

AcSS/CfSS response to the Industrial Strategy Green Paper Consultation

April 17, 2017

PILLAR I – Investing in Science, Research, and Innovation

Question # 4: Are there important lessons we can learn from the industrial policies of other countries which are not reflected in these 10 pillars?

There is a large social science literature spanning economics, economic history and political science examining the industrial policies of other countries that will have important lessons for the UK. While the importance of context means that comparisons must be made carefully,[1] there are lessons that can be learned. For example, in comparing the industrial policies of the UK, France, and Germany since the Second World War, Sir Geoffrey Owen, highlights the importance of the type of horizontal policies that appear to be embraced in the Green Paper – but he stresses that in order to be successful such strategies must be ‘embedded in a set of policies and institutions which promote competition, encourage innovation, and facilitate industrial change.’[2] The work of Professor Stephen Broadberry and Dr Tim Leunig on the historical impact of UK policies related to manufacturing since 1945 demonstrates the dangers of picking winners by supporting national champions in specific sectors, and the importance of fostering competition across the economy.[3] The experiences of Japan, South Korea, and Taiwan also demonstrate that economic growth and prosperity are more likely to be come from ‘improvements in the macroeconomic, microeconomic, and institutional dimensions of the economic environment, including the retention of highly skilled citizens and, ultimately, reversal of the brain drain.’[4]

There is also clear international social science evidence concerning the importance of government support for curiosity-driven research and blue-skies work. Mariana Mazzucato’s work on the US and the role of the entrepreneurial state points out that, rather than picking winners, the state should define a vision for the ‘direction of economic development and technological change’, and be willing to take risks investing in research the private sector will not fund, in order to enhance innovation.[5] At the same time there is also a body literature from the US and Europe suggesting the need for open innovation and the flow of ideas across sectors and companies,[6] as well as collaborative systems of innovation across national borders.[7] Successful industrial strategies usually involve deeper and more cross-national engagement, rather than less.

In developing its policies for the UK Industrial Strategy the government will therefore need to embrace such cross-national research to capitalise on innovative policies from abroad and to avoid repeating the mistakes of previous UK governments. This will mean engaging with the social science evidence on both the

successes and failures of differing approaches to industrial strategy in countries such as the United States, Germany, France, Brazil, Argentina, Japan, and the Asian Tigers.

Moreover, rigorous social science will be relevant to grappling with every one of the challenges identified for the Industrial Strategy Challenge Fund (see question 6). It will also be vital to understanding the role of central government in what does and does not work for promoting regional economic growth and development. If the What Works Centre for Local Economic Growth is to help with the development of policy *and* to support Local Enterprise Partnerships (LEPs), the government will need to ensure that the Centre is properly resourced not only to conduct its own systematic reviews, but also to commission the necessary research across social science disciplines to bolster the evidence base in these areas, and to increase their capacity to advise regional institutions and local policy makers.

References:

- [1] Paul Nightingale (2016). 'Written evidence from Prof. Paul Nightingale (ISG 0134) to the BEIS Committee Industrial Strategy Inquiry.' 28 September.
- [2] Owen, Geoffrey (2012). 'Industrial Policy in Europe Since the Second World War: What Has Been Learnt?' ECIPE Occasional paper, 1. The European Centre for International Political Economy, Brussels, Belgium. <http://eprints.lse.ac.uk/41902/>.
- [3] Professor Stephen Broadberry and Dr Tim Leunig (2013). 'The Impact of Government Policies on UK Manufacturing Since 1945.' Future of Manufacturing Project: Evidence Paper 2. London School of Economics commissioned by: Foresight, Government Office for Science. <https://www.gov.uk/government/publications/future-manufacturing-impact-of-government-policies-since-1945>.
- [4] Marcus Noland and Howard Pack (2005). 'The East Asian Industrial Policy Experience: Implications for the Middle East.' Peterson Institute for International Economic Working Paper (05-14). <https://piie.com/publications/working-papers/east-asian-industrial-policy-experience-implications-middle-east>.
- [5] Mariana Mazzucato (2015). *The Entrepreneurial State*. New York: Anthem Press, 5.
- [6] See, for example: Henry Chesbrough (2006). *Open Innovation: The New Imperative for Creating and Profiting from Technology*. Boston: Harvard Business School Press.
- [7] See, for example: Jo Ritzen and Luc Soete. (2011) 'Research, Higher Education and Innovation: Re-Designing Multi-Level Governance within Europe in a Period of Crisis.' United Nations University, UNU-MERIT Working Paper Series, #2011-056. <http://www.merit.unu.edu/publications/wppdf/2011/wp2011-056.pdf>.

Question # 5: What should be the priority areas for science, research, and innovation investment?

Social science not only has much to say about how to prioritise science, research, and innovation investment, but can also provide evidence about the socio-economic problems the industrial strategy seeks to remedy and offer international comparisons

about policy interventions that might help solve those problems. In further defining the industrial strategy, the government will need to seek the advice and evidence of social scientists such as urban, transport, infrastructure and environmental planners, lawyers, policy analysts, data analysts, behavioural scientists, economists and economic historians. Achieving the goals set out in the industrial strategy will require a transdisciplinary approach that integrates social science across its parts in order to be successful, including efforts to address current and future challenges set out in the Industrial Challenge Strategy Fund, as well as the identification of future challenges.

Social science evidence will play, for example, a critical role in understanding how to best drive regional growth, how universities can be used to anchor such development and sense of place, and where agglomeration might be most appropriate. New Economy in Manchester, for example, has undertaken a number of important studies on policies covering issues ranging from the entrepreneurship, business innovation, and science to skills and employment at the local and regional level.[8] Mike Emmerich's work highlights the importance of devolving budgetary and other powers to localised combined authorities, whether city regions or larger conurbations, in relation to areas like skills training and transport.[9] The Industrial Strategy Commission chaired by one of the UK's most illustrious economists, Dame Kate Barker FAcSS, will draw on both the science and social science expertise of leading academics from the University of Sheffield and the University of Manchester to make evidence-based recommendations for fleshing out the UK's industrial strategy over the long term.[10]

Social science is also central to attempts to improve productivity in the UK. There is a rich literature on the various causes of Britain's productivity performance and many of the factors are social and economic.[11] Analysis by the LSE's Centre for Economic performance, for example, found that strong UK productivity growth after 1997 was related to 'the growth of education, support for innovation and tough competition policy' at that time.[12] Research from Nesta and the National Institute of Economic and Social Research found that much of the productivity puzzle that emerged following the 2008 financial crisis is due to the stagnation of labour productivity within incumbent firms across sectors, which have not recovered as well as after previous recessions, and that any solution to this puzzle must therefore 'consider economy-wide market factors,' rather than focusing on specific industries alone.[13] Similarly, the ESRC-funded Project on Structural Transformation, Adaptability and City Economic Evolutions at Cambridge found 'a growing imbalance in the productivity performance of cities' across economic sectors in the UK.[14] We also commend the submission of the Regional Studies Association to this consultation, which highlights the importance of local and regional meso-level governance institutions for productivity, innovation and supportive public policy.[15] Finally, we note the important research on the effects of company governance that prioritises short-term rather than longer-term returns to investment.[16] The ESRC's programme of research investments related to boosting innovation and

productivity should be a useful starting place for government to engage with the latest social science research on these issues.[17]

Indeed, much of this research points to changes that will be needed across the UK economy, and not only concentrated in specific geographic populations. In setting budget priorities for 'science' in research inside and outside of the university context, we stress a recognition that the STEM community and social sciences need to work together to address societal challenges, and all disciplines must be properly resourced to do so. Investment in technological priorities alone, with only minimal investment in social institutions and science research relating to productivity, management, organisation, the economy, cities and regions, would ignore half a century of evidence about why the UK has so often failed to build on its initial technical leads and turn those into large scale industries and the social structures that promote them. Ensuring that national and local policy-makers, investors, workers and others have the appropriate incentives and skills to foster the development of initial innovations into sustainable industries requires learning from social science evidence.

Finally, it will be important to ensure that the priorities set for the UK's investment in science, research and innovation in the context of its domestic industrial strategy is developed in such a way that it supports the UK's international strategy in relation to Brexit and the Global Challenges Research Fund (GCRF). At the moment, for example, the ISCF is heavily focused on domestic UK technology and innovation capacity, while the UK's Brexit strategy is (rightly) focused on retaining options for collaborative research, and the GCRF is weighted towards developing such capacity in countries eligible for the UK's Official Development Assistance (ODA). These three distinct strands of work and funding are not necessarily incompatible, but care will need to be taken to ensure that the policies which surround them support their coherence and integration over time.

References:

[8] <http://www.neweconomymanchester.com/publications>.

[9] Mike Emmerich (2017). *Britain's Cities, Britain's Future*. London: London Publishing Partnership.

[10] <http://industrialstrategycommission.org.uk/>.

[11] See, for example, the body of research produced by the Structural Economics and Productivity Programme of the National Institute of Economic and Social Research at: <http://www.niesr.ac.uk/research-theme/structural-economics-productivity>.

[12] Dan Corry, Anna Valero, and John Van Reenan (2011). 'UK Economic Performance Since 1997: Growth, Productivity and Jobs.' Centre for Economic Performance, London School of Economics.
<http://cep.lse.ac.uk/pubs/download/special/cepsp24.pdf>.

[13] Rebecca Riley and Chiara Rosazza Bondibene (2016). 'Sources of Labour Productivity Growth at Sector Level in Britain, After 2007: A Firm Level Analysis.' Nesta Working Paper 16/01 April 2016. www.nesta.org.uk/wp16-01.

[14] R. L. Martin, P. Sunley, B. Gardiner, E. Evenhuis and P. Tyler (2017). 'Structural Change and Productivity Growth In Cities.' Working Paper 3, ESRC Project on Structural Transformation, Adaptability and City Economic Evolutions (ES/N006135/1), Department of Geography, University of Cambridge.

[15] Regional Studies Association (2017). Response to the Industrial Strategy Green Paper Consultation.

[16] See for example: Martijn Cremers, Ankur Pareek and Zacharias Sautner (2017). 'Short-Term Investors, Long-Term Investments, and Firm Value,' (March 14). Available at SSRN: <https://ssrn.com/abstract=2720248>; and Maria Maher and Thomas Andersson (1999). 'Corporate Governance Effects on Firm Performance and Economic Growth.' Paris: Organisation for Economic Cooperation and Development. <https://www.oecd.org/sti/ind/2090569.pdf>.

[17] See: <http://www.esrc.ac.uk/news-events-and-publications/news/boosting-innovation-and-productivity/>.

Question 6: Which challenge areas should the Industrial Strategy Challenge Fund (ISCF) focus on to drive maximum economic impact?

The social sciences can play an important role in addressing each of the eight challenge areas already identified by government, namely: bioscience and biotechnology; leading edge healthcare and medicine; manufacturing processes and materials of the future; smart, flexible and clean energy technologies; quantum technologies; robotics and artificial intelligence; satellites and space technologies; and transformative digital technologies. All of these challenges will need the contribution of social scientists to help ensure their success, refinement, and integration into local economies and societies.

The social sciences have played a historically critical role in advancing healthcare. Innovations in healthcare delivery and medical services, assessing and evaluating the utility of novel interventions, and understanding the social determinants of human health and behaviour depend on the contributions of behavioural scientists, policy and data analysts, and health delivery scientists to be successful. The gains from advances in medical technology are not always the most cost-efficient,[18] and in effecting wider population change as well as change in medical institutions, social sciences can be crucial.[19]

Similarly, behavioural scientists, economists, public opinion analysts, and lawyers will need to be involved in public discussions and decisions over the adoption and development of artificial intelligence (AI) and robotic technologies. For this reason, Cambridge University's Leverhulme Centre for the Future of Intelligence is interdisciplinary and collaborative. It is supported by Cambridge's Centre for Research in the Arts, Social Sciences and Humanities, involving social scientists in the important technical and practical questions raised by AI. Similarly, economists, financial services, patent lawyers, and business analysts will need to be involved for the successful commercialisation of such technology.[20]

When it comes to meeting challenges like designing flexible and clean energy technology, the STEM sciences cannot work by themselves if they are to be successful. Oxford Energy, for example, has pointed out that ‘the challenge of devising policies and regulatory interventions that will enable this to be done in an economically efficient, politically feasible, and socially and ethically acceptable manner is even greater’ than the ‘technical challenge.’[21] Engagement with the social sciences will also be particularly important in the additional challenge area currently being considered on integrated and sustainable cities, where there is a large body of social science evidence available on cities both in the UK and abroad. The ESRC-funded City Evolutions project, for example, brings together economists and geographers from Cambridge, Southampton, Aston, and the Centre for the Cities to look at how 70 UK cities have changed and adapted to the fundamental economic shifts of globalisation and deindustrialisation, by collating and examining new data on these cities to better understand issues like productivity and unemployment.[22] The Urban Age Programme at LSE Cities, jointly run with Deutsche Bank’s Alfred Herrhausen Gesellschaft, collates comparative economic, environmental, social, and spatial data on international cities, with research on issues like the connection between transport and cities’ economic resilience and social inclusion.[23]

The ISCF should also seek to fund ongoing research on UK innovation and other policy initiatives that might help to unlock the nation’s economic potential. The government could, for example, back a UK equivalent of the US Science of Science and Innovation Policy Program (SCISIP). Funded by the National Science Foundation, SCISIP ‘supports research designed to advance the scientific basis of science and innovation policy’, bringing together ‘researchers from all of the social, behavioural and economic sciences as well as those working in domain-specific applications such as chemistry, biology, physics, or nanotechnology.’[24] Such an endeavour would help build up UK innovation capacity, and help to underpin the policy and strategy behind the ISCF and UKRI.

References:

- [18] Rebecca Masters, Elspeth Anwar, Brendan Collins, Richard Cookson and Simon Capewell (2017). ‘Return on Investment of Public Health Interventions: A Systematic Review.’ *Journal of Epidemiology and Community Health* (29 March).
<http://jech.bmj.com/content/early/2017/03/07/jech-2016-208141>.
- [19] Campaign for Social Science (2017). *The Health of People: How the Social Sciences Can Improve Population Health*. London: Sage.
https://campaignforsocialscience.org.uk/wp-content/themes/cfss/assets/images/the_health_of_people.pdf.
- [20] For an example of such work, see:
http://www.cbi.org.uk/index.cfm/_api/render/file/?method=inline&fileID=65F7E3B8-3109-4A8A-AB76029C857A4DB9.
- [21] <http://www.energy.ox.ac.uk/wordpress/economics-policy-politics/>.
- [22] <http://www.cityevolutions.org.uk/about-the-project/>.
- [23] <https://urbanage.lsecities.net/search?theme=%5B18%5D> and
<https://urbanage.lsecities.net/search?theme=%5B20%5D>.

[24] <http://www.scienceofsciencepolicy.net/SciSIPCentral>.

PILLAR II – Developing Skills

Question 10: What more can we do to improve basic skills?

Number and data skills are vital to improving the UK's capacity for research innovation and growth in the future, with improvements needed both to make basic skills more widespread, and to increase the numbers with advanced and technical skills. This will require changes in education before the stage of technical education. Better number and data engagement should begin in primary school, embedding number and data skills across a range of subjects and disciplines to improve the ability of students to use them to solve problems of all sorts at a young age. We recognise that there is a shortage of maths teachers; this may need to be considered among the priorities of a future migration regime for skilled applicants who are in short supply in the UK.

Beyond improving skills for those proceeding to technical education, there are particular concerns about the need to bolster number and data skills for those not going on to pursue STEM careers, but who will be tomorrow's business, government, and civic leaders. Social science graduates, for example, take roles in the service sector that makes up almost 80% of the UK economy, and play an important role in an industrial strategy that intends to support business, drive growth across the country, and cultivate world-leading sectors in areas like business and finance.

In policy and practice in the public and private sector, virtually every major challenge faced by the UK requires social science if it is to be tackled effectively. Recent years have also seen an explosion in the availability and use of data (ranging from 'big data' to individual data, often captured in routine administrative and operational systems) which have transformed the information available to decision-makers in public policy, healthcare, and the private sector. Yet most social science disciplines face difficulties in ensuring engagement with sufficiently deep quantitative data skills. AS level maths intake is falling, attributed to the decoupling of AS and A levels maths and the decision not to fund schools for those doing AS maths. Recent revisions to the quantitative component of social science A levels are welcome, as is the Q-Step programme,[25] but cannot alone fill the gap. Core maths may help but we strongly urge government to make an exception to funding AS maths to deepen the number skills of the large numbers of students who will not go on to STEM subjects or technical education.

Finally, most of our successful international competitors have a far more broadly based system of secondary education, with most students expected to study both STEM and non-STEM subjects (in varying proportions) through secondary school. We urge government to consider how to broaden education in such a way that

more students might transfer into STEM subjects after 16, and that more non-STEM students have an understanding of number, data and science. Re-instating at least some AS levels (as stand-alone models for which schools receive teaching funds) would be a start.

References:

[25] The Q-Step programme is designed to create a step-change in quantitative social science training in the UK, and is funded by the Nuffield Foundation, ESRC, and HEFCE. See <http://www.nuffieldfoundation.org/q-step>.

Question # 11: Do you agree with the different elements of the vision for the new technical education system set out here? Are there further lessons we can learn from other countries systems?

We welcome proposals for a new technical education system in the UK, but would highlight that there are lessons that need to be learned from social science before refining and implementing such proposals. In the most recent OECD review of vocational and educational training in England and Wales, it was pointed out that one of the challenges was that in developing policy, the government paid ‘inadequate attention to international experience’[26] – though there is information on which the government can base sound judgments. The 2010 OECD *Learning for Jobs* report offers insights on such policies from 17 countries, ranging from the engagement of such systems with stakeholders to help match skills to the national labour market. Professor the Baroness Wolf of Dulwich’s November 2016 report *Remaking Tertiary Education* examines the differences between the current UK system and the availability of technical education through different routes in countries such as Germany, the Netherlands, US, Canada, and Finland.[27] Baroness Wolf found serious concerns with the sustainability of the current UK model that may require a wider series of policy measures than those currently outlined in the Industrial Strategy Green Paper, including the system of loan provision for tertiary education as a whole, which affects uptake of qualifications below university degree level.[28] There is also a conflict between the short-term labour goals of many employers and the need to have a highly structured educational component if a system of technical education is to result in a more highly-trained workforce.[29]

No matter how the proposals for technical education are developed, it will be important to ensure the commitment of employers as stakeholders in the process and to take a longer term view of higher level learning. Social science data and analysis will need to be involved in the design of any tertiary education framework if a longer term perspective is to be adopted, which takes into account the socio-economic factors affecting the relationship between the education system and labour market in the UK.

References:

[26] <http://www.oecd.org/edu/skills-beyond-school/43947857.pdf>, 5.

[27] <http://feweek.co.uk/wp-content/uploads/2016/11/remaking-tertiary-education-web.pdf>.

[28] <http://feweek.co.uk/wp-content/uploads/2016/11/remaking-tertiary-education-web.pdf>.

[29] <http://feweek.co.uk/wp-content/uploads/2016/11/remaking-tertiary-education-web.pdf>.

PILLAR X – Creating the right institutions to bring together sectors and places

Question # 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 drive growth across the country?

It is much easier to raise skills when people think there is a chance to get work as result of those skills, and the government will need to fully engage with the social science research in this area. In a report on UK apprenticeships that is part of the larger EU-funded longitudinal study Reducing Early School Leaving in the EU, Professor Louise Ryan FAcSS and Magdolna Lorinc found that UK apprenticeships face a number of challenges. These include the ‘lack of information available to school leavers about apprenticeships, the low esteem of this learning pathway, financial limitations due to low pay for apprentices, low quality or uneven training in some programmes, and a vocational education system that many find difficult to navigate.’[30] They suggest, for example, that training providers should be better monitored, schools need to do a better job of providing information on apprenticeships and encourage young people to move on to qualifications at Level 3 and beyond, the application system should be nationally coordinated through a single portal like UCAS, and support higher pay for apprenticeships among other policies.[31]

References:

[30] Louise Ryan FAcSS and Magdolna Lorinc. The Opportunities and Challenges of Apprenticeships in England: Findings from New Research. University of Sheffield and Middlesex University.

[31] Louise Ryan FAcSS and Magdolna Lorinc. The Opportunities and Challenges of Apprenticeships in England: Findings from New Research. University of Sheffield and Middlesex University.

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

As a body, the social science and higher education communities can help policy makers to better support research and foster innovation in local areas by helping build capacity for collaborative working across the boundaries between research, commercial businesses, government and civil society. Universities in these regions and core cities also have a critical role to play in contributing to the realisation of local economic growth and development, as well as being an invaluable source of advice, expertise, and strategic insight.

Newcastle University, for example, played an instrumental role in the cities foresight process and the creation of a City Futures Development Group for Newcastle. Universities can also help to promote pan-regional cooperation among cities within these regions that may have traditionally been focussed more on competition with

one another, and can serve as economic engines in their own right. Collaborations like the N8 Research Partnership between the Universities of Durham, Lancaster, Leeds, Liverpool, Manchester, Newcastle, Sheffield and York have demonstrated, for example, how such cooperation can strengthen regional research bases and maximise impact (<http://www.n8research.org.uk/>). But realising this potential will require more specific linkage of BEIS's Science and Innovation Audits, to the objectives of the new Industrial Strategy, incorporating a recognition of the need for social change, as well as technological innovation.

Partnerships among universities, like the N8, and catapult centres can act as powerful accelerators. Yet, such partnerships should extend beyond research intensive universities and there should be a recognition that, while some regions may be well placed to focus on cutting edge technology, others may instead find their competitive advantage in acting as a test-city for innovative policies and interventions to tackle 'grand challenges, such as aging and sustainability' that 'are local problems with potentially global markets.'^[32] While universities will not be able to support innovation in a particular local economy if other factors necessary to promote local development and entrepreneurship are not present, the government should aim to support and strengthen 'the role of universities as anchor institutions in left behind city regions [as] an important component of a place based innovation strategy.'^[33]

References:

[32] John Goddard FAcSS (2016). 'Left-Behind Places Need New Ideas and New Money.' *Research Fortnight*, 7 December.

[33] John Goddard FAcSS (2017). 'Towards a Place Based Science and Innovation Strategy for England: A Role for Universities?' A paper for the BEIS Advisory Group on Smart Specialisation and Innovation Audits, p. 8, 15.