



The UK has a strong history of excellence in science and research, and a wide variety of kinds of research endeavours have contributed to this. Research institutes have played a valuable role, with their different models and functions increasing the diversity of the research landscape. In recent years a number of institutes have been established as a result of collaborations between multiple funders and universities, to advance the UK's capacity in particular areas of research. The creation of UKRI presents an opportunity to consider how this model fits into the wider landscape of institutes, and what key principles, based on previous experience, can support the establishment of future institutes.<sup>1</sup>

### The history of research institutes

There is a wide variety of research institutions that can be seen as 'institutes', and their typical functions have evolved over time. National facilities have long been in existence, with the British Geological Survey dating back to 1835 and the National Physical Laboratory to 1900. Over the 20<sup>th</sup> century, a number of institutes were established to advance research in a particular field; these were typically either standalone or research council-funded institutes or were based at a university. Following this, in the early 21<sup>st</sup> century, institutes with other, strategic functions have been developed: those with coordinating functions (such as the National Cancer Research Institute) and Catapult Centres, funded by Innovate UK, which have more applied functions, in line with the Government's focus on the economic potential of research.

More recently, in the last few years, there have been a number of collaborations between multiple universities and funders to pool their resources and bring talented researchers together (physically or virtually) through the creation of institutes (for example the Alan Turing Institute and Henry Royce Institute). Such collaboratively-founded institutes have often had a clear application (for example the UK Dementia Research Institute or the Faraday Institution). In line with the standing associated with the term 'institute', ESRC began, in April 2018, awarding 'institute status' to two existing research centres (the ESRC Centre for the Microeconomic Analysis of Public Policy, at the Institute for Fiscal Studies, and the Centre for Economic Performance, at LSE), in recognition of their research excellence.

### The diverse landscape of research institutes and their roles

Research institutes serve to advance research in a particular field or with a specific purpose. The way in which this is achieved varies depending on the model (see appendix for the types of research institute). They may provide shared space for research, links to partners, a network for collaboration or a national service of some kind. On a practical level, institutes can be standalone institutions, hosted at a university, or be a collaboration between universities, between universities and funders or the NHS. Collaborations between universities and funders serve to harness the complementary strengths of each to advance research in areas identified as priorities by all partners, often by bringing researchers into closer proximity (e.g. the Francis Crick Institute). University-NHS collaborations support the translation of research into benefits for patients (e.g. the UCL Great Ormond Street Institute of Child Health), while Catapult Centres support translation of research outputs into industrial applications.

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<sup>1</sup> In February 2018 Russell Group members met to discuss and share their experiences of establishing research institutes, to identify key principles.

Government-funded institutes have strategic functions for the nation, whether serving Government, the public, academia or industry. Executive agencies advise the Government using research (e.g. the Defence Science and Technology Laboratory), or provide information to the public (e.g. the Met Office). National facilities provide a national service in the form of physical infrastructure (e.g. the Diamond Light Source) or a national framework, standards or data for academic or industrial research in a particular area (e.g. the British Antarctic Survey). Government departments also collaborate with the private sector to advance causes that are important for the country (e.g. Fera Science Limited).

Other institutes that take a national approach serve to coordinate research activities across the UK and support networking (e.g. the National Cancer Research Institute) and may also carry out research (e.g. the UK Energy Research Centre).

The various models and functions of research institutes advance UK research in complementary, and often interdependent ways. They also vary in their funding models and their dependence on capital and non-capital investment. The diversity of institutes generates myriad research endeavours and outputs. As a consequence, promoting such diversity, in existing and future institutes as appropriate, is crucial to the resilience of UK research and its impact.

## Collaborations

Research institutes are typically highly collaborative organisations, joining forces with other institutes, universities, private companies and Governments to carry out research or develop its applications.

Institutes at universities often have close links with other parts of the university (for example the CRUK/MRC Oxford Institute for Radiation Oncology at the University of Oxford), and institutes focussed on research areas with clear applications (such as the Wellcome Trust Sanger Institute, UCL Energy Institute, and the Faraday Institution) have strong links with a number of private companies.

National facilities typically collaborate with a large range of universities (for example the Diamond Light Source collaborates with over 35 universities through the UK Catalysis Hub), or take a coordinating approach (for instance the British Antarctic Survey administers the UK National Committee for Antarctic Research). They can partner with Government departments or regulators (as the British Geological Survey does) or may be collaborations in themselves – the National Wind Tunnel Facility is a partnership between seven UK universities.

There are a number of international partnerships involving research institutes, particularly for those with internationally relevant remits. The Institute for Fiscal Studies has a number of international collaborations, including with the Pension Authority in Chile and the World Bank, while the Meteorological Office is part of the Unified Model Partnership, alongside other international operational and research centres.

In line with their remit, Catapult Centres engage with, and give support to, large numbers of private companies, as well as collaborating with universities.

As described, collaborations both generate new institutes, capitalising on partners' joint resources, and also extend the reach of existing institutes, providing means for expertise to be shared and research to lead to applications. In part owing to their varied collaborations, institutes are very active players in the research landscape, providing a range of approaches to finding solutions to research problems.

## Significance

The fact that the organic development of the landscape of research institutes has led to such variety reflects the diversity of research aspirations that institutes fulfil – in turn reflecting, as well as reinforcing, the wider diversity and vibrancy of the UK research landscape. In so doing, institutes form a valuable part of the UK's research ecosystem.

Such variety in the models and aims of research institutes also provides complementarity with other organisations, as illustrated by the high frequency of collaborations. This supports coordination of, and the maximising of, research efforts in the UK and internationally. Consequently, diversity and collaboration in the landscape of institutes should continue to be fostered.

## Key principles for research institutes

Keeping in mind the need for variety in models and functions of institutes, there are a number of key principles to take into account when creating new institutes. The below principles aim to ensure investments in institutes translate into impactful benefits for society and the research community, as well as for the UK's international standing and economy. In each section we have included recommendations (in bold) in line with these principles.

**Value:** *Research institutes should generate more than the sum of their parts. They are most effective when their prime rationale is to provide nationally unique facilities, rather than to bring people together physically. Their model should support their particular purpose, in the context of the broader landscape of research, and of institutes, across the UK.*

**Sustainability:** *It is important to consider how to ensure the long-term viability of institutes, both financially and with regards to the value they provide. They should be developed in such a way that enables their repurposing if they no longer fulfil their original aims.*

**Inclusivity:** *Where institutes are collaborations between multiple universities, they should be nationally unique facilities open to all on merit. They should capture the best research activities and researchers, not just a subset from selected universities.*

**Excellence:** *Research institutes should seek to provide an approach that drives excellence in research, advancing the purpose of the institute. They can do this in particular through their potential for collaboration and interdisciplinary working.*

**Transparency:** *The reason for the establishment of research institutes, and the way in which they are set up, should be transparent, to allow monitoring if appropriate.*

**Skills:** *A training link with universities should seek to ensure that researchers at institutes have sufficient career support and opportunities for teaching. This not only supports the career development of existing staff, but also boosts the pipeline of talent at institutes.*

**Collaboration:** *Institutes should explicitly stimulate collaboration across the research base, including through provision of unique facilities. Mechanisms should exist to facilitate collaboration in pursuit of the institute's mission, both within an institute and with partners.*

**Operations:** *HR, payroll, IT, library and other functions should be based on effective systems in use at existing institutes, to ensure they run efficiently and to minimise organisational complexity.*

**Diversity:** *The variety of research institutes across the UK, from national facilities to research council institutes, is valuable to maintain the diversity of the research landscape and sustainability of UK research.*

## Value

### Models of institutes

- There are a variety of models for institutes; some provide greater value than others.
- **The model of an institute should be chosen or developed based on the institute's mission or purpose, to ensure that the institute is modelled in such a way that is best suited to its purpose.**
- Institutes that bring people together to use shared facilities provide good value for money; this is an effective model.
- Creating institutes for the purpose of bringing people together to a shared location has potential to generate collaboration. Indeed, if researchers are located close to businesses, this can facilitate collaboration. However, we are not aware that increasing the proximity of research groups to each other provides a clear benefit that makes the capital investment worthwhile.
- Where institutes seek to advance research in a coordinated way across the country, a hub and spoke model may be more appropriate than a centralised model.
- Institutes with collaboration as a key aim may be best located close to potential partners.
- **A review of the various models employed and lessons learned from each would be helpful to develop best practice and inform the development of future institutes.**

### Missions and success

- There should be clarity around an institute's mission or purpose, to ensure that the institute is providing added value towards the research field or aim in question. It should also fit into the broader research base, complementing other research efforts, and promoting the diversity of the research landscape.
- 'Mission creep' can alter the work of an institute, for instance by affecting the balance between basic research and translation, or in terms of subject, such as data science vs. AI.
- There should be clarity on what success looks like (which will differ depending on the mission), what the KPIs are and who sets them. **Building a KPI base to illustrate the success of institutes, and inform the development of future institutes, would be worthwhile.**

## Sustainability

A large amount of upfront investment goes into institutes, but their long-term financial sustainability can often be uncertain. This risks both researchers' job security and capital investment not providing the long-term returns expected. **A long-term financial plan should be put in place that considers future options for the funding of an institute**, to ensure that upfront investments are made in ways that provide good value for money and improve sustainability.

To ensure funding is used in the most effective way, **there should be processes in place to check that institutes are fulfilling their aims, and procedures for closures or repurposing of institutes where appropriate** (the quinquennial review process carried out by the research councils provides an example model). **Institutes should be set up in such a way that enables evolution and**

**repurposing if they are no longer effective in fulfilling their original aims.** This minimises the risk of capital investment being wasted.

## Inclusivity

For institutes to reach their potential they should aim to harness the best talent from across the UK and its research institutions. **There should be an open application process for universities that want to take part, and where possible membership fees should not prohibit smaller institutions with talented researchers from participating.**

## Excellence

Research institutes should seek to drive excellence in a particular area, advancing the purpose of the institute. They should provide an approach that adds value to this end, relative to the landscape of existing research in the field. For example, institutes may have particular potential to advance a field by enabling opportunities for collaboration or interdisciplinary working to address research questions. There may be increased flexibility in funding, allowing the testing of novel or unconventional approaches, with less time pressure for results. Where institutes have several bases across the UK, there may be the potential for each to specialise in complementary ways. **In the planning stage for a new institute, consideration should be given to how it can provide novel added value to research in that field.**

## Transparency

It is important for the reason for the establishment of a research institute, and the way in which it is set up, to be transparent, to allow monitoring if appropriate. This ensures that the institute is fulfilling an appropriate need, the relevant partners are involved, and enables assessment, for example by those with relevant experience, into how processes might be improved. **Open and timely communication to the academic community, in particular UK universities, should be in place to ensure transparency in the establishment and development of a new institute.**

## Skills

**Links with universities should be used to provide researchers with career development opportunities as well as career support.** In particular the focus on research at institutes provides fewer teaching opportunities, and this could affect the career prospects of postdocs and other researchers. The expertise of researchers working at institutes is also valuable for educating future researchers.

It is also important for institutes to provide opportunities (either in house or via universities) for researchers to have wider impact, for example by engaging the public or policy makers. The university environment enables researchers to come into contact with potential collaborators who are working in different, potentially complementary, fields.

Universities provide training for researchers, for example in research methods, opportunities for secondments, and advice and information on careers both within and outside of academia. Such valuable career support should be made available to staff at research institutes.

## Collaboration

As discussed earlier, there is great potential for institutes to generate impact by working with other institutions, and this requires mechanisms to facilitate collaboration. Institutes that aim to bring scientists together have not always been successful at encouraging working between groups. There can be limited modes of engagement between institutes and other institutions. There is a fundamental difference in how institutes cost research (they run at 100% FEC), and this can impede collaboration with universities. In addition, the translational opportunities associated with institutes do not always come to fruition. **Mechanisms should be put in place to facilitate collaboration, including to strengthen relationships with industry and to overcome barriers associated with variation in funding models.** Variation in kinds of collaboration is also valuable to sustain the diversity (see below) of research activities.

## Operations

For the research to thrive, it is important to ensure operations (HR, payroll, IT library, etc.) run efficiently and organisational complexity is minimised. **It is worth basing operations on effective systems in use at existing institutes, rather than reinventing the wheel.**

## Diversity

The variety of research institutes across the UK is valuable to maintain the diversity of the research landscape. There is considerable variety in research institutes across the UK, as described on page 1. The diversity of research and innovation institutions and initiatives supports the UK to create a variety of valuable research outputs. Furthermore, the various models of institutes have different costs and benefits, with some being more sustainable or flexible than others, and crucially, with each being suited to a different purpose. **Variety in models of institutes should be maintained in order to promote the long-term resilience and sustainability of UK research at institutes,** as ways of working and funding priorities change.

## Appendix: Types of research institute and examples

### Standalone

- Wellcome Trust Sanger Institute, Institute for Fiscal Studies

### Research Council-funded

- *Standalone*: BBSRC-funded John Innes Centre, STFC Daresbury Laboratory
- *Based at a university*: MRC Laboratory of Molecular Biology at the University of Cambridge, BBSRC-funded Roslin Institute at the University of Edinburgh
- *Based within an existing institute*: ESRC Centre for the Microeconomic Analysis of Public Policy at the Institute for Fiscal Studies
- *At multiple locations*: NERC Centre for Ecology and Hydrology

### Hosted at one university

- *Primarily funded by university*: UCL Energy Institute, Institute of Development Studies at the University of Sussex
- *Funded by research funder*: CRUK Manchester Institute at the University of Manchester
- *Collaborations between funders*: CRUK/MRC Oxford Institute for Radiation Oncology at the University of Oxford

### Collaborations between multiple universities

- International Centre for Mathematical Sciences, jointly owned by the University of Edinburgh and Heriot-Watt University

### Collaborations between multiple universities and funders

- *Single location*: Francis Crick Institute, Alan Turing Institute, Faraday Institution
- *Hub and spoke model*: UK Dementia Research Institute, Henry Royce Institute, Rosalind Franklin Institute

### Collaborations between universities and the NHS

- UCL Great Ormond Street Institute of Child Health

### National facilities

- *Providing physical infrastructure*: Diamond Light Source, National Wind Tunnel Facility, British Antarctic Survey
- *Providing a framework, standards and/or data for research*: British Geological Survey, British Antarctic Survey, National Physical Laboratory

### Government Executive Agencies

- Meteorological Office, Defence Science and Technology Laboratory

### Collaborations between Government and the private sector

- Fera Science Limited (formerly the Food and Environment Research Agency)

### Catapult Centres

- High Value Manufacturing Catapult Centre

### Institutes with coordinating functions

- *Primarily coordinating functions*: National Cancer Research Institute
- *Research and coordinating functions, with a hub and spoke model*: UK Energy Research Centre