchers in science and engineering, they found that departments led by professors with high research performance and more public funding were more likely to produce researchers who took jobs in public research (p.1091). Departments with links to industry, on the other hand, predicted jobs in the private sector. There are, however, likely to be selection differences in terms of candidates across research cultures, which deter any causal inferences from being drawn.

Finally, focused on post-graduation trajectories in Canada, McAlpine and Austin's (2018) study of humanities graduates yet again emphasised the growing prevalence of non-academic careers. Findings from interviews with over two hundred PhD holders graduating between 2004 and 2014, they confirmed that entry into tenure-track positions diminished over time.

While the evidence clearly demonstrates that a growing number of PhD holders will forge non-academic careers, students' career aspirations may not be aligned to the likely outcomes. While Sauermann and Roach (2012) found that academic career intentions declined over time, late-stage PhD students seeking these careers continued to outnumber job openings. Analysing data from 7,561 doctoral graduates across Europe, Parada and Peacock (2015) found that academic research careers remained the most popular option in all countries, and that few respondents were interested in other outcomes. Though it was unclear whether these intentions arose from a 'lack of knowledge' or 'unrealistic expectations', Parada and Peacock expressed concern that the doctorate was 'largely mis-sold' (2015, p. 610). An earlier study of US social science PhD graduates found them to be oriented towards

academic careers, with most seeking employment as professors (Nerad *et al.*, 2008). For Skovgaard Pedersen, these issues are not disconnected from the under-developed, long-term evidence base on doctoral careers. She suggests that a limited appreciation of how PhDs are valued beyond academia may deter the attractiveness of these occupations. From this, we now turn to consider what is known about employer needs and perspectives.

RQ 2d: What skills do employers seek in social science PhD graduates?

As has been noted, empirical research with employers of social science PhD graduates is limited across both the academic and ‘grey’ literature. Many of the insights on skills sought by employers are generated through studies of PhD graduates. Graduates are asked to report the attributes and competences required for their current role, and to reflect on the extent to which doctoral training supported the development of these. These studies are not always clearly limited to a specific disciplinary field. In what follows, we consider the evidence on skills sought by employers through such approaches, before moving to address evidence of skills mismatch and deficit.

In the UK, Purcell *et al.* (2006) found that the skills sought by employers varied by sector. Social science PhDs in academic employment generally viewed the qualification to be of greater importance to their current role than those in non-academic employment. Academic employers were understood to seek critical thinking skills; as well as skills in the interpretation and presentation of quantitative and qualitative data. Non-academic employers were also perceived to value critical thinking, as well as the skills to formulate research problems and apply a range of methods and tools. In addition to the perceived differences in sector requirements, social science PhDs reported differences in terms of the relevance of doctoral training by sector. Some 71.1% of those in academic employment regarded their research training as ‘very useful’, compared to just 49.0% of those in non-academic employment. Interviews with employers, however, suggested that greater emphasis was placed on applicants’ skills and experiences than their qualifications. Among those employers who actively sought PhD holders, ‘quantitative and statistical research skills, communication skills, project management and business awareness’ were thought to be under-developed in candidates (p.71). Across all sectors of employment, social science PhDs related that doctoral training neglected to develop management and leadership skills.

There is a consensus in the literature that doctoral training does enhance the development of transferable skills, and that these are particularly valued by employers in non-academic sectors. CFE’s research found that graduates believed doctoral training helped them to develop skills in the following domains: problem-solving, thinking creatively, communication, innovation and leadership (2014, p.68). These skills were also those valued by employers. From their analysis of the relevance of doctoral training across different labour markets in Europe, Kyvik and Olsen (2012) concluded that ‘generic skills’ such as ‘training in systematic/analytical thinking’ and ‘training in handling complex problems’ were most valued by non-academic employers. Subject expertise developed through the thesis, meanwhile, is

most useful to those employed in academic research. Drawing from the 2011 Eurodoc survey of doctoral graduates across Europe, Parada and Peacock (2015) found that academic skills training was more routinely and effectively offered across doctoral programmes than transferable skills training. Courses in the latter are often voluntary, even though graduates working in non-academic occupations felt these would have been very useful.

In the United States, Nerad *et al.*'s survey of social science PhD holders ($n=3,025$), similarly found that many of the skills developed during doctoral training were highly valued by employers. These included critical thinking, research design, presentation skills, inter-disciplinarity, and working with diverse groups. Nevertheless, gaps were also identified. Doctoral training was rarely thought to develop skills in 'teamwork, communication, working in inter-disciplinary contexts and managing people and budgets' – despite employers valuing these. Echoing the sentiments of the UK employers in Purcell *et al.*, the National Academy of Sciences (2017) reported that industry experience was favoured over 'a PhD graduate with no industry experience, as they often need retraining' (p.5). Training in quantitative social science skills were also highly sought but rarely well developed (p.5). Sinche *et al.*'s 2017 survey of PhD holders across the natural and social sciences in the United States ($n=8,099$), presented slightly more positive findings. Nearly all respondents agreed that doctoral training developed transferable skills, and that these skills were 'crucial to success in a wide range of careers' (p.1). While most transferable skills were deemed relevant regardless of occupation, some sector differences were noted. Academic and research employers were seen to seek creativity, innovative thinking, career planning, and the ability to work with people outside of the university. Non-academic employers were understood to value time-management, project management, and the ability to learn quickly.

Looking beyond the social sciences, the Careers Research & Advisory Centre's (CRAC) 2017 evaluation of the Natural Environment Research Council's (NERC) doctoral training partnerships considered the skills needs of non-academic employers in relation to doctoral graduates. While it is not known whether these employers also recruit social scientists, survey data highlighted the skills they valued most: non-academic communication, subject knowledge, coding for data handling (including visualisation), numeracy and statistics (CRAC, 2017, p.18). Concluding their evaluation, CRAC recommended that NERC DTPs maintained close engagement with non-academic partners to ensure that skills training continued to develop in a manner most useful for students' careers.

Turning to the future, the advent of the knowledge-based economy has prompted a growing body of research on '21st century' and digital skills. Though attempts to identify and conceptualise future skills needs rarely explicitly foreground doctoral graduates, they are concerned with people and 'human capital' more broadly – and are thus relevant to our understanding of social science PhD graduates as highly-skilled workers.

Nesta, an innovation foundation based in the UK, has undertaken extensive research on the future of work, skills investment and employer needs. Across a number of recent reports, a rather complex picture on future skills demand emerges. First is the challenge of defining such skills. Though references to ‘digital skills’ are commonplace, following a systematic literature review, van Larr *et al.* (2017) advocate for a distinction between ‘21st century’ and digital skills. While digital skills are an essential part of competitiveness and innovation in the knowledge economy, a longer list of ‘21st century’ skills emerges; not all of which are related to ICT. Seven core 21st century skills are identified: technical; information management; communication; collaboration; creativity; critical thinking and problem-solving – demonstrating, the authors argue, that ‘21st century skills are broader than digital skills’ (p.582). van Larr *et al.* further identify five ‘contextual skills’, which relate to attitudes and behaviours needed ‘to thrive’ in the knowledge economy (p.582). These are: ethical awareness (e.g. knowledge of legal and ethical use of digital technologies); cultural awareness and respect; flexibility of attitude or behaviour; self-direction and lifelong learning. These contextual skills are not, van Larr *et al.* stress, exclusively focused on digital aspects of work and ICT; and even when they are, the association can be subtle. Ethical and cultural awareness, for example, have more to do with managing the *implications* of digital technology in the workplace than they do with being a proficient developer or user of technology.

The second challenge in forecasting digital skills need arises from the expectation that these will vary widely by role, sector, career trajectory and timeframe. Indeed, Nesta’s view is that questions on future skills ought to be framed in as focused a way as possible – citing the example of: ‘What digital skills do doctors need for general practice in the next three years?’ as a robust way to proceed with such enquiry (Orlik, 2018a). This raises a potentially significant challenge for thinking about the skills development of social science PhDs. As we have seen in response to RQ 2b, social science PhDs occupy diverse roles. Skills demands across these are likely to vary considerably. It would thus seem unwise for doctoral training programmes to prioritise the development of a rigid set of skills and competencies, since the appropriateness of these for future careers will differ by individual and context. This observation also emphasises the importance of collecting granular evidence on the skills needs of PhD employers, as the primary data collection stage of this review will do.

Other work on future skills demand perhaps translates more easily into recommendations for practice. Nesta’s 2018 report on jobs for the future offers a forecast of which occupations are likely to shrink and grow in coming decades, and of the skills needs associated with these. In addition to again stressing the variance of skills needs across sectors, this analysis of 41 million job adverts indicated the most, and least, promising digital skills to invest in. The most promising digital skills of relevance to social science research included statistics, quantitative data analysis, Stata (statistics software); and for teaching, Moodle (course management software) and the maintenance and management of student record data (Djumaliev & Sleeman, 2018, p.9). Across all sectors analysed, demand for skills in data input,

processing and administration were forecast to decline; largely due to the increasing automation of these tasks. A forthcoming project to be commissioned by the ESRC in summer 2020 will seek to scope data skills needs in the social sciences to support data-driven research. This work will generate a holistic understanding of the both the current and future skills needs, identifying which skills are being met by the ESRC and where there are gaps. Findings from the study will help to identify where potential further investment is required via training or career pathways and will inform the Postgraduate Training Strategy post 2022.

The shift towards a knowledge-based economy and ongoing advancements in digital technologies are also frequently associated with an increasing demand for enterprise and entrepreneurship skills. Whereas enterprise education is associated with general employability, entrepreneurship education aims to support individuals to become 'self-employed venture owners or leaders' (Abdul Rahman & Vorley, 2020, p.2). As part of this review, additional research is being undertaken by the Innovation Caucus to look specifically at the provision of enterprise and entrepreneurship education at doctoral level. This strand of research will report fully in due course, but a preliminary review of the evidence suggests that much of the UK guidance on enterprise and entrepreneurship education is focused on undergraduates, with limited understanding of skills training for PhD students and social scientists in particular (Abdul Rahman & Vorley, 2020).

RQ 2e: How are social science PhD graduates regarded by employers and how does this vary across countries and disciplines?

In light of the restricted empirical research with employers, exploring their perceptions of social science PhD graduates brings challenges. Across the studies previously cited, there is consensus that doctoral graduates acquire a broad range of academic and transferable skills. Many of these are reported to be highly valued by employers. This claim gains further traction when considered against evidence of the increasing proportion of PhD holders forging non-academic careers. Setting out their vision for doctoral education beyond 2010, the League of European Research Universities (LERU) stated that the number of doctoral-level jobs in the public sector, charities, industry and commerce was expected to grow, and that there was strong demand for doctorates in areas that have traditionally not recruited PhDs – including law, finance, management. Despite a historic emphasis on investment in STEM, Skovgaard Pedersen's analysis of OECD member states observes that most European countries have large service sectors, and that humanities and social science PhDs may be more essential to this activity than policymakers have assumed.

Despite these observations, the employment of social science PhDs in non-academic sectors raises complex questions of supply and demand, which are difficult to answer given the absence of direct empirical research with a representative set of employers. For Skovgaard Pedersen, the growth of PhD holders in non-academic occupations cannot be taken as a straightforward indication that these employers seek and value doctoral-level knowledge and skills. There are considerable uncertainties in the labour market demand for PhDs outside academia:

'Issues of demand need to be thoroughly investigated to evaluate whether the increase in the number of PhD graduates is in line with demand. If mismatches arise, it may severely affect PhD holders' career outcomes and prospects' (p.637).

Employers may understand that a PhD qualification 'signals' a high-quality applicant, but this is not the same as a clear articulation of the value that PhD employees bring. Over-skilling the labour force is 'inefficient', in Skovgaard Pedersen's view, and can have severe consequences for the motivation and satisfaction of PhD holders employed in roles that do not make use of their research knowledge and skills. This set of concerns finds some support in Auriol et al.'s observation that there is only a 'weak association' between the proportion of PhD holders in the labour market and the intensity of national research and development activities (2013, p.6)

It may be the case that employers value the skills developed through the doctorate, without attaching particular significance to the qualification itself. The social scientists in Purcell *et al.*'s study believed that the PhD qualification had been vital to securing their current employment. Employers, however – particularly those outside of the academic system – present a contrasting view; often placing skills before the qualification. Purcell and colleagues (2006) concluded that while there was demand for the skills that social science doctorates offer, employers were not necessarily seeking to recruit PhD holders. This may reflect a limited understanding of the PhD, and of developments in doctoral training to enhance the employability of its holders.

RQ 2f: What are the optimum ways to develop the skills requirements of social science PhD students for academic and non-academic careers?

Before evidence on optimum ways to develop the skills requirements of social science PhD students is presented, it is worth recapping some of the significant challenges facing doctoral training identified in the literature.

On the issue of career preparation, the increasing proportion of PhD holders entering non-academic occupations dominates. Across several national contexts and disciplinary fields, the evidence suggests that doctoral training is perceived as less useful by graduates entering non-academic employment (Purcell *et al.*, 2006; Crossouard, 2010; Kyvik & Olsen, 2012, Parada & Peacock, 2015; McAlpine & Austin, 2018). A stronger articulation of the value of doctoral training to the broader economy may enhance the attractiveness of non-academic roles as a viable career route. If graduates are unsure whether doctoral training will help their career prospects outside academia, they are unlikely to actively seek such careers. This may well explain the persistently high proportions of doctoral students who aspire to academic careers which, in turn, perpetuates the notion that the doctorate is first and foremost an academic apprenticeship (Parada & Peacock, 2015; Bennett, 2020).

While the limited research with employers suggests that the skills and knowledge developed through doctoral training are valued, it is rare that the qualification itself is explicitly sought. Furthermore, while there is evidence that doctoral training

enhances transferable skills beyond academic subject expertise, formal training provision is inconsistent and not always positively received by research students. Transferable skills courses are associated with timely submission of the thesis and enhanced confidence (Humphrey *et al.*, 2012; Walsh *et al.*, 2010). Yet, they are also commonly characterised by students as generic, lacking disciplinary relevance, time-consuming, of poor quality and lacking supervisor support (Deem *et al.*, 2015; Golovushkina & Milligan, 2013; Walsh *et al.*, 2010).

There are challenges of resource and political support. Historically, social science PhDs have received less attention from policymakers, funders and non-academic employers than that directed at STEM students (Clarke & Lunt, 2014; Skovgaard Pedersen, 2014). Approaches to doctoral training in the social sciences have often followed the models of the natural and physical sciences – but this ignores important epistemic and demographic differences (Budd *et al.*, 2018; Locke *et al.*, 2018; Lunt *et al.*, 2014). Recent attempts to reform social science doctoral training in the UK have further been compromised in the context of considerable financial austerity (Budd *et al.*, 2018; Lunt *et al.*, 2014).

The evidence suggests a number of structural reforms to enhance the development of skills during doctoral training. As noted, these recommendations rarely emerge from robust evaluations of practice, but rather take the form of common-sense suggestions arising from empirical research with students, graduates, supervisors and – to a lesser extent – employers. Just as many of the challenges facing doctoral training transcend disciplinary and national boundaries, the following reflections are replicated across several studies, not all of which focus exclusively on social sciences.

A common conviction in the literature is that transferable skills training ought to be firmly embedded into the context of the doctoral project and discipline (Blaj-Ward 2011; Sinche *et al.*, 2017; Walsh *et al.*, 2010). Blaj-Ward's (2011) conceptualisation of research training across arts and humanities doctorates in the UK suggested that transferable skills courses were most effective when embedded into a clearly articulated pedagogic discourse, which brought together disciplinary and academic culture. When training was provided outside of the disciplinary context, it could become an 'object of dispute' (p.698) and was unlikely to garner supervisory support. Collaborative peer learning, formative coursework and opportunities for reflection are just some of ways that training can be better embedded into the doctoral project and discipline: 'outsourcing' such training to other parts of the university is not advocated. Transferable skills training should also follow an individual needs analysis, initiated and undertaken by the doctoral researcher with formal support at the department and institutional level (LERU, 2010; Vitae, 2019; Walsh *et al.*, 2010; Weber *et al.*, 2018). Institutions should commit to regular formal reviews of development as part of doctoral and post-doctoral training (Vitae, 2019).

On the issue of 21st century and digital skills, it is clear that most universities offer training on developing these competencies, at both undergraduate and postgraduate level. However, we found little published evidence on the efficacy of current approaches. JISC, which supports the digital infrastructure of UK universities and provides advice to institutions on technology for education and research, reported in

2017 that only half of all higher education students believed that their course was preparing them well for the digital workplace (Newman & Beetham, 2017). JISC concluded the need for individual self-assessment to identify digital training needs, and the greater embedding of digital practice into programmes. These ideas are consistent with those cited above to enhance transferable skills provision more generally. The limited published research on PhD students' use of digital tools suggests that time pressures are a significant barrier to upskilling and that tools are typically only used when they are obviously related to the immediate research project (Dowling & Wilson, 2015). Carpenter (2012) similarly noted that while doctoral students were confident users of eJournals and eBooks, they were not keen users of new technology to facilitate their research and had a limited understanding of open access science. While that research is almost a decade old, Nesta's 2018 report 'Delivering Digital Skills' also stressed the importance of a supportive culture, sufficient time and resource, and easy access to training, in order to encourage and motivate individuals to learn new digital skills (Orlik, 2018b, p.13).

As noted, collaborative doctoral training programmes are increasing internationally, and there are compelling pedagogical and practical arguments in favour of these (Barnacle *et al.*, 2020; Borrell-Domain *et al.* 2010; Golovushkina and Milligan, 2013; Kyvik & Olsen, 2012; Mills & James, 2019). Collaborative doctoral training is seen to work best when there is strong strategic commitment from both sides; the partner organisation takes an active role in supervision; and the student spends time in the partner organisation (Borrell-Domain *et al.* 2010). Mills and James (2019) suggested that collaboration with non-academic partners during doctoral training could be particularly beneficial in the social sciences, where the negotiation of reflexive and instrumental forms of knowledge were an essential part of epistemic culture. They argued that such approaches should not simply be viewed as beneficial for doctoral graduates entering non-academic employment, since those forging academic careers would also be expected to engage with external partners. Barnacle *et al.* (2020) similarly emphasised the importance of industry engagement for social scientists entering academic employment. They noted that many social scientists approached doctoral study mid-way through their career, but that their professional contacts and experience was seldom recognised. Rather than assuming that all PhD students were 'empty vessels' (p.2) – institutions could better utilise the industry networks of social scientists as a basis for collaborative training. Social scientists who sustained their industry engagement during study found it strengthened their research design, data collection and knowledge exchange (Barnacle *et al.*, 2020).

It may not be preferable for all efforts to engage industry in doctoral training to be university or funder led. Mills and James (2019) observed that collaborations were fragile and took time to build – and they could easily disintegrate due to a lack of trust. This could be disastrous for the student, but rarely resulted in any formal ramifications. The Directors of the ESRC DTPs featured in Lunt *et al.* (2014) largely supported the emphasis on collaborative training but related that facilitating knowledge exchange presented one of the greatest challenges in programme design and delivery. Directors also expressed the difficulty of demonstrating how doctoral training supported pathways to impact.

Alternative pathways through the doctorate are advocated in some of the studies reviewed. In their evaluation of postgraduate research training in Australia, McGagh *et al.* (2016) reported that an integrated masters-level pathway to doctoral studies in the social sciences might be beneficial, as this could better prepare doctoral graduates for careers in industry, as well as reducing time for completion. The 2017 National Academy of Sciences report on graduate training in the social and behavioural sciences in the United States similarly recommended a more structured pathway through the doctorate. Four to five-year programmes comprised of a one-year disciplinary focus followed by inter-disciplinary, team-based work involving university and industry collaboration were proposed to better support graduates for non-academic careers. Opportunities to work internationally, internships and mentoring from industry were among other ideas. LERU (2010) advocated doctoral pathways that enabled students to cross the boundaries of academic disciplines.

In order to emphasise the relevancy of transferable skills training, and encourage greater engagement among doctoral researchers, Crossouard (2013) questioned whether doctoral assessment could better incorporate some of the skills that funders wished to embed. A number of studies with doctoral researchers across the humanities and sciences suggest that training courses and careers guidance ought to acknowledge the ‘variation in agency’ that students bring to the PhD (McAlpine & Austin, 2018; Hancock & Walsh, 2016; Hancock, 2019). Doctoral students assert different goals and strategies, meaning that not all approaches to supporting progression will be suitable, nor will all opportunities be seized upon. More pragmatically, Walsh *et al.*’s evaluation of transferable skills courses for STEM students suggested that residential workshops may be more impactful than shorter training courses.

Finally, at the sector-level, in the interest of widening participation to the doctorate and fostering inclusive research cultures, the importance of distributing doctoral funding and training structures across an inclusive network of higher education institutions has been raised by a number of evaluative reports (Bartholomew *et al.*, 2015; Budd *et al.*, 2018). Put simply, any consideration of optimum ways to develop the skills of social science PhD students for academic and non-academic careers, must also consider how fair access to such training opportunities can be ensured.

05. Commentary

Reflecting on the evidence presented in this report, this chapter brings together overarching conclusions. Evidence gaps are identified and recommendations for future research are offered.

This REA sets out to assess the skills that UK social science PhD graduates need to compete in a global economy, and to find evidence of the relative effectiveness of different approaches to PhD training and support. It has identified examples of innovative practice and different models of provision across a number of systems and subject areas as well as prominent gaps in current knowledge. On the basis of the evidence reviewed, it is not possible to give a definitive, objectively substantiated view on reforms to the UK PhD in the social sciences. To enable this to be achieved by the end of the review, the insights gained and gaps identified from the REA will guide the primary data collection with leading academics and sector stakeholders, students, graduates, supervisors and employers.

Overarching conclusions

Across the body of doctoral scholarship literature, there is an absence of systematic, comparative work. Where practices and provision are evaluated, the quality of evidence on causality is weak. Evaluations of innovations in practice and pedagogy are typically small scale, and lack pre- and post-testing, or a suitable comparison group. There is very little longitudinal analysis of student trajectories over time: most approaches are cross-sectional. Samples of students, graduates and supervisors are small and opportunity-based, limiting the wider applicability of findings.

Some of the topics included in our research questions are not well covered in the evidence. Detailed and reliable information on PhD funding across countries could not be obtained. There are no studies included in our review with an explicit focus on different teaching methods for PhDs, and there is an absence of detail at the social sciences and individual-discipline level about teaching methods. There is little first-hand evidence on the skills that employers seek, and their perceptions of social science PhD graduates. On these matters, insights largely come via the reflections of doctoral graduates, rather than from employers directly.

There is very little directly comparative research on a range of matters. One example of this is the cycle of admission, assessment and attrition, considered across RQs 1b, c and d. From the current evidence, it is difficult to judge how selective different systems are and how much attrition occurs during studies. This prevents meaningful judgements about the *quality* of different systems. The Norwegian system has been evaluated as producing high-quality graduates, but there are fewer students than in the UK, they take longer to complete, and are typically older. It is not straightforward to draw lessons to the UK context, which is larger and more open.

Disciplinary differences feature less strongly in the body of doctoral scholarship evidence than might be expected. In larger studies, subject differences are not often the focus of analysis; in smaller studies, any discernible differences cannot be considered generalisable. Several international studies report that a higher proportion of social science PhD graduates forge academic careers compared to those from other subject areas. This is true also in the UK. However, this observation is likely less due to differences in the demand for knowledge and skills, and more likely the result of the numbers of PhD graduates across fields. In most nations, the vast majority of PhDs continue to be awarded in the STEM subjects, intensifying the subsequent competition for academic jobs in these areas. Furthermore, the ‘social sciences’ are rarely disaggregated in the empirical studies we reviewed. Known variation across social science disciplines – for example, the shift towards an article-based thesis in economics – did not feature in our literature search.

Evidence gaps and research recommendations

This rapid but systematic review indicates that the empirical evidence on the relative effectiveness of different approaches to PhD training support is limited. It is difficult to draw meaningful conclusions or policy and practice recommendations to enhance the skills and employability of social science PhD graduates from the literature alone.

Within the scope of this review, the lack of evidence on assessment and teaching methods in social science doctorates constitutes a significant gap in current knowledge that will be explored through primary data collection with students, graduates and supervisors. On reflection, it is surprising how little connection there is between the intended outcomes of the PhD and what gets assessed. Many of the ‘extra’ competencies that funders and employers value are not formally assessed during doctoral training. Though the evidence suggests that doctoral students are highly intrinsically motivated, all earlier levels of education place a strong emphasis on assessment as a driver for learning. Few individuals can afford to undertake a PhD without any consideration of their future employment prospects.

The evidence provided several suggestions to enhance training. However, as noted, robust evaluation of these is lacking. Data collection with supervisors, leading academic experts and sector stakeholders can helpfully focus on the feasibility of such ideas to better prepare social science PhDs for diverse careers. These discussions will explore perspectives on: enhanced collaborative training, embedded transferable skills training, and internships and placements.

Interviews with employers of UK social science PhDs will enable a direct exploration of their perceptions. Here, particular attention should be directed at non-academic employers, to gain a richer insight into the skills sought and the range of roles occupied by social science PhDs. The empirical studies of PhD employment included in this review seldom reached beyond the binary classification of ‘academic’ and ‘non-academic’ sectors, greatly reducing our understanding of the complexity and diversity of the latter. While forecasting future and digital skills needs may be an imprecise science, it is clear that these broad categories in fact refer to many different competencies; demand for which varies by role and sector. By exploring this further

through our social science employer interviews, a more nuanced picture of current and anticipated skills demands, and the extent to which these are general or context-specific, will emerge.

In the longer term, governments and funders should prioritise the collection of comparative data on the doctoral lifecycle, including longitudinal tracking of careers. Given the growing interest in inclusion, diversity, mental health and wellbeing among doctoral researchers, it is essential that any interventions planned to address these issues must be robustly evaluated once developed at a sufficient scale.

Though the shortcomings in the available evidence are significant, we should not rush to assume that the social sciences PhD is in need of fixing. It is well documented that, in many countries, the expansion of doctoral education has been accompanied by a 'crisis discourse' (Cuthbert & Molla, 2015; Bao *et al.*, 2018). Often, however, claims of over-supply, skills deficits and frustrated ambitions owe less to the evidence than they do to the competing agendas that varied stakeholders bring to the contemporary doctorate.

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Appendix 1: Search Terms

Search Terms

List of initial search terms:

Primary terms	General secondary terms	Discipline/subject terms	Specific secondary terms	Country (for deep dives)
PhD Doctorate/ Doctoral	Training Teaching/ delivery Structure Funding Assessment	Social science Economics Sociology Psychology Education Politics Law Geography Anthropology Political Science Development Studies Management Studies Business Studies STEM Arts & Humanities	Wellbeing Mental health Inclusive/inclusion Diversity Equality Demand Competitiveness Under-represented Skills Employment Employability Outcomes Destinations Progression Innovation Evaluation Strengths/limitations	USA Germany The Netherlands

Search Strings

Search terms were combined together into search strings using Boolean operators, as follows:

- **OR** for synonymous/alternative terms
- **AND** to join terms
- “___” (quotation marks) for exact phrases
- * (wildcard) to stand for any string (for variations on words, e.g. doctora* = doctorate / doctoral).

Search strings for grey literature

# / RQ	String
1	(PhD OR doctora*) AND (training OR teaching OR delivery OR structure OR funding OR assessment) AND ("Area and development studies" OR Demography OR Economics OR "Economic and Social History" OR Education OR "Environmental planning" OR "Human geography" OR Linguistics OR "Management and Business Studies" OR "Political science and international relations" OR "Psychology OR "Science and technology studies" OR "Social Anthropology" OR "Social Policy" OR "Social Work" OR

	"Socio-legal studies" OR Sociology OR "Statistics, Methods and Computing") AND (Wellbeing OR "Mental health" OR Inclusive OR inclusion OR Diversity OR Equality OR Demand OR Competitiveness OR Under-represented OR Skills OR Employment OR Employability OR Outcomes OR Destinations OR Progression OR Innovation OR Evaluation OR strengths OR limitations)
2	(PhD OR doctora*) AND (training OR teaching OR delivery OR structure OR funding OR assessment) AND ("social science")
3	(PhD OR doctora*) AND (training OR teaching OR delivery OR structure OR funding OR assessment) AND ("social science") AND (Wellbeing OR "Mental health" OR Inclusive OR inclusion OR Diversity OR Equality OR Demand OR Competitiveness OR Under-represented OR Skills OR Employment OR Employability OR Outcomes OR Destinations OR Progression OR Innovation OR Evaluation OR Strengths OR limitations)
RQ1	"social science PhD" structure funding
RQ1a	strengths limitations "social science PhD" structure funding
RQ1b	teaching assessment "social science PhD"
RQ1c	(duration OR length) "social science PhD"
RQ1d	"social science PhD" student (inclusion OR diversity OR "mental health" OR wellbeing)
RQ2.1	What skills are included in social science PhD training?
RQ2.2	"social science" PhD training meet requirements employers
RQ2a	processes support progression pathways "social science" PhD students
RQ2b	destinations social science PhD students
RQ2c	"social science" PhD How employment outcomes vary by discipline country "PhD model"
RQ2d	skills employers seek "social science" PhD graduates
RQ2e	How are "social science" PhD graduates regarded by employers
RQ2f	optimum ways to develop skills requirements of "social science" PhD students careers

Search strings for academic literature