

Science Research and Innovation Policy – Collaboration is critical to the delivery of the UK's Industrial Strategy.

Introduction

In November, the Government published its ambitious modern Industrial Strategy, setting out a long term approach to increasing the productivity and earning power of people throughout the nation. It sets out how we are building a UK that is fit for the future – how we will help businesses create better, higher-paying jobs in every part of the country with investment in the skills, industries and infrastructure of the future. Science, research and innovation are central to driving productivity, and this is therefore one of the five key drivers of this modern Industrial Strategy.

The UK's success has been founded on the back of a great history in developing and deploying innovative ideas, from the establishment of the railways through to the discovery of graphene. The UK continues to be at the forefront of research and innovation today – top in measures of research excellence and home to many of the most innovative companies in the world.

But the UK's significant innovation strengths are not entirely reflected throughout the economy. Our productivity is not as high as our competitors and overall we currently invest less than comparator economies in Research & Development as a proportion of GDP.

The Industrial Strategy makes the ambition clear – we want the UK to be the world's most innovative economy. A major step towards achieving this is the policy announcement to increase overall investment in Research & Development - public and private investment - to 2.4 per cent of GDP by 2027, and 3 per cent in the long term. As a first step, Government has already committed to increase public funding for R&D from around £9.5bn in 2016/17 to around £12.5bn in 2021/22. In itself, this investment will be an important element towards achieving the ambition, which will be underpinned by the development of a roadmap in partnership with industry and other partners. Furthermore, this investment represents a critical long term signal to domestic and international investors.

The Industrial Strategy also set out four **Grand Challenges** – areas where the UK can be at the forefront of future industries. Grand Challenges will seek to galvanise action across disciplines and different sectors of the economy. They include:

- Putting the UK at the forefront of the artificial intelligence and data revolution;
- Maximising the advantages for UK industry from the global shift to clean growth;
- Becoming a world leader in shaping the future of mobility; and
- Harnessing the power of innovation to meet the needs of an aging society.

In recent years, research and innovation policies have sought to increase levels of collaboration, with some considerable success. Nonetheless, achieving the 2.4 per cent goal within a decade and making progress with our Grand Challenges will require us to increase collaboration further and in a number of ways:

- Collaboration between disciplines.
- Collaboration across the economy – including between universities, research and innovation bodies and businesses;

- International collaboration – UK has a strong history of international collaboration in the area of research and innovation. We will seek to maintain and build on this further.

Interdisciplinary Collaboration

The scale and complexity of many of the challenges we face require collaboration between the different academic disciplines – for example, between social science, engineering, the life sciences and medicine - and require innovation across business and industrial sectors.

The establishment of *UK Research & Innovation* (UKRI) is an explicit recognition of this need to collaborate across disciplines. UKRI will provide a major opportunity to increase overall coherence, building on the excellent reputation already established by the constituent councils. It will allow us to take a more interdisciplinary approach domestically and when collaborating with international partners.

This approach is further demonstrated through the introduction of the *Strategic Priorities Fund* set out in the Industrial Strategy. The fund builds on ideas set out in Sir Paul Nurse's review¹ around a 'common fund', supporting multi-disciplinary and inter-disciplinary programmes – priorities which might otherwise be missed.

Collaboration across different institutions and economic actors

Many of the policies within the Industrial Strategy have a particular focus on fostering greater collaboration by bringing institutions together to achieve impactful research and innovation outcomes. At a national level the Industrial Strategy Challenge Fund aims to bring together the UK's world-leading research with business to meet the major industrial and societal challenges of our time. Our transforming construction challenge will bring together the construction sector with the UK's research base to create affordable places to live and work that are, safer, healthier and use less energy. Our audience of the future challenge brings together creative businesses, researchers and technologists together to create striking new experiences that are accessible to the general public. We are developing innovative ideas that will transform industries and create whole new ones.

Evidence suggests that the impact on local growth from Research and Innovation is greater in areas where there are strong institutions that collaborate together. With this in mind, the Industrial Strategy announced the *Strength in Places Fund*. This will fund research and innovation projects which build on a local strength, demonstrate a strong impact on local growth and productivity, and which enhance collaboration between local institutions.

We have witnessed significant increase in collaboration between Universities and businesses in recent years. The Industrial Strategy also set out an ambition to build innovation excellence across the country. Our universities and colleges are central to world-class innovation clusters spread across the country, and we have some of the best research laboratories in the world. Some of our universities have distinctive research strengths (e.g. Leicester for space, the University of East Anglia for agri-science, Abertay for video games and precision optics at Glyndwr). We want to enable these

¹ 'Ensuring a successful UK research endeavour. A Review of the UK Research Councils' by Paul Nurse

and other excellent institutions to develop and scale up local innovation clusters which will deliver local growth.

The Industrial Strategy includes a set of policies which seek to increase this collaboration even further. These include:

- **Knowledge Exchange Framework** – the new KEF framework will benchmark how well universities in England are doing at fostering knowledge sharing and commercialisation.
- **Higher Education Innovation Funding** increase – HEIF supports knowledge based interactions between universities in England and the wider world. The Industrial Strategy announced that HEIF will increase to £250m per year by 2020/21.
- **Connecting Capability Fund** - CCF supports groups of universities in England to work together to meet business needs.
- **Research Excellence Framework** assessment of 'impact' – the Industrial Strategy confirmed that the importance of impact within the REF would increase from 20 to 25 per cent in REF2021.

International Collaboration

Tackling the big global challenges and opportunities of the future will depend greatly on international collaboration – including Climate Change, aging societies, and Artificial Intelligence (to name but a few). Working with others to innovate is one of the UK's great historic strengths. The UK is in the top five of the Global Innovation Index and is at the cutting edge of new and future industries. This makes us a magnet for international businesses and talent, which in turn enriches our knowledge and talent base: 17% of total UK R&D investment is financed from abroad.

As part of UK's exit from the EU, the UK is seeking to maintain and strengthen close collaboration with Europe in the area of research and innovation and has signalled its desire for an ambitious science and innovation agreement with the EU. At the same time, we will seek to forge new partnerships with those countries that are committed to strengthening their research and innovation base. The first formal science and technology agreement with the United States, signed in September 2017, and a joint Science, Technology and Innovation Strategy with China (signed in December 2017) demonstrate this. We will also be publishing an International Research and Innovation Strategy later this year.

Going forward, research and innovation policy must ensure our universities, research organisations and businesses are able to collaborate and operate effectively with international partners and draw on resources from around the world. This means creating conditions for them to continue developing stronger relationships with a range of countries - encouraging investment into the UK and enabling our businesses to export.

Access to the international talent is central to this. With this in mind, the Industrial Strategy announced an additional £300m of investment in **world-class talent** from 2018/19 onwards. This investment will focus on the flow of people between industry and academia and interdisciplinary and cutting-edge research and innovation to support the Industrial Strategy programme and the Grand Challenges. Support will range from Knowledge Transfer Partnerships and PhD programmes with strong and flexible links to industry, to prestigious awards that support rising stars and the top talent from both the UK and overseas.

In conclusion, Science, Research and Innovation is a critical element of the UK's Industrial Strategy. Our future productivity, health and prosperity will depend on our ability to innovate. Our future success will also depend on increased openness and collaboration in its many forms.

Sharon Ellis, Director of International Science & Innovation, BEIS. 25 January 2018.