BRITISH ACADEMY
for the humanities and social sciences

HM Government Industrial Strategy Green Paper

Response from the British Academy for the humanities and social sciences

The British Academy is the UK's national academy for the humanities and social sciences. A Fellowship of over 1200 of the country's leading academics, the Academy received its Royal Charter in 1902. It exists to promote and champion its disciplines, and awards funding to researchers at all career levels.

The humanities and social sciences provide a critical lens through which Government and society can address the wide-ranging challenges we face today. From security to health, climate and demographic change, technology and artificial intelligence, the humanities and social sciences can provide a crucial means of focussing on the issues facing our world, and offer solutions to seemingly intractable problems.

The UK enjoys a huge comparative advantage in having a strong service sector, which relies heavily on the skills and expertise of the humanities and social science disciplines. Throughout this submission, the British Academy will make a strong case for the role of the humanities and social sciences in our economy and society, while displaying the best evidence of our disciplines in seeking to address the challenges posed by Government in its Green Paper.

The British Academy particularly welcomes the focus on *place* in the Green Paper, and the importance the Department for Business, Energy and Industrial Strategy is placing on playing to the strengths of local regions and developing an approach which is sympathetic to the individual needs of different areas of the UK. As the development of an industrial strategy for the UK continues, we would urge this focus on place to remain, with recognition being given to the needs of, and appropriate developments in, different areas of the country.

We would encourage the Government to focus on the skills brought to the labour market by the study of our disciplines, as well as the benefits to the economy delivered through the STEM subjects, as Government progresses industrial strategy work in the months ahead.

Our Fellows number some of the world's leading economists, political scientists and geographers; we have utilised their expertise and ground breaking research to address some of the questions outlined in this consultation.

If you have any questions about this submission or you would like to discuss any aspect of it in more depth please contact Helen Gibson, Public Policy and Engagement Manager, H.gibson@britac.ac.uk

Main consultation questions

1. Does this document identity the right areas of focus: extending our strengths; closing the gaps; and making the UK one of the most competitive places to start or grow a business?

The document does identify some of the right questions which must be answered fully to deliver the economic growth Britain needs, and to help to close the gap between the more prosperous South East and other regions in the UK. We would also urge the Government to consider however the evolution of the future labour market, and how technological developments will alter the traditional world of work.

We would like to highlight the need for skills growth across all sectors of the economy, with a recognition by Government of the role played by the humanities and social sciences in both the service sector and wider economy. As we seek to boost STEM subjects and the skills level of the UK in general we must recognise the benefits provided to the economy of the skills provided by the arts, humanities and social sciences. The service sector, which includes financial services, the creative industries and professional services, accounts for 80% of the UK economy, and has been and will continue to be an engine for economic growth and the creation of new jobs. For example, the economic value of the legal services is estimated to be £25.7bn, and the legal sector grew by 3.3% per year between 2005 and 2015.[1] In 2014, financial and insurance services contributed £126.9bn in GVA to the UK economy.[2] These services are underpinned by the knowledge and skills developed by research and study in the humanities and social sciences. These disciplines should receive sufficient support and recognition through the Industrial Strategy Challenge Fund, and other means, as we leave the European Union.

2. Are the 10 pillars suggested the right ones to tackle low productivity and unbalanced growth? If not, which areas are missing?

The British Academy believes there should be more emphasis on potential future jobs, and the potential good, and threats, for the labour market posed by a growth in areas such as robotics and artificial intelligence. Government needs to be looking at the jobs likely to be in existence in 30 – 50 years' time, and plan accordingly to invest in skills in schools as well as lifelong learning opportunities to help improve the resilience of the labour force. Government should be ambitious, forward thinking and working with those institutions who are undertaking modelling activities, posing questions about the future world of work. Such steps should support productivity and enable the population to weather changes in the workplace, as have been seen in the last decade with the development of the 'gig economy', and the strengths and weaknesses it brings to the UK economy, as well as to the individual worker.

More focus needs to be given to enabling women to re-join the workplace after career breaks owing to childcare, or other responsibilities; this should form an important focus of the next stage of the Industrial Strategy. Addressing imbalances in earnings between men and women,

[1] The Law Society (March 2016). Economic Value of the Legal Services Sector: www.lawsociety.org.uk/news/.../legal-sector-economic-value-final-march-2016/

[2] House of Commons Library (February 2015), Financial Services: contribution to the UK economy: researchbriefings.files.parliament.uk/documents/SN06193/SN06193.pdf

as well as the ability to participate in the labour market, will have strong benefits for the UK economy. The Academy would recommend a joined-up approach with other relevant Government departments looking at what more can be done to make it easier for women to stay in and return to the labour market, as well as having the opportunity to gain new skills while on maternity or other leave. The Academy stands ready to offer further advice on this.

3. Are the right central government and local institutions in place to deliver an effective industrial strategy? If not, how should they be reformed? Are the types of measures to strengthen local institutions set out here and below the right ones?

The growth of Local Enterprise Partnerships (LEPs) and the changing devolution settlement in some regions of the UK should help economic development in those regions, provided adequate resources are placed at the disposal of new combined authorities. Government must be aware of the limitations placed on some Local Authorities in recent years to undertake such development work, owing to local government funding cuts, and must assess how best to support Local Authorities and Chambers of Commerce, amongst others, to assist economic development opportunities.

While devolution to some areas, such as the North West, is well developed, it is far less so in other areas of Britain. There is a risk of some areas of the UK doing well economically in 'pockets', while other regions, or even rural areas of the same regions, are left behind due to a lack of a devolution deal or adequate powers to support local firms trying to export or grow. BEIS must address this working in an integrated way in conjunction with local authorities and the Department for Communities and Local Government (CLG).

The Academy understands that following the closure of Regional Development Agencies there are only a small number of Whitehall civil servants with responsibility for directly linking with specific geographic areas. Government should look at this to see if a cohort of civil servants with responsibility for liaising and monitoring, or developing policy to boost economic growth, in specific geographic areas would be effective. The devolved objectives for each region or area should be clear so success at a local level can be measured.

4. Are there important lessons we can learn from the industrial policies of other countries which are not reflected in these ten pillars?

Productivity is higher in countries which invest more in research and development. The British Academy has called for a total 3% of GDP to be invested in research and development, with 1% coming from the private sector and 2% from the public sector.[3] We believe this investment would be repaid with higher levels of productivity and innovation, and would do much to stimulate the economic growth that is so desperately needed in so many parts of the United Kingdom.

There is no one perfect international example which Government should seek to copy in its entirety. We would encourage Government to look to many different international examples and seek to replicate the best while casting a critical eye over that which has not been so successful. South Korea provides a good example of a country which set out strong objectives

[3] UK National Academies (2016) Open for Business
http://www.britac.ac.uk/sites/default/files/Open%20for%20business%20-%20a%20nation%20of%20global%20researchers%20and%20innovators_0.pdf

for an industrial strategy several decades ago and pursued it strategically over the following years. By focussing on exports, growing research and development (R&D) and investing as a nation for the long-term in skills, South Korea enabled the development of major international tech companies, and a thriving economy. The successful long termist nature of this plan raised the growth rate and economic performance of South Korea while boosting exports.

Japan and South Korea's industrial strategies both benefited from 'deliberation councils' established in key industries; these were made up of government representatives, industry and independent participants such as journalists and academics; these may be a model Government wishes to explore.

The development and execution of a long term industrial strategy fit for the 21st century must be a core focus for Government in the years ahead, especially as Britain's exit from the European Union may lead to a period of economic and political uncertainty for some years to come, with all the attendant issues that can raise for investment and trade.

As Government seeks a new role for Britain in the world we would urge BEIS to look at the strengths and success stories of developing and developed economies across the world; while ensuring industrial strategy for Britain is placed on a long-term path, removed from day to day political interference.

Questions on individual pillars

Science, Research and Innovation questions – pillar 1

The Academy welcomes the Government's commitment to a major new industrial strategy underpinned by science, research and innovation. The UK has a world-leading research base, which provides the foundation for new ideas and discoveries, and fuels economic growth and the creation of high-value jobs. This enables the UK to compete with other leading nations and to develop the capabilities needed to respond to national and global challenges now and in the future.

The Industrial Strategy needs to harness the full breadth of this resource, and recognise the benefits that the arts, humanities and social sciences bring to modern economies, alongside those from science, engineering, technology, industry and manufacturing.

5. What should be the priority areas for science, research and innovation investment?

Research and innovation, underpinned by investment

The UK's successful education, research and innovation and service sectors are a source of major comparative economic advantage. Future growth will be driven principally by innovation,[4] which in turn depends heavily on research and development across the full breadth of disciplines. The industrial strategy needs to be robustly framed, designed and delivered in a way which capitalises on the UK's key strengths and the sectors that will continue to play a key role in generating UK growth. If the government focuses the industrial strategy too narrowly and does not give due weight to the major benefits the arts, humanities

[4] OECD (2007) Innovation and Growth: Rationale for an innovation strategy http://www.oecd.org/sti/inno/39374789.pdf

and social sciences clearly bring to modern economies, independently and through multidisciplinarity, it will weaken the UK's drive towards sustained growth and future prosperity for all.

Jointly with the other UK National Academies, representing research, scholarship and innovation across the full breadth of disciplines, the Academy has called on government to signal the UK's ambition to compete internationally by setting a target 3% of GDP for combined public and private R&D spending[5]. The Academy welcomes the increase in investment in research and development to £2bn a year by 2020-21. This helps narrow the gap between the level of investment in research and innovation by the UK and that of other leading economies. Creating a stable long-term investment environment for research and innovation, and securing the ring fence around the science budget are significant milestones in building a stronger future throughout the UK.

The Academy welcomes the Government's commitment in the Green Paper, and in the Higher Education and Research Bill, to the dual support system of research funding. Dual support is central to the continued success and strength of a diverse, UK-wide research base, to the benefit of students and the economy.[6]

The Academy also welcomes the Government's plans to strengthen the strategic capability of the UK by the creation of UK Research and Innovation (UKRI). UKRI is an opportunity to drive forward a positive and expanded role for research and innovation, by developing a strategy and associated investment framework that can operate on a cross-disciplinary scale and be delivered more coherently, effectively, and efficiently.

However, while the increase in investment in R&D is helpful, the mechanisms for allocation of funding for priority areas, and the role of UKRI in administering it through the Industrial Strategy Challenge Fund, are not clear. The Government should clarify two key points:

- the extent to which this additional funding will be used to address the deficit from European research funding after the UK leaves the EU

- how allocation of the Industrial Strategy Challenge Fund will recognise the contribution which all disciplines can make to economic growth. If it only invests in STEM subjects the fund will not benefit from the expertise of the humanities and social sciences which can drive productivity.

The role of humanities and social sciences in fostering innovation

The Green Paper identifies a number of areas at which the Industrial Strategy Challenge Fund may be targeted, drawing on the Eight Great Technologies initiative. All of these areas will raise human challenges, which will require understanding from the humanities and social sciences to resolve. Government should consider the cross-cutting themes which link the potential areas of investment, and explore the potential for efficiencies by tackling these themes in a coordinated way, rather than on a sector by sector basis.

[5] UK National Academies (2016) Open for Business
http://www.britac.ac.uk/sites/default/files/Open%20for%20business%20-%20a%20nation%20of%20global%20researchers%20and%20innovators_0.pdf

[6] British Academy response to the Public Bill Committee on the Higher Education and Research Bill, September 2016: http://www.britac.ac.uk/news/british-academy-submits-evidence-public-bill-committee-higher-education-and-research-bill

Moreover, as the Green Paper acknowledges, innovation is not just about breakthrough technologies or scientific and engineering processes. Effective adoption of technology throughout businesses and improvements in management and workforce skills are just as important and depend on the understanding and insight which the humanities and social sciences can bring to the complexity of social phenomena and human behaviour. In this way, we can incentivise behaviours that increase worker productivity.[7]

The humanities and social sciences also have a far wider role to play in facilitating delivery of the Government's social justice agenda, and raising living standards for all across the UK, by providing insights into the forces that shape people, cultures and society and how they might be realigned.[8] The Academy's Fellows can provide expertise in this area.

6. Which challenge areas should the Industrial Challenge Strategy Fund focus on to drive maximum economic impact?

The contribution of the service sector and the creative and cultural industries

The service sector, which includes financial services, the creative industries and professional services, accounts for 80% of the UK economy, and has been and will continue to be an engine for economic growth and the creation of new jobs. For example, the economic value of legal services are estimated to be £25.7bn, and the legal sector grew by 3.3% per year between 2005 and 2015.[9] In 2014, financial and insurance services contributed £126.9bn in GVA to the UK economy.[10] These services are underpinned by the knowledge and skills developed by research and study in the humanities and social sciences.

Government should ensure that the industrial strategy is underpinned by explicit strategies for generating growth in the cultural industries if it is to achieve maximum economic impact.

In 2014, the creative economy was worth £133.3bn, accounting for 8.2% of the UK economy and 2.8m jobs, approximately 1 in 11 of all UK jobs. The creative economy grew by 25% between 2011 and 2014, a rate twice that of the UK economy as a whole.[11] Jobs in the creative economy are also highly skilled jobs at low risk of automation, with 59.9% of jobs in creative occupations held by graduates, compared to 32.7% in other sectors

Crucially, a thriving cultural sector is able to attract business and investment and generate spill-over effects across the economy[12]. The museums and galleries sector is a vital part of the

[7] For example, the CLEAR IDEAS innovation development model has improved cost-efficiency in service delivery for public sector organisations. In Sheffield alone savings of £1.7 million for social care services have been achieved. The model was developed by the ESRC-funded Centre for Organisation and Innovation from research on the barriers and facilitators for organisational innovation (see ESRC (2017). Research Performance and Economic Impact Report 2015-16: http://www.esrc.ac.uk/research/research-and-impact-evaluation/economic-impact-reports/

[8] British Academy (2014). Prospering Wisely: www.britac.ac.uk/publications/prospering-wisely

[9] The Law Society (March 2016). Economic Value of the Legal Services Sector: www.lawsociety.org.uk/news/.../legal-sector-economic-value-final-march-2016/

[10] House of Commons Library (February 2015), Financial Services: contribution to the UK economy: researchbriefings.files.parliament.uk/documents/SN06193/SN06193.pdf

[11] Department for Culture, Media and Sport Economic Estimates 2016: www.gov.uk/government/statistics/creative-industries-economic-estimates-january-2016

[12] UNESCO (2012) Measuring the economic contribution of cultural industries. A review and assessment of current methodological approaches.

UK's cultural tourism offer, with heritage tourism in England alone contributing over £21.7 billion GVA to the UK economy (2% of national GVA) and employing over 320,000 people.[13] Heritage is vital to the UK's ability to attract international tourism. There were over 15.3 million heritage-related international visits in 2014 which have steadily increased since 2010. International tourists are estimated to have spent £9.86bn on heritage-related visits in 2014.[14]

The Academy would strongly urge the Government to extend its challenge areas for investment to include both the cultural and creative industries and the wider service sector, areas which can be led by the humanities and social sciences, in order to maximise the potential economic return from the investment it plans to make. Without it the Industrial Strategy overlooks a major dimension of the UK economy, with the potential to drive future growth.

7. What else can the UK do to create an environment that supports the commercialisation of ideas?

New challenges require innovative solutions

The Academy welcomes the acknowledgment in the Green Paper that many of the challenges which the Industrial Strategy needs to tackle cut across the boundaries of existing disciplines, requiring the removal of traditional silos. Most of the major challenges which society faces - climate change, growing inequalities, computerisation of occupations - require interdisciplinary research and cooperation, including between humanities and social sciences, and STEM disciplines. Innovation is often found at the intersections and margins of formerly distinct disciplines.[15]

The British Academy, and the other national Academies, have wide expertise in this area and stand ready to offer further advice. Mobility between sectors and disciplines, and of people more generally stimulates innovation and facilitate development of cross-sector skills and competence. Encouraging and facilitating inter-sectoral and inter-disciplinary mobility would improve the UK's ability to commercialise ideas and build on global advances.

8. How can we best support the next generation of research leaders and entrepreneurs?

Building the pipeline

The delivery of the Industrial Strategy will depend on the existence of a creative, well-trained workforce, the 'pipeline of talent for an innovative economy' described in the Green Paper. The Academy agrees that it is vital that the UK continues to be able to attract the world's most talented researchers from across the world. Championing the UK as a hub of research and innovation to attract a diverse mix of international and national entrepreneurs and researchers is vital for long term socio-economic growth throughout the UK. We should also celebrate and encourage the benefits of postgraduate study, which we go on to outline under Pillar 2.

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www.uis.unesco.org/culture/Documents/FCShandbook-1-economic-contribution-culture-en-web.pdf

[13] Historic England (2016). Heritage and the Economy: Heritage Counts 2016: https://historicengland.org.uk/research/heritage-counts/heritage-and-the-economy/

[14] AHRC (2017). The Impact of AHRC Research, April 2015-March 2016: www.ahrc.ac.uk/newsevents/publications/impactreports/

[15] British Academy (2016). Crossing Paths: Interdisciplinary institutions, careers, education and applications: www.britac.ac.uk/interdisciplinarity

But building the pipeline also means supporting the development of postgraduates and early career researchers. Research conducted for Research Councils UK found that doctoral graduates were particularly valued for their research and analytical skills, as well as their capacity for critical thinking.[16] They create a 'spill-over' effect on other employees with doctoral graduates exploring new perspectives and questions, encouraging and inspiring improved problem solving approaches. With the proposed changes to the higher education landscape set out in the Higher Education and Research Bill, there is a need to ensure a strong working relationship is established between the Office for Students and UKRI, as two newly-formed entities without a history of previously working together.

9. How can we best support research and innovation strengths in local areas?

We recognise the role UK Research and Innovation will have to play as the UK wide body that will hold responsibility for ensuring funding across the devolved administrations. We would urge both UKRI and Government to work with universities across the regions to support and identify potential new growth areas.

Developing skills – pillar 2

The focus on skills in the Green Paper is welcome. Improving the UK skills base is critical to increasing productivity and to the future success of the UK economy. The Academy also recognises the pivotal importance of skills and has recently launched a new programme of work in this area celebrating skills in the Arts, Humanities and Social Sciences (AHSS), led by Professor Sir Ian Diamond FBA. The Academy would be happy to discuss any aspects of the project with the Department and will share findings when they are available.[17] .

The key points of the Academy's response under this pillar are:

- the scope of the Industrial Strategy and the need to look beyond purely technical/ vocational education and to recognise the critical role of universities in preparing the high-skilled workforce of the future;
- the importance of AHSS skills for the future workforce and for lifelong learning;
- the importance of language skills as part of the UK's industrial strategy for security, diplomacy and international trade;
- the importance of social sciences and humanities in helping to deliver STEM skills, particularly to underrepresented groups.

[16] Research Councils UK (2014). The Impact of Doctoral Careers: www.rcuk.ac.uk/publications/reports/impact-of-doctoral-careers/

[17] This response draws on emerging evidence from the project, including its Call for Evidence and commissioned work. The response also draws on the findings of the Academy's 5-year Programme on Languages and Quantitative Skills (LQS), funded by the Department for Business, Innovation and Skills.

10. What more can we do to improve basic skills? How can we make a success of the new transition year? Should we change the way that those resitting basic qualifications study, to focus more on basic skills excellence?

Defining Skills

A definition of 'skills' can be problematic. While often synonymous with vocational and technical education, skills can refer to both cognitive and non-cognitive skills, employability skills, social skills, technical skills and 'soft' skills. A further distinction is that between high- and low-level skills.

The Green Paper largely adopts a narrow definition of skills, regarding them as purely 'technical' skills, or what someone 'can do', in a particular context. It also focusses almost entirely on basic skills, overlooking high-level skills that will be crucial to the UK's future success. The Academy believes the definition of skills should be broad, to go beyond purely 'what you can do', to include attitudes and behaviours. It aims to deal with high-level skills, meaning those skills developed through the study of AHSS at degree level and above, including in the early stages of a career in research in these subjects.

Why is a broader definition of skills necessary?

The Prime Minister is right to point out in her foreword that skills will be crucial for the 'high-paid, high-skilled' jobs of the future. Yet the Green Paper focuses almost entirely on 'basic skills'. It further points out that 'the United Kingdom has some of the top universities in the world and a larger proportion of our population have degree level qualifications than most of our competitors' and that 'it is now estimated that around half of all 17-year olds will participate in higher education by the age of 30'. Yet there is no discussion, nor proposals, around how to ensure that these graduates are equipped with the skills they, and the UK economy, will need. While there is no doubt that basic skills such as literacy and numeracy are crucial for any Industrial Strategy, we must address high-level skills, including those developed at university, that will be crucial for the jobs of the future and the UK economy.

The jobs market is constantly changing and evolving and the skills needed by many employers will be skills which are not currently considered essential by recruiters.[18] Increased automation is predicted to lead to more demand for high-skilled jobs, particularly in major occupation categories 1-3 in the Standard Occupational Classification (Managers, directors, senior officials, professional occupations and associate professional and technical occupations).[19] Computers are unlikely to be able to perform general behavioural and non-cognitive 'soft' skills necessary for collaboration, innovation, and problem solving such as resourcefulness, creativity, abstract reasoning, and emotional intelligence. Demand is growing for individuals to be equipped with these higher-level skills which they can deploy in different contexts, whether in a career which may cross many sectors of employment or within a research community which is increasingly interdisciplinary. Universities have a

[18] World Economic Forum (2016). *The future of jobs: employment, skills and workforce strategy for the fourth industrial revolution*, Global Challenge Insight Report; Institute for the Future for University of Phoenix Research Institute (2011). *Future Work Skills 2020*

[19] The Economist Intelligence Unit (2015). *Automated, creative and dispersed: the future of work in the 21st century*

pivotal role to play in fostering the development of the necessary skills to meet the challenges of a transforming work force and solve the UK productivity puzzle.

The focus on lifelong learning in the strategy is welcome. It is essential that our workforce is equipped with the skills to allow them to cope, adapt and thrive. In a world that will be far more complex and interconnected AHSS are ideally placed to deliver these skills – resilience, adaptability, flexibility, adapting to change, navigating uncertainty are some of the core skills provided by these disciplines.

11. Do you agree with the different elements of the vision for the new technical education system set out here? Are there further lessons from other countries' systems?

For more context on this answer see our answer to question 14.

Pathways for quantitative skills

To enable more students to develop appropriate capability in quantitative skills, there is a need to continue to develop and promote alternative routes including by the inclusion of quantitative content in subjects beyond traditional STEM disciplines. Qualification development should not be seen as a zero-sum game, where expanding one route leads to the contraction of another, but as a means of adding to the total numbers of young people learning quantitative skills.

New Core Maths qualifications, designed to appeal to students who have gained a C grade or better at GCSE but do not currently take A-level mathematics, are a welcome first step in addressing the issue of premature specialism. The focus in the curriculum on applying maths and on data is particularly welcome, and this should be applied across both schools and further education colleges.

Firmer links could be built between school and college education and the workplace through continued support for the apprenticeship route, further and continuing training and other schemes that allow people in work to up-skill. The apprenticeship route combines employment-based training with part-time attendance in vocational education classes or workshops related to the field of training. It is, therefore, in principle well suited to developing quantitative skills which can be applied in workplace settings.

The Academy looks forward to the findings of Professor Sir Adrian Smith's Review of Post-16 Mathematics Provision in England, which is due to report very shortly, and hopes that the recommendations it makes support direction outlined above. The Academy is happy to play its part in working with universities and the Department for Education on signalling the importance of qualifications in quantitative skills.

Building capacity and professional support for teachers of quantitative skills

The supply of suitably qualified and trained teachers is critical to the successful delivery of QS in all these routes. This goes beyond the need for specialist teachers in mathematics. Teachers of the sciences, social sciences and the humanities also need to incorporate numerical evidence and data into their teaching. Therefore, the recruitment, retention and professional development of data-literate teachers are important. This will require a strategic approach to considering the teaching workforce, at primary, secondary and college level.

12. How can we make the application process for further education colleges and apprenticeships clearer and simpler, drawing lessons from the higher education sector?

The Green Paper suggests creating a course-finding process for technical education similar to the UCAS process. This is an excellent idea in principle. Students should be able to easily access information about post-16 opportunities in their area (from all providers receiving public money, including schools). It would also be useful to have a national portal for apprenticeships (which has not happened with the National Apprenticeship Service). If this is too complicated for all types of apprenticeship, it would be useful to have portals developed for different vocational sectors where opportunities for young people exist. This might be developed in the context of the 15 routes proposed in the Post-16 Plan and deliver it regionally.

13. What skills shortages do we have or expect to have, in particular sectors or local areas, and how can we link the skills needs of industry to skills provision by educational institutions in local areas?

Skills in the Arts, Humanities and Social Sciences (AHSS)

The Green Paper notes that 'a larger proportion of our population have degree level qualifications than most of our competitors'. 55% of university students are studying AHSS subjects, totalling around 1.25 million students.[20] This is a large and valuable resource that must be harnessed.

But what are AHSS skills? While it is difficult to provide a comprehensive list of the skills developed through the study of AHSS in higher education, and to separate them from generic characteristics of all graduates, an initial informal consultation with AHSS subject communities produced the following list:

- Advocacy and the ability to present a case
- Analysis and evaluation of evidence, weighing up arguments and understanding multiple perspectives, awareness of the possibilities and limitations of data, methodological rigour
- Ability to notice and describe, and to contextualise, pointing out and unravelling complexity
- Imaginative objectivity, persuasion, diplomacy, negotiation, listening, empathy
- Leadership, independence, initiative, problem solving
- Creative enthusiasm, emotional intelligence, self-awareness, self-management
- Resilience, cultural awareness, adaptability, flexibility and the ability to navigate change

These skills often match up with the 'people and personal skills' or 'soft skills' which are found to be in deficit in employer skills surveys.[21] The skills developed through post-graduate

[20] HESA (2017) *Students in Higher Education 2015/16* www.hesa.ac.uk/data-and-analysis/publications/students-2015-16

[21] Universities UK and CBI (2009). *Future fit: preparing graduates for the world of work*; CBI (2016). *The right combination: CBI/Pearson Education and Skills Survey 2016*, Pearson; UKCES (2016). *Employer Skills Survey 2015: UK results*, UKCES Evidence Report 97; Association of Graduate Recruiters (2016). The AGR 2016 Annual survey

research in AHSS, also make a significant contribution. Research Councils UK and Vitae have looked at the skills which researchers can bring to careers outside higher education, and this work does include a subject specific dimension. This study argued that employers value doctoral graduates' deep specialist subject knowledge, excellent research and analytical skills, capacity for critical thinking, and ability to bring fresh perspectives to problems. Specifically, AHSS doctoral graduates are able to communicate complex information to non-specialists, solve problems, think creatively and be innovative in the workplace.[22]

AHSS graduates make an important contribution to the economy. Three years after graduation, 78% of AHSS students were in further study or sustained employment with average earnings of £28,300 per annum.[23] More specifically, four out of five graduates in practice-based art, design, crafts and media subjects surveyed in *Creative Graduates Creative Futures* project were in paid work, the majority in creative jobs and achieving their career goals.[24] According to a British Council study, over 50% of professional leaders in 30 countries studied humanities or social sciences at university. Among young professional leaders and politicians, the proportion is even higher.[25]

The Case of Languages

One specific example of the value of AHSS skills is languages. The British Academy's Language Programme argued that language skills were crucial for UK security, diplomacy and soft power, international trade and for individual's employability and recommends that they are considered as part of this Industrial Strategy.

71% of UK Small and Medium Sized Enterprises (SMEs) surveyed in the Academy's *Born Global* project agreed that future executives would need language skills. Over half agreed that graduates who only spoke English were at a disadvantage in the jobs market, and that additional foreign languages would be helpful to extend business opportunities in future. [26]

The British Chambers of Commerce found that 62% of non-exporters cite language and 55% cultural barriers when deciding when and where to export.[27] Research for UK Trade and Investment claimed that a lack of foreign language skills is costing the UK up to £48bn a year,

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[22] Diamond, A. et al (2014). *The impact of doctoral careers*, CFE, with supporting fact sheets for arts and humanities, and social sciences doctoral graduates; www.vitae.ac.uk/impact-and-evaluation/what-do-researchers-do. See also Innes, P. and Feeney, D. (2012). *Career paths of AHRC funded PhD students*

[23] Department for Education Longitudinal Education Outcomes data: www.gov.uk/government/statistics/graduate-outcomes-by-degree-subject-and-university

[24] Ball, L., Pollard, E. & Stanley, N. (2010). *Creative graduates creative futures*, Council for Higher Education in Art and Design and University of the Arts London.

[25] British Council (2015). *The educational pathways of leaders: an international comparison*

[26] www.britac.ac.uk/born-global

[27] www.britishchambers.org.uk/assets/downloads/policy_reports_2013/2013%20BCC%20Int%20trade%20Survey%20Factsheet_Market%20Opps.pdf

or 3.5% of GDP.[28] The lack of language skills risks putting the UK at a competitive disadvantage; a situation set to become all the more important in the wake of Brexit. [29]

STEM: Quantitative Skills in the Social Sciences and Humanities

The Academy agrees that STEM skills are vitally important to the Industrial Strategy. But the focus on traditional STEM disciplines is too narrow. The humanities and social sciences provide an excellent context for the development of data and numeracy skills (quantitative skills).[30] Quantitative skills (QS) are vital for all citizens, enabling them to participate more fully in the democratic process, enhancing research in universities and in the work place, and supporting the economy. [31]

The Academy's report *Count Us In* argues that the ability to understand and interpret data, developed through the study of the social sciences, is an essential feature of life in the 21st century: vital for the economy, for our society and for us as individuals.[32] The demand for quantitative skills in the UK workforce will continue to grow, with changes in the nature of work as a result of increasing competitive pressures, the development of technology and growing availability and use of data. Research has predicted that between 2012 and 2017, 58,000 new jobs a year may be created in the UK in the big data marketplace and that 'big and open data' could contribute an extra £147 billion per annum to GDP across the European Union economies by 2020.[33]

Growing numbers of firms are now committed to data-driven decision-making. Such firms have need of employees with hybrid skills sets, combining quantitative, computing and analytical skills with business understanding and the ability to communicate. The development of QS within a range of disciplines beyond traditional STEM subjects offers a valuable opportunity to respond to this need. Our response to question 11 explains how this could be tackled.

The Q-Step Programme

The Q-Step Programme, where quantitative skills are developed as part of social science higher education programmes, is now in its fourth year of operation. It is funded by the Economic and Social Research Council (ESRC), the Nuffield Foundation and the Higher

[28] Foreman-Peck, J. & Wang, Y. (2014). *The costs to the UK of language deficiencies as a barrier to UK engagement in exporting: a report to UK Trade & Investment*, Cardiff University

[29] British Academy (2013). *Lost for words: the need for languages in UK diplomacy and security*

[30] The Academy defines QS as the ability to reason using numbers. This includes an understanding and appreciation of probability, error and inference; confidence in the manipulation of numbers; an understanding of the possibilities and limits of measurement; and understanding the role of evidence in testing and modifying our understanding of social processes.

[31] British Academy (2015). *Count us in*

[32] Ibid.

[33] Mohamed, S. & Ismail, O. (2012). *Data equity: unlocking the value of big data.* Centre for Economics and Business Research; Buchholtz, S., Bukowski, M. & Śniegocki, A. (2014). *Big and open data in Europe: a growth engine or a missed opportunity?* Demos Europa & Warsaw Institute for Economic Studies

Education Funding Council for England.[34] 15 Q-Step centres have been established at universities across the UK, along with three further affiliates. The Q-Step approach is to fully integrate QS training within module or degree programmes in subjects including education, geography, law, linguistics, political science and sociology. The integrated (as opposed to 'bolt-on') approach, which allows contextualisation of quantitative skills, together with a substantial increase in curriculum time devoted to these skills, has been critical to its success, in engaging students and enabling them to understand the relevance of the skills they have developed.

The British Academy recommends the national roll-out of the Q-Step Programme at university level and will look into similar approaches to improve QS in the Humanities disciplines and subsequently develop new measures to target student groups which traditional STEM subjects fail to attract, including females and students from disadvantaged or ethnic minority backgrounds.

14. How can we enable and encourage people to retrain and upskill throughout their working lives, particularly in places where industries are changing or declining? Are there particular sectors where this could be appropriate?

Addressing barriers in the take-up of STEM

The Green Paper rightly notes the barriers to uptake of STEM subjects, and the gender imbalance amongst mathematics students at A-Level. Encouraging the development of QS through the social sciences (as in the Q-Step approach) and humanities also offers the potential to deliver 'STEM skills' to student groups which traditional STEM subjects fail to attract. Students in the social sciences and humanities are predominantly female.[35] The Q-Step Programme at Manchester Metropolitan University is an example of how strong quantitative skills can be gained by students from disadvantaged or ethnic minority backgrounds, without a strong track record in mathematics.

The British Academy has also commissioned a research team, led by the University of Manchester and including researchers from Loughborough University and the University of Edinburgh, to provide an up-to-date systematic review of research into the issue of mathematics anxiety, a key barrier to the uptake of mathematics, and analyse its implications for policy and practice, and identify potential interventions and gaps in our knowledge. The Academy would be happy to discuss this with the Department.

<u>Upgrading infrastructure – pillar 3</u>

15. Are there further actions we could take to support private investment in infrastructure?

Infrastructure investment is vital to sustainable growth. We support the calls made by the LSE Growth Commission for the establishment by Government of an Infrastructure Bank, in order to provide the strategic and long term investment infrastructure requires to enable large projects to flourish. We support the development of the National Infrastructure Commission,

[34] http://www.nuffieldfoundation.org/q-step
[35] UUK Patterns and Trends in UK Higher Education 2015, http://www.universitiesuk.ac.uk/policy-and-analysis/reports/Documents/2015/patterns-and-trends-2015.pdf

but a lack of statutory powers is concerning, regarding its long-term independence and viability. We hope the establishment of the National Infrastructure Commission will reduce the likelihood of short termism with regard to infrastructure projects.

There are persistent inadequacies in UK infrastructure and large-scale investments are required in all areas. This is holding back productivity growth, but also harming our quality of life. The experience of recent decades suggests that Britain has been finding it hard to make informed decisions on our infrastructure needs, and harder still to implement them. The lack of coherent, long term infrastructure strategy has also led to a high cost of capital and problems raising finance.

16. How can local infrastructure needs be incorporated within national UK infrastructure policy most effectively?

Investment (in infrastructure, business investment and housing) is the key to improved performance. A large fraction of investment expenditure is on built structures, particularly for infrastructure. Enabling the construction sector to deliver effectively and at lower cost should be a priority.

17. What further actions can we take to improve the performance of infrastructure towards international benchmarks? How can government work with industry to ensure we have the skills and supply chain needed to deliver strategic infrastructure in the UK?

The announcement of the National Productivity Investment Fund is very welcome, but UK investment in infrastructure remains low by international standards. This needs reconsideration by Government and regular review.

Supporting businesses to start and grow – pillar 4

The UK's tangible capital investment record is a long-standing weakness: investment as a proportion of GDP has been historically lower than that in France, Germany and Japan, and investment has been biased towards real estate rather than capital investment.

The UK's record in relation to R&D has been even weaker. Over the last 30 years, UK business expenditure on R&D relative to GDP has declined while in most advanced countries it has increased, leaving the UK currently below the OECD average.

There are several factors contributing to the UK's weak investment and R&D performance. Short-termism in financial markets and the failure of the investment chain to transform savers' desires for short-term, liquid, safe savings into companies' needs for long-term, illiquid, risky investments lie at its roots. But there is also a problem of the UK corporate sector lacking the stability of ownership observed in other countries required to value the benefits of long-term investments.

The combination of a failure in the transformation process and ownership has resulted in deficiencies in both the financing and governance of UK companies. British companies lack access to the equity funding that is required and frequently available elsewhere to promote long-term investment, and small and medium and sized enterprises (SMEs), which in general have limited access to market as against bank finance, are constrained in their sources of debt

finance. Instability of ownership results in a preoccupation with short-term financial returns in British boardrooms and a failure to prioritize long-term high-risk investments and R&D.

Against this background, the questions raised under pillar 4 of the Green Paper on industrial strategy can be considered:

18. What are the most important causes of lower rates of fixed capital investment in the UK compared to other countries, and how can they be addressed?

The UK has an exceptionally low level of family ownership. The reason for this is the high level of dilution that occurred in the 20th century when family owned firms issued equity to fund growth, particularly through acquisitions.

The inability of UK firms to employ the type of control devices observed elsewhere in the world, including in the US, such as pyramids and dual class shares, contributed to this. The main alternative to family owners as a source of stable ownership in the UK is institutional investors but asset owners are failing in their function as engaged owners to provide the long-term stable basis for corporate investment, as against passive investment in index funds and short-term trading in equity.

19. What are the most important factors which constrain quoted companies and fund managers from making longer term investment decisions, and how can we best address these factors?

In most countries, listed companies combine dispersed ownership with long-term stable holdings. In the UK, regulatory rules have prevented block holders from being able to retain the significant shareholdings required to provide the stability of ownership that exists elsewhere. These rules relate inter alia to disclosure of holdings, access to information, collective engagements and dual class shares.

A combination of exceptionally high levels of dispersion of ownership of large listed companies, absence of significant share blocks held by family or institutional owners, regulatory rules preventing firms from adopting the types of control devices observed elsewhere in the world, and takeover rules restricting companies from implementing defences against takeovers has made UK firms more exposed to external control changes than virtually anywhere else.

20. Given public sector investment already accounts for a large share of equity deals in some regions, how can we best catalyse uptake of equity capital outside the South East?

The demise of local stock markets in the first half of the 20th century concentrated equity investment in the South East.

An institutional structure that restores a close engagement of financial institutions with their local economies is required to re-establish the basis for equity funding outside of the South East. There are examples of institutions that have been and continue to be successful at doing this and there are valuable lessons to be learnt from them.

21. How can we drive the adoption of new funding opportunities like crowdfunding across the country?

A key aspect of the promotion of fintech, crowdfunding and peer to peer lending is their regulatory treatment. There is a risk of them being both a source of financial stability because of inadequate regulation and stillborn because of excessive regulation. The lessons from mobile money around the world are highly pertinent in that regard. In particular, it will be important to recognize the need to regulate crowdfunding on a functional basis to ensure that it does not promote regulatory arbitrage between traditional banking, securities markets and these new forms of funding.

22. What are the barriers faced by those businesses that have the potential to scale-up and achieve greater growth, and how can we address these barriers? Where are the outstanding examples of business networks for fast growing firms which we could learn from or spread?

The UK's problem in financing high tech firms is no longer predominantly at the start-up phase of providing venture capital finance. It is in the later stages of scale-up to "unicorns", i.e. start-up companies valued at more than $1 billion, where the UK still lags behind the US. The failure reflects a combination of insufficiently large amounts of funding at later rounds, less well-developed markets for both primary funding and secondary trading of SME equities, and a tendency for UK firms instead to sell out to acquirers. It is in transitioning from start-up to scale-up where UK firms fail.

Improving procurement – pillar 5

23. Are there further steps that the Government can take to support innovation through public procurement?

We would draw Government's attention to the example of cities and their combined power in relation to public procurement. When cities collaborate, such as via the C40 group[36], they can organise sufficient scale for real choice and innovation through procurement projects. Setting standards for city fleets of buses, for example, can specify standards, efficiencies, drive down cost through scale and reduce uncertainty. Coordination across government and governments can be a powerful tool. Setting standards, as the European Union did on incandescent lightbulbs, can drive innovation and force creative solutions because of government policy.

24. What further steps can be taken to use public procurement to drive the industrial strategy in areas where government is the main client, such as healthcare and defence? Do we have the right institutions and policies in place in these sectors to exploit government's purchasing power to drive economic growth?

Government should consider whether the UK alone provides sufficient scale for value in procurement on health and defence and must explore coordination with other nations on procurement questions such as these.

[36] http://www.c40.org/about

Encouraging trade and inward investment – pillar 6

25. What can the Government do to improve our support for firms wanting to start exporting? What can the Government do to improve support for firms in increasing their exports?

Larger businesses are more likely to be exporters than smaller companies in the UK. This is weak when compared to countries like Germany, where medium sized companies have a higher rate of exports. Access to finance is critical here, and as Government can and should do more to better promote the support they can offer companies to start exporting. UK-based SMEs rely more heavily in general on EU funding than large companies in order to access new markets and make new partnerships. There is thus a question of a loss of important support for UK-based SMEs exports once the UK leaves the EU in terms of funding, access to markets, as well as any additional hurdles created in terms of regulatory and other such barriers.

As much of Britain's economic strength lies within the services sector, great care must be taken that this remains strong in the coming years and that licensing and regulatory constraints do not become a factor in limiting the export of services.

26. What can we learn from other countries to improve our support for inward investment and how we measure its success? Should we put more emphasis on measuring the impact of Foreign Direct Investment (FDI) on growth?

As the UK leaves the EU, it will need to have established arrangements, which are likely to include transitional arrangements, so that the UK remains an attractive destination for inward investment. The UK has a number of negotiations ahead of it in terms of trade, regulation, data protection, customs and so forth which will all affect the ability of the UK to continue to attract and expand the level of inward investment it encourages. The UK Government must be mindful of the interplay between these various factors and how providing certainty is a fundamental bedrock for any decision that is taken with regards to inward investment in the preparations for the UK's withdrawal from the EU, in any transitional arrangements with the EU and for further arrangements with the EU and other potential partners.

Good trading arrangements depend on clarity. Uncertainty and non-tariff barriers can be major blocks on inward investment. Government must focus on the things that can impede inward investment; even annoyances such as bureaucracy at border control can be off putting to investors. Government must be mindful of the varying impediments which can stand in the way of foreign direct investment when drawing up new policy in this area.

Delivering affordable energy and clean growth – pillar 7

What are the most important steps the Government should take to limit energy costs over the long term?

It is crucial that carbon emissions continue to be reduced while the economy continues to produce economic growth. Government must focus on price mechanisms, externalities and standards. Good, well planned city and urban design is critical to efficiency; this principle should be applied to infrastructure more generally.

Energy costs can be minimised subject to meeting environmental objectives and reliability standards by ensuring efficient production, investment and pricing of various services. Limiting costs is not the same as minimising costs subject to various objectives, as equity and fairness may entail some inevitable inefficiency.[37]

Government should also consider the Paris Agreement as an overriding framework. This should aim for a maximum global cap on temperature rise due to anthropogenic greenhouse gas emissions world-wide to 1.5 degrees Celsius. This is a good position and the UK should commit itself to the importance of seeking to maintain this in all its energy policy. The impact of new energy policy should be carefully monitored to ensure that limiting energy costs does not result in some form of "rebound effect" which might lead to increased energy use.

The most important steps will be to invest in energy conservation and efficiency of use in the domestic and commercial (especially small business sectors) so that the existing bundle of energy is redistributed. This policy could be incorporated into the Industrial Strategy's next stage of development. Energy savings reduce overall long term costs, stimulate the efficiency enterprise and job-creating sectors and encourage innovation of efficiency of design and installation of energy saving equipment.

All energy using goods should be designed for really high efficiency levels supported by both clarity and standards to maintain a comparative competitive field. Government may wish to consider other policy ideas, including where possible supporting energy goods being leased to consumers rather than sold, so that their future when no longer in use is brought into the circular economy.

All buildings, especially new housing should be built to low energy "passive haus" standards from 2020 on. This should also apply to water use in the household with high emphasis on high recycling, the use of grey water and the design of water appliances which are very water frugal.

The British Academy Fellowship counts some outstanding energy and climate change experts amongst its number and would be glad to further advise the Government in this area.

28. How can we move towards a position in which energy is supplied by competitive markets without the requirement for ongoing subsidy?

A necessary condition is that all externalities are properly priced or paid for. Currently carbon is priced below its social cost, partly justifying the combination of the carbon price support, emissions performance standards, and subsidies to low-carbon energy. Learning externalities

[37] Newbery, D.M. (2016a). "How do we get to an electricity market with government making as few decisions as possible by 2025?" at http://www.eprg.group.cam.ac.uk/wp-content/uploads/2016/06/D.-Newbery_How-to-deliver-an-electricity-market-freer-of-government-R2.pdf

Newbery, D.M., 2016b. Towards a green energy economy? The EU Energy Union's transition to a low-carbon zero subsidy electricity system - lessons from the UK's Electricity Market Reform, *Applied Energy*, 179, 1321–1330. Doi: http://dx.doi.org/10.1016/j.apenergy.2016.01.046

Newbery, D.M. (2017a). "What future(s) for liberalized electricity markets: efficient, equitable or innovative?" submitted to *The Energy Journal*

Newbery, D.M. (2017b). 'How to judge whether supporting solar PV is justified', under submission to EPRG Working Paper series

from immature technologies similarly require some form of support (as does R&D) if their sources (e.g. off-shore wind, solar PV) are to be competitively supplied at an efficient level.

The Paris Agreement seeks global carbon neutrality by 2075 or thereabouts; designing markets which seek that outcome should be the focus. In the spirit of the Paris Agreement, Government may wish to consider there being a premium on the price of fossil fuel to provide the funding for carbon neutral sustainable development across the world and ideally based on community led low carbon schemes and resilient adaptive measures to adjust for the era of new normal hazards.

29. How can the Government, business and researchers work together to develop the competitive opportunities from innovation in energy and our existing industrial strengths?

There are two related aspects to this question. If the aim is to stimulate innovation in energy for the benefit of mankind and the planet, then there is much to be said for encouraging the formation of a coalition to jointly fund and competitively allocate those funds to promising projects.

Funding should flow to our areas of competitive advantage. If there are no consequential learning spill-overs from such activities, it should be left to competition in the market place. If there are learning spill-overs, then the objective needs to be specified (e.g. develop a capability of delivering off-shore wind, delivering Carbon Capture and Storage) and then competitive tenders for support selected. The main problem is achieving the right balance of R&D support, demonstration projects and large-scale deployment – at present the latter take the lion's share of funds via the renewables targets set by the EU.

See "Public Support for the Financing of RD&D Activities in New Clean Energy Technologies" at http://www.eui.eu/Projects/THINK/Research/Index.aspx

It may be necessary to consider, in time, reorganising the energy markets which favour renewable over fossil fuels, which redistribute saved energy to higher payer users, and then provide a carbon neutral investment fund to support enterprise based small businesses in creating new community based non-carbon energy schemes.

30. How can the Government support businesses in realising cost savings through greater resource and energy efficiency?

Ofgem's Network Innovation competitions are an excellent example where networks have little incentive to innovate if their costs are recovered by regulated tariffs, but it they are benchmarked against best practice and the best practice identified by funding competitions then that barrier can be addressed.

Government could support businesses through redistributing saved energy without the cost of providing new supplies from whatever source. Here widespread adoption of smart meters should be deployed but with the scope for stepped prices for each level of energy use, so that higher energy usage for the same category of user is more highly priced with the income invested into use efficiency.

Cultivating world leading sectors – pillar 8

31. How can the Government and industry help sectors come together to identify the opportunities for a 'sector deal' to address – especially where industries are fragmented or not well defined?

The Academy would urge caution in the development of 'sector deals'; these must be fair and transparent to all parties if suspicion is not to develop that certain industries secure better deals from Government in taxation and incentives.

Sector deals must not fall in to the traps of the past, which often saw industries which were no longer economically viable supported for political reasons, and also saw some sectors supported which would have flourished without Government intervention or taxpayer subsidy.

Government must avoid the past policies of 'picking winners' or propping up declining industries. Economic history would demonstrate that Government is not particularly strong or accurate when choosing which industries to back financially. Government must be a careful guardian of the public finances and must exercise great caution where the potential for protectionist developments are concerned.

This is particularly vital as Britain leaves the European Union, and State Aid rules from the EU no longer apply. The end of the State Aid rules offer some opportunities to the UK, but also many pitfalls. Government must be mindful of these risks and ensure development of robust and rigorous systems for testing and measuring 'sector deals' before they are signed off.

32. How can the Government ensure that 'sector deals' promote competition and incorporate the interests of new entrants?

Government will need to establish robust principles and oversight of sector deals, as well as ensuring they are not creating monopolies, are being fair to new entrants and that they are not entrenching the position of those already dominant in the market. Government must consider a range of measures as how best to do this and may wish to explore international examples. Government may wish to develop explicit criteria for deciding the ways in which it should intervene. Oversight of these deals is critical; a set of rules which are abided by should be in place, with an agency tasked to enforce these rules. A body such as the Competition and Markets Authority may be suitable to fulfil this function, although Government must be mindful of the administrative burden this may place upon such an agency. The improved emphasis by Government and economists on using competition to enhance productivity performance is welcome, and must not be threatened by the risks posed through sector deals.

33. How can the Government and industry collaborate to enable growth in new sectors of the future that emerge around new technologies and new business models?

Overwhelmingly start-ups report the need for good infrastructure and access to capital markets to support the development of their businesses. In conjunction with the development of an industrial strategy Government must place significant focus on developing a national infrastructure plan which will improve Britain's aging transport system and deliver the roll

out of super-fast broadband to all areas of the UK. These, amongst other developments, will help grow the economy and provide the tools needed to boost small companies. It is positive that Government is seeking to improve 'horizontal industrial policy'.

It is positive that Government wishes to see improved innovation across the UK economy, but it must be mindful of what economists' call 'The Valley of Death', whereby successful research and development gets a product to the point of viability, but there is a lag between getting the product to market and technology being ready to enable business to take it up and develop it further. Government must address the weaknesses in the middle of this development chain and address the market failure which exists; innovation policy ought to be shaped to address this prevailing problem.

Government should not be tempted as the UK leaves the European Union to water down protections on employees and work place rights in the drive to help small firms and start-ups to grow, this will fail to grow the economy and will further entrench the real concerns of those who work within the more precarious end of the labour market.

Driving growth across the whole country – pillar 9. Do you agree the principles set out above are the right ones? If not what is missing?

Spatial or 'place-based' policy needs to be informed by a number of features of spatial economics that receive insufficient attention in the Green Paper as it stands.

To attract investment a place has to meet many necessary conditions. These include access to markets, access to suppliers, access to labour with appropriate skills, access to land, utilities, and provision of housing and amenities for employees.

Research literature provides both theoretical foundations and robust empirical findings on the positive relationship between productivity and economic mass (as measured by e.g. employment within a travel-to-work area, or by more general measures of 'connectivity' to economic activity). These results suggest productivity gains of the order of 10-20% in large cities (over 5 million) relative to small (0.5 million). For some sectors, particularly those that are knowledge intensive, these effects and the consequent incentive to agglomerate are considerably larger.

It is important to distinguish between non-tradable activities (sectors producing goods and services for local or national markets) and tradable goods and services (sectors where production is internationally mobile and footloose). Attracting the former to a place is generally easier but is a zero-sum game as the activity is simply displaced from elsewhere in the country. While not all places will have tradable activities, policy is positive-sum only if tradable activities expand somewhere in the country. Several implications follow from these observations:

First, policy that operates on one of these 'necessary' conditions while others are not met is unlikely to be successful. And in places that are doing well constraints are likely to becoming

binding, most obviously in supply of immobile factors, land and housing. Unless these are addressed investment will be lost, particularly damaging if it is investment in tradable sectors.

Second, scale matters. This comes directly from the productivity benefits of agglomeration, and from the fact that larger cities are more likely to be able to provide the wide range of complementary activities and inputs needed to attract internationally tradable sectors. Productivity is high in cities partly because the urban environment acts as a self-selection mechanism.

Third, the location of economic activity is inherently uneven. Clusters form and success breeds further success. It follows that spatial policy has to make spatial choices; framing the policy in terms of 'the whole country' is potentially courting failure.

Two further points are noteworthy for the UK:

1) The population of the UK is predicted to increase by 10 million over the next 30 or so years. Where these people will live and work needs to be factored into spatial policy.
2) The UK is unusual amongst large developed countries in the dominance of its prime city, the small size of secondary cities, and their relatively weak economic performance.

The points above suggest that the strategy should focus efforts on strengthening the larger secondary cities. They have the potential to create scale, particularly if they experience increases in connectivity and/or significant population growth. They provide the platform for deepening existing clusters of activity, and perhaps also developing new ones. They offer the scale to provide thick labour markets and the range of amenities needed to create a magnet of attraction for high skilled workers, and to counter-balance the current disproportionate attractiveness of London.

A focus on developing smart, connected, liveable cities is crucial. Ensuring housing supply rapidly meets demand will fuel growth in other areas, as well as providing work opportunities. Investing in Britain's digital infrastructure will be a crucial asset here, as well as expanding environmentally sustainable transport options. City design is fundamental to efficiency, to having cities where urban dwellers can move and breathe, and to cutting carbon emissions.

35. What are the most important new approaches to raising skill levels in areas where they are lower? Where could investments in connectivity or innovation do most to help encourage growth across the country?

Emphasis on the acquisition and development of basic skills needs to be important part of the school and further education system. The most important policy is to improve the quality of teaching. Research has shown that variation within schools is several times greater than between schools: who you are taught by matters much more than which school you go to.[38] It

[38] See OECD (2009), or Reynolds (2007) for more discussion on "Within School Variation" (WSV).

has been estimated that if the bottom 10 per cent of teachers were as effective as the average teacher over a period of 10 years, the UK's position in OECD rankings would improve to fifth place in maths and third place in reading[39] (Murphy, 2011). Most studies find that improvements in teaching are most effective for disadvantaged pupils[40]. There are around 440,000 teachers in UK state schools and 37, 000 new teachers are trained annually. Therefore, efforts to improve recruitment and training can only act gradually, and must be accompanied by action to enhance training among existing teachers (See chapter 6 in Cassen et al., 2015).

Policies to improve initial teacher training could include making it easier to enter training, but harder to qualify. This would make it easier to assess the quality of potential teachers as more information is known after a period of training. Continued training for existing teachers is important, with a focus of transmitting skills within schools to underperforming teachers. There is a small but growing literature showing that there are interventions that will boost teacher skills. For example, Taylor and Tyler (2012) show that teacher evaluation has an effect on teacher (and student) performance and that the effect persists beyond the evaluation year. Machin et al. (2016) show that consultant support to schools to support teaching using 'synthetic phonics' boosted literacy in the medium-term amongst those with a higher propensity to struggle with reading.

About 30-40% of students do not get a grade C in English and maths which operates like a minimum standard to access many 'level 3' courses. Because literacy and numeracy are important for all students in education and the labour market, it is important that these skills continue to be taught post-16. In fact, there is a strong case for making English and maths compulsory in some form within post-16 education for all students regardless of GCSE grade.

In a dynamic economy one would expect to see skill shortages at a point in time, as supply adapts to the demands of a changing labour market. However, underlying problems in a country can be reflected in persistent problems of skill mismatch and shortage. The overall situation in the UK is one of rising attainment in qualifications, driven primarily by rapid expansion of Higher Education, and yet where skill shortages still exist in a number of areas, due to the education system not always producing the skills that they want or need. Traditionally such skill shortages in the UK have been in terms of intermediate skills, and this still largely remains the case.

Data on skills shortages can be obtained from the series of Employer Skills Surveys (ESS), undertaken biennially and UK-wide since 2011. The most recent data, from 2015, show that, 19% of establishments had a vacancy at the time of the ESS survey, with 23% of these (so 6% of all employers) having a vacancy that was hard to fill due to a shortage of skills available in the external labour market (UKCES, 2016[41]). This density figure (the proportion of vacancies that are hard to fill for skills reasons) differs substantially across sectors. The sectors with the most skills shortages are Electricity/gas/water, Construction, Transport and Communications, and Manufacturing. The sectors least affected by skills shortages are Education and Public Administration.

[39] Latest rankings put the UK at 26th in maths and 23rd in reading.
[40] See evidence given to the House of Commons (2014).
[41] https://www.gov.uk/government/organisations/uk-commission-for-employment-and-skills

A picture of skill shortages can also be obtained from the UK Shortage Occupation list, prepared by the UK Visa Bureau
https://www.gov.uk/guidance/immigration-rules/immigration-rules-appendix-k-shortage-occupation-list
which details the (skilled) occupations currently open to applicants from outside the EEA. This is one definition of shortages - the implication being not enough suitable labour applying from within the EEA. However, there may be regional shortages which can be addressed through another migration route (the Resident labour Market Test). This route accounts for the majority of work visas issued to non-EEA nationals.

These lists are consistent with the survey evidence from UKCES. Many of the jobs where employers find it difficult to recruit are in skilled manual, professional and associate professional jobs, with engineering and healthcare jobs being particularly prevalent in these lists.

There are also persistent regional imbalances in economic performance and concentration of skills in certain regions of the UK. This (mismatch) is a longstanding issue (of at least 35 years). The issue is whether this got any worse over time. Much of the 1980s and 1990s literature finds little evidence that these regional or skill mismatch have got worse (nor have they improved much)

In all of the above, the emphasis throughout is on skills shortages and skills mismatch amongst workers/employees, since this is both the focus of the preamble to this questionnaire and its definitions, and of the questions that have been posed as the diagnosis. However, it is important to recognise that one of the biggest weaknesses identified in poor performance amongst UK firms and organisations (eg in comparison to their US counterparts) is the paucity of good managerial skills amongst UK employers (see, for example, Bloom and Van Reenen, 2007, 2010), partly linked to ownership and, particularly, *primo geniture*. They find that differences in management practices (which are at least in part accounted for by differences in their skills) account for a large part of cross-country total factor productivity differences between countries.

Linking the skill needs of industry to skills provision by educational institutions in local areas requires structures that facilitate cooperation between the needs of employers and educational providers in the same areas – and then the resources and authority to address the identified needs (with accountability structures in place). In developing strategies, it would be useful to have evidence on what works well already, both in Britain and in other countries.

Creating the right institutions to bring together sectors and places – pillar 10

36. Recognising the need for local initiative and leadership, how should we best work with local areas to create and strengthen key local institutions?

BEIS should work with DCLG to renew focus on meaningful funded devolution to regions. An assessment should be undertaken on the devolution settlement in the North West of England within seven – ten years to assess how DevoManc has helped grow the economy of the North West, and to see what lessons can be learned for the rest of the country, while not responding with a 'one size fits all' approach. The importance of fitting policy to match individual place cannot be overstated. A balance must be struck between giving more

decision-making powers down to the local level, while still ensuring a strategic level of oversight for economic growth at the central level. Devolution areas must take account of real economic areas which make sense to local communities; local leaders must be listened to when they express concern or ask questions about Government policy and direction as it affects their prospects for economic development.

37. What are the most important institutions which we need to upgrade or support to back growth in particular areas?

As the LSE Growth Commission reminds us, Government and business research and development are consistently lower than our main peers as a share of GDP. Publicly financed research and development is an important source of UK innovation, and it is also important that evidence exists to suggest this type of research feeds in to the private sector, and stimulates investment there. Universities are a key asset here.

38. Are there institutions missing in certain areas which we could help create or strengthen to support local growth?

In developing combined authorities and supporting new devolution models around the UK, thought must be given also to those areas which fall outside the remit of these new authorities. Pockets of regions not included in devolution deals, particularly in rural areas, may risk falling behind in economic development terms. This should be borne in mind as Britain leaves the EU and a range of regulatory powers return to the UK in areas such as farming, fishing and the environment. Where these powers will be devolved to will have implications for the economy and thought must be given to this question in the development of the industrial strategy.

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