

THE MOST IMPORTANT CHALLENGES OF OUR TIME

Positioning Britain to succeed and priorities for research and innovation

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FOREWORD

I am delighted to introduce this paper written by my predecessor as President of the British Academy, Lord Stern, and the Academy's Chief Executive, Alun Evans. This is a robust and insightful analysis which serves as a valuable resource to everyone with an interest in our nation's future, and particularly those charged with shaping and scrutinising policy and legislation.

In an age of vast technological change, we stand at a cross roads. If we are to keep pace, we must both seize the opportunity and rise to the challenges of our times. Critical to this is how we use the resources at our disposal and this paper makes a compelling case for the contribution of the humanities and social sciences towards delivering an effective industrial strategy.

As you will read, there is huge opportunity for growth and productivity in our service sector, which already accounts for some 80% of our GDP. At the heart of the most productive sectors such as the creative industries and financial, legal and professional service are graduates from the disciplines of social science and the humanities.

There are many great questions facing humanity today: How can we make our cities good places in which to live? How can we ensure that we live well as we age? How will automation affect the workforce? We must approach these questions with rigour and by drawing on all disciplines. These are as much human and societal challenges as technical and scientific ones and require the investment in research and researchers that is called for in this paper.

The combination of the humanities and social sciences working together with science and technology can help us all to understand and shape our economic and social future.

It will take fresh perspectives and many minds to respond to the complex and interconnected questions that face our society and the debate about our future. The British Academy - as the national Academy for the humanities and the social sciences - is willing, able and keen to help shape that debate.

Professor Sir David Cannadine, President, British Academy

SECTION 1. THE CHANGING INTERNATIONAL ECONOMY; THE STRENGTHS OF THE UK; ITS CHALLENGES AND OBJECTIVES: FOUNDATIONS OF STRATEGY.

1. Britain stands at a crossroads. Over the next five years the country will be making momentous and far-reaching decisions, which if taken strategically and wisely, can position the UK well in relation to its competitors and go some way to tackling the most important challenges of our time. Not just to respond to Brexit and to the growth of globalisation – but still more fundamentally, to exploit and manage opportunities, risks and disruptive changes brought about by technological transformation. The nations that best respond to these challenges will be those that will progress and lead.
2. The challenges are structural and long-term but many of the issues are already with us. Action should not only have a clear focus on the UK's future for the coming decades, it must also produce results quickly. For example, productivity and place are clearly long-term issues, but it is also important that we see improvements in the next few years both for living standards and competitiveness as we leave the EU, and for social cohesion. In summary, the UK does indeed require an industrial strategy but it must be one that is based on a clear understanding of the forces at work and embedded in a broader economic and social strategy for the nation as a whole.
3. A serious economic and social structuring requires an analysis of (i) where the world is going, (ii) the UK's strengths and problems and (iii) identification of key objectives to pursue as a nation. It should be clear that such an analysis requires social sciences and humanities to be centre stage.
4. We must, however, begin with an understanding and analysis of these extraordinary times, and this means starting with technology. It brings great opportunity but its remarkable pace and scale also imply dislocation. The great economist and historian of technological change, Chris Freeman, identified five waves of technological change: the first was the industrial revolution, particularly around textiles, in the late-18th century; the second saw the age of steam and railways from the mid-19th century; the third was the age of steel and electricity during the later-19th century; then came the age of oil, cars and mass production and more recently the age of information and communication in the later-20th century. We are now in the midst of further rapid change across a number of interwoven dimensions – notably in artificial intelligence, in biotechnology, and in materials. This sixth wave is moving at lightning pace. The multiple and mutually-reinforcing dimensions we are witnessing present spectacular opportunities. But, like the waves that preceded them, they also entail fundamental dislocation and the redefinition of work and of other activities. In this case, the pace and nature of change appear unprecedented, as do the opportunities and potential dislocation.
5. These technological changes coincide with rapid transformation of the international division of labour, the rapid movement of ideas, strong trade and substantial migration – in other words, globalisation. These forces are interwoven and have led to precarious livelihoods for many and great wealth for a few. At the same time, the rapid growth of the last 70 years, with energy dominated by fossil fuels, together with

pressure on land and forests has generated great risks of climate change, which for many will potentially be existential. They have brought severe pollution, which kills millions a year around the world and around 40,000 a year in the UK. Geo- and local politics have also been transformed by these changes and many are accelerating, not slowing. The management of such change is almost wholly in the social, economic and political spheres and how we perform will have immense consequences for the future of this country and the world. What is clear amid all this change is that any successful strategy for the UK must be based on an analysis and understanding of these issues and forces and how they can be managed. The nature of the driving forces, the centrality of economics and politics to their management, together with the role of services in the economy, make it clear that the skills and insights of humanities and social sciences must be at the heart of the analysis and perspectives necessary to formulate an effective strategy for the future of the UK.

6. Why the focus on services? Because the UK's strengths lie predominantly (and more than before) in the service sector. The service sector accounts for over 80% of the UK's Gross Domestic Product (GDP), while manufacturing accounts for around 10%. Over 80% of the UK workforce was employed in the service sector in 2011. It would be folly, therefore, to assume that we can compete in terms of developments in manufacturing alone, important though these may be. Even if we were to achieve a (highly ambitious) growth rate of 5% in that sector, it would equate only to a 0.5% overall increase in GDP. Large overall net gains in growth and productivity cannot be achieved without significant growth in services. So, the UK must play to its strengths. It must invest where return is greatest.
7. The UK is a world leader in education and research. Its service sectors are a success, playing a crucial role in the UK's current and future economic growth, driven not only by information technology and digital growth, but also by our creative industries. These sectors flourish, many of them in large measure by employing people with knowledge and skills from the humanities and social sciences – skills of critical thinking and analysis, problem solving, creation of ideas, writing, objects and insights, negotiation and communication, teaching and listening, performing arts and speaking other languages. It is in the combination of these, with our great strengths in science and technology, that our outstanding comparative advantages and opportunities lie.
8. The UK's most productive sectors include the following:
 - Creative industries and associated technologies (film, TV broadcasting, theatre, art and the computer games industry...)
 - Financial services and associated sectors
 - Legal and associated services
 - Professional services (accountancy, architecture etc.)
 - Health and health-related products and services
 - Universities and research related sectors
 - Advertising.

This is not to dismiss some parts of the manufacturing sector where the UK is strong. Far from it. But we make a profound mistake by focussing only there when they constitute a small fraction of the economy and we have such strong achievement and potential across the service sector.

9. By putting the humanities and social sciences together with science and technology, including the life-sciences, we can be able to understand and shape our economic and social future. Together, they contribute to tackling the great stresses in the domestic economy, as well as the international nature of so many of the cross-cutting challenges. From security to health, from climate change to demographic change, from technology to artificial intelligence, combining the humanities and social sciences with science and technology offers stronger and more innovative responses to seemingly intractable problems compared to a single discipline approach to “solutions”. If we drop any of these disciplines from our analytical approaches, we risk serious consequences.
10. Following the EU referendum, it is vital that we build a workforce of the future that is underpinned by a whole range of skills in order to remain a modern, bold and global nation. The government’s commitment to an active industrial strategy, including a £2billion a year increase in investment in research and innovation by 2020-21, is therefore a welcome first step. It will help close the gap between the level of investment in research and innovation by the UK and that of other leading economies with whom we must compete. Future growth will be driven principally by innovation which, in turn, depends heavily on research and development – not least in the humanities and social sciences.
11. At the same time as we are investing in research and innovation, we must, as Brexit proceeds, redefine our economic and political relationships with the world as a whole. Here again, the humanities and social sciences will be vital in understanding the historical, present and future nature of these relationships.
12. To realise fully the Government’s vision for the industrial strategy, we need to exploit the insights and benefits that the arts, humanities and social sciences have to offer. If we do not, we risk developing a narrow strategy that distorts and destabilises the UK’s drive towards geographically-balanced and sustainable growth. Innovation, productivity and competition all require an understanding of human behaviour, including its influence upon the take-up of key technologies. The nexus between technology and creativity is increasingly recognised as the driver for the industries of the future. It is also the most likely lever for promoting regional growth beyond London and the South East, and helping to regenerate cities and foster dynamism so as to help even out disparities in all the nations of the United Kingdom.
13. The British Academy, together with the other national academies, has recommended that the Government set a target of 3% of GDP for combined public and private investment in R&D. Up to 1% of this should come from public sources. A major part of this investment should be targeted to harness the dynamism and innovative potential of the UK’s high performing service. The predominance of this sector and its potential

for increasing productivity should be crystal clear, as should its dependence on skills, innovation and research from the arts, humanities and social sciences.

14. *A strategy for the UK* involves three crucial action areas:

- Sectors where we have a comparative advantage (as above, paragraph 8)
- Cross-cutting crucial factors or facilitators for which research has shown investment and focus are crucial for productivity and growth. For example, competition, openness, skills, infrastructure, innovation, management
- An identification of and action on the key economic and social issues driving change in our times and in the future (these are the subject of the following section).

Attention to all three must be crucial parts of research and innovation and at the heart of the agenda of UKRI. The first two are sometimes called the *vertical* and *horizontal* elements of an industrial strategy. It is the three together that form the basis for a strategy for the UK and the research and innovation necessary to drive and guide it.

SECTION 2. FIVE KEY RESEARCH PROGRAMMES

15. How can the social sciences and humanities best respond to this challenge? We have already identified the vertical and horizontal elements of an industrial strategy. UKRI's role in investing in the identified sectors (the verticals) by supporting the very best of UK researchers will be essential. UKRI can ensure funding streams support research in these sectors as well as in science and innovation and in the key horizontals. In addition to the already identified strands for investment via the Industrial Strategy Challenges Fund (ISCF), the British Academy has identified the following five great challenges of our time as priorities for research. They are based on serious evidence and analysis from the humanities and social sciences. They are also topics where collaboration with science and technology, including the life sciences, will be of fundamental importance. Virtually all the major problems of our time require such collaboration.

- **Cities, city regions and regional policies.** A new city-challenge-research initiative funded through ISCF can help identify the most effective levers of action and research required to support sustainable growth in cities. We know that cities can be great drivers of innovation; that is a powerful lesson of new economic geography and its emphasis on economies of agglomeration. But they can also entail difficult downward spirals, which only good policy and economic and social investment can arrest. The research and action should include the role of cities and city regions in reviving the housing market. A critical driver of research in this programme should be collaborations between local government, business and universities. Universities and within them, those with humanities and social science skills and knowledge, are major contributors to local, regional and national growth. A new funding stream should be available to support the most innovative collaborations between these three partners. These should focus on the contribution that the sectors make to civil society and to promoting growth, in particular, in underperforming geographical parts of the UK.

- **The integration of health and health care.** How can the humanities and social sciences support the understanding of, and policy making for, the changing role of the NHS as it will increasingly concentrate on fewer centres of excellence – many in city centres? How can the much-discussed integration of the NHS and social care move forward? We know that serious policy must put these together but research on how best to do so is critical and the social sciences and humanities will be at its core. Again, collaboration with the life sciences and digital and other technologies will be critical, but economic and social issues – including the current state of communities, incentives, wages, skills, costs, outcomes and so on – are at the heart of these challenges.
- **Pollution, environment and climate.** Action on pollution and climate, and the environment more generally, is now extremely urgent. It is estimated that around 40,000 people die in the UK each year as a result of air pollution (more than 20 times the number of those killed in road accidents). The political, social and legal pressure is mounting. Further, the next 20 years will be decisive on climate change, where the UK has been a world leader. There are enormous opportunities to improve well-being in our cities, to make them places where we can move and breathe, and move to a low-carbon economy *at the same time*. This is the cleaner, more efficient, more attractive growth model of the future. It can revitalise our economy and cities and make them much more productive. We can improve international trade and investment and our global reputation and relationships. Again, the interweaving of the humanities and social sciences with science and technology will be crucial. This has the potential to be a growth story in the shorter-to-medium-term via investment in sustainable infrastructure, and to unleash a Schumpeterian wave of technological change in the medium run. We note that an attempt at high-carbon growth in the longer term would derail itself on the very hostile environment it would create (as recognised in the UK climate legislation and targets and in the Paris COP21 agreement).
- **The ageing society.** How can we best respond to and benefit from the powerful effects and forces of demographic change? UKRI should support a major programme of activity to tap into the increased opportunities that could come from an ageing society. Older people can be much more productive in the economy and society and we can be much more productive in the care of old people. The humanities and social sciences can propose effective actions and policy to encourage lifelong learning, help recognise that there can be growth-potential in a number of elements of an ageing society, and improve the ways in which social services, the health service and other local agencies collaborate, and in doing so exploit the great potential benefits of new technologies.
- **The role of technology and globalisation in the future of economic structure and employment.** Many or most of the fundamental changes in our economy and society come from the joint impacts of technology and globalisation. The major changes are not usually related to globalisation alone. To think that they are is a mistake with potentially harmful consequences for policy. For example, the change in employment structures and practices that will emerge from greater automation and the fact that

other technologies, including some robotics and AI, will generate new jobs in some technologies while leading to job losses in semi-skilled and unskilled activities, but also in activities regarded as skilled, such as accountancy. This presents opportunities to be realised and dislocation to be managed.

These five topics are inextricably linked: indeed the linkages should be key to any research and innovation programmes. By putting them together we have a real chance to tackle the big problems, current and future, and turn them into a strategy for success for the UK. They should be fully interwoven with, and integrated into, industrial strategy.

SECTION 3. CONCLUSIONS

16. Evidence shows that outstanding talents, researchers and skilled people will, in turn, attract commercial investment. Further, public investment in R&D can help leverage private and charitable funding. Indeed, we see across countries that a pound or dollar of public R&D usually comes with twice that amount from outside the public sector. A key task for the Government is to ensure that the industrial strategy incentivises higher levels of collaboration between the whole research base, including the humanities and social sciences, and private sector R&D investment from home and abroad. We should harness the dynamism and innovative potential of the UK's high performing service sectors.
17. The humanities and the social sciences offer invaluable skills to modern economies – skills demanded by employers in fields as diverse as financial services and other professions, creative and digital companies, museums, theatres and galleries, teaching, and health care. These skills underpin a growing proportion of the innovation that drives the competitiveness of UK firms. A BIS report said in 2014 that: “too narrow a focus on STEM skills can be detrimental. Most importantly, a solid base of business management and entrepreneurial capability is needed to bring innovation to market effectively and profitably.” Let us be clear, investment in STEM skills are vital. But just as important, and complementary, are those in the humanities and social sciences.
18. Growth depends on innovation and improving productivity. Current ideas on the industrial strategy appear to focus heavily on industrial sectors. The evidence is strong that, in order to realise the potential of the UK to prosper and to rise to the challenges of our times (see Section 2 above), there should be both further public investment into research in the service sector and greater recognition of the ways in which expertise in the arts, humanities and social sciences are key to innovation, creativity, collaboration and competition and, through them, to economic growth for the economy as a whole. They have much to teach us too about cohesiveness, identity and community.
19. The challenges of Brexit and the opportunities afforded by the new industrial strategy now offer the chance for Britain to invest in a targeted and strategic way, that can best support all our growth industries and foster their competitiveness at a time of unprecedented international geopolitical change. In addition to the investment already

announced as part of the Industrial Strategy Challenge Fund, the British Academy would support further development of the following five topics (see Section 2 above):

- Cities
- Health and health related policy development
- Pollution, environment and climate
- The ageing society
- Technology and globalisation and the future of employment.

It is in these areas that the humanities and the social sciences can provide fresh creative thinking and new innovative policy initiatives based on the best evidence and expertise available. Investing in these disciplines, alongside science, new technologies and innovation will be of significant long-term benefit to the UK economy.

20. These areas constitute *the third leg* of a strategy for the UK. The first two are the key sectors (see paragraph 8 above) or *vertical* drivers, and the *horizontal* drivers (including competition and openness, skills, infrastructure). Together they can provide a coherent, dynamic and productive framework for research and innovation for a better UK; not only a more dynamic and productive economy but a more cohesive community. A future based on evidence, reflection and analysis. A potential for a new age of enlightenment.

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