National Audit Office

REPORT

DSIT's investment in research infrastructure

Department for Science, Innovation & Technology

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DSIT's investment in research infrastructure

Department for Science, Innovation & Technology

Report by the Comptroller and Auditor General

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Gareth Davies
Comptroller and Auditor General
National Audit Office

5 March 2026

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The National Audit Office study team consisted of:

Sue Heard, Jessica Lyon Cole, George Mélançon-Talboys, Olivia Rogerson and Michael Slater with assistance from Tom Fiddick, Rosh Hart, Magnus Hopkins-Powell, Prani Rajakumar and Jake Trotman, under the direction of Charles Nancarrow.

For further information about the National Audit Office please contact:

National Audit Office
Press Office
157–197 Buckingham Palace Road
Victoria
London
SW1W 9SP

020 7798 7400
www.nao.org.uk
@NAOorguk

Key facts

£1.2bn

UK Research and Innovation (UKRI) spending on research infrastructure in 2024-25

£451mn

UKRI spending on the Infrastructure Fund between April 2022 and March 2025

£2.04bn

approved cost of the 30 projects being delivered through UKRI's Infrastructure Fund

58%	proportion of current Infrastructure Fund projects that report they do not face any major issues threatening delivery of the agreed outcomes
£750 million	estimated cost (including contingency) of building the Next National Supercomputer and operating it for five years
£287 million	10-year budget for the National Quantum Computing Centre approved by HM Treasury in July 2025
£5.6 billion	estimated cost of restoring research infrastructure owned by English universities to a fully operational condition

Summary

1 Research infrastructure consists of the facilities, resources and services used to conduct research and innovation activities. They can include specialist equipment, laboratories, supercomputers, and large-scale multi-use facilities. They are a key part of the UK’s research and innovation landscape and are integral to the UK’s role as a hub for international collaboration. The government’s ambition is for the UK to be “one of the top three places in the world to create, invest in and scale-up a fast-growing technology business by 2035”. This ambition requires high-quality, accessible, and internationally competitive science and technology research infrastructure.

2 The Department for Science, Innovation & Technology (DSIT) is the government department responsible for “positioning the UK at the forefront of global scientific and technological advancement”. It sponsors UK Research and Innovation (UKRI) which is a non-departmental public body bringing together seven disciplinary research councils,[1] Research England (which supports research and knowledge exchange at higher education institutions in England), and Innovate UK (which supports businesses). UKRI’s purpose is to invest in research and innovation to “advance knowledge, improve lives and drive growth”.

3 Building, maintaining, and upgrading research infrastructure requires strategic decision-making to ensure that the most crucial research infrastructure is accessible within the budget available. In 2016, we conducted a study examining spending on research infrastructure.[2] We concluded that the Department for Business, Innovation & Skills (BIS) – DSIT’s predecessor department – had not used good-quality information to inform investment decisions, and we recommended a more structured and strategic process for deciding what to fund. UKRI was subsequently created in April 2018.

1 The seven research councils are: Arts and Humanities Research Council, Biotechnology and Biological Sciences Research Council, Economic and Social Research Council, Engineering and Physical Sciences Research Council, Medical Research Council, Natural Environment Research Council, and Science and Technology Facilities Council.

2 Comptroller and Auditor General, *BIS’s capital investment in science projects*, Session 2015-16, HC 885, National Audit Office, March 2016.

4 This report examines how effectively DSIT and UKRI work together to develop and operate research infrastructure that meets the needs of the government, researchers and industry. It examines:

- how well DSIT understands the research infrastructure landscape, how DSIT and UKRI determine what infrastructure to fund, and whether they manage infrastructure as a portfolio (Part One);
- whether DSIT and UKRI are working effectively to deliver the research infrastructure the UK needs (Part Two); and
- whether existing research infrastructure assets are being used in a way which achieves the best possible outcomes (Part Three).

Key findings

Strategic oversight of research infrastructure

5 The UK's research infrastructure funding landscape is fragmented, although UKRI is responsible for almost all the DSIT group's spending. UKRI spent £1.17 billion on research infrastructure in 2024-25. Since April 2022, UKRI funding for infrastructure has been split into multiple funding streams comprising UKRI-wide funding lines, funding through Research England that universities can use on new or existing infrastructure, and funding provided by the individual research councils themselves. In 2024-25, the most significant funding streams were World Class Labs (£628 million spending) and the Infrastructure Fund (£248 million spending). World Class Labs funding is either spent by UKRI's research councils or passed on to universities. The Infrastructure Fund enables construction of new infrastructure or major upgrades which the research councils or Innovate UK would not be able to fund themselves. DSIT provides a comparatively small amount of research infrastructure funding grants directly (£68.9 million over the last three years) (paragraphs 1.5, 1.7 to 1.9 and 1.13).

6 UKRI has introduced a more consistent approach to funding larger research infrastructure projects. UKRI conducted a review of the research infrastructure landscape and, in 2022, established the Infrastructure Fund. This was intended to provide a more structured and strategic approach for identifying, prioritising and selecting major research infrastructure projects for investment than existed previously. UKRI has approved 30 projects, with an expected total cost of £2.04 billion (it has spent £451 million on the Infrastructure Fund as of March 2025). UKRI also established new governance structures around the Infrastructure Fund (paragraphs 1.6, 1.7, 1.9, 1.11 and 1.16).

7 DSIT is starting to do more to ensure that UKRI spends money in line with its policy ambitions for the UK than it has done previously. DSIT has identified six ‘frontier technologies’ it believes will be particularly important for achieving its objectives. DSIT has generally limited itself to providing high-level guidance to UKRI about current government priorities, and only became involved in the later stages of business case approval processes for the largest projects. In late 2025 it set three broad priorities for the research and development (R&D) system. UKRI subsequently set out how its spending would support these priorities, and how much it expected to spend on R&D to benefit the ‘frontier technologies’ and on other government priorities (paragraphs 1.20 to 1.22).

8 Although there have been improvements since we last reported in 2016, UKRI is still not managing all its research infrastructure as an integrated portfolio. Managing projects and other activities as a portfolio allows organisations to maximise the likelihood that they achieve their intended outcomes regardless of the performance of individual components of the portfolio. UKRI does not manage its research infrastructure estate as a portfolio, though it is seeking to apply portfolio management techniques to the Infrastructure Fund in a more comprehensive way. However, its ability to do so is limited by the inflexibility of the funding arrangements. In particular, UKRI did not allow any projects to bring spending forward between November 2023 and July 2025 – despite knowing other projects were proceeding more slowly than planned because UKRI needed to restrict spending to remain within its overall budget. This resulted in an £81 million (18%) underspend. We did not see any evidence of UKRI slowing or stopping research infrastructure projects to enable more strategically important projects to proceed until December 2025 (paragraphs 1.14 and 1.16 to 1.19).

Commissioning research infrastructure

9 Our review of research infrastructure business cases identified opportunities for streamlining. For novel and complex research infrastructure, there is a high level of uncertainty about outcomes. We found that information on cost-benefit analysis was less likely to be useful for decision-makers as they do not primarily rely on benefit-cost ratios to compare different projects. This is because it is particularly challenging to quantify and monetise the benefits that an individual proposal would be expected to deliver. Other elements of the business case are more useful for investment decision-making and judging proposals against one another. We found that, while some strategic cases were strong, some did not articulate the rationale for funding a project as clearly as they could have done. DSIT has issued additional guidance about business cases to ensure they are more appropriate for research infrastructure (paragraphs 2.2 to 2.5).

10 **Some of the earlier business cases we reviewed seriously underestimated how difficult it was likely to be to deliver the project.** One of these projects will not now deliver all the benefits anticipated in its business case. Another project to upgrade an aircraft would not have delivered all the planned benefits even before UKRI decided it would decommission the aircraft instead (after this project had spent £46 million of its £49 million budget). Our review of business cases found that UKRI did not do enough initially to ensure that the projects’ delivery risk assessments were realistic, and it fixed budgets too early before costs could have been well-understood. UKRI did not initially put in place appropriate safeguards to ensure it challenged over-optimism from individual research councils – who were naturally keen to ensure that their priorities were funded. Some business cases did not assess whether the available contingency was likely to be sufficient. However, 58% of the Infrastructure Fund projects report that they expect to achieve the intended outcomes and do not face any major issues significantly threatening delivery. We also saw some examples of UKRI taking action to increase the likelihood that the project succeeds (paragraphs 2.6 and 2.8 to 2.10).

11 **UKRI and DSIT have shown they can adapt their processes where technology is advancing particularly rapidly but both were too slow to replace ageing supercomputers.** The UK’s supercomputers have lagged behind those available to researchers in other countries in recent years. The cost of building and operating supercomputers has increased significantly in recent years – the Next National Supercomputer is expected to cost up to £750 million to build and operate for five years. DSIT and UKRI did not act quickly enough to replace the ageing ARCHER2 supercomputer and did not have an overarching strategy for computing until recently. ARCHER2’s declining performance relative to other supercomputers means it is less capable of supporting world-leading research. Additionally, it is currently expected to close 13 months before its replacement can be switched on, although UKRI believes it will be able to limit the consequences of this for researchers. However, DSIT and UKRI did work together effectively to develop the National Quantum Computing Centre (NQCC). Both adapted their processes appropriately to reflect the importance of quantum computing and the need for speed and agility. The NQCC is currently one of two DSIT-sponsored programmes with a budget that extends beyond the current Spending Review period: HM Treasury has agreed it can spend at least £287 million over the next 10 years (paragraphs 2.12 to 2.13, 2.17, 2.19 and Figure 6).

Utilising research infrastructure

12 **Researchers are using research infrastructure to make breakthroughs with benefits for people and for the economy.** We explored the potential impacts of research infrastructure for society and the economy through six case studies spanning disciplines such as quantum computing, medical research, biotechnology, and climate science. All had already produced tangible benefits, such as UK Biobank's work to develop methods to identify people at high risk of particular diseases, or the John Innes Centre's contribution to improving wheat productivity (paragraph 3.3).

13 **The research councils and universities have not adequately maintained facilities, and some infrastructure can no longer be used as intended.** The Science and Technology Facilities Council – which operates some of UKRI's largest research facilities – has not carried out sufficient maintenance to ensure its estate continues to meet its standards. It estimates that it would need to spend £360 million to restore its condition to an acceptable standard. The higher education sector is facing financial sustainability issues, and the condition of research infrastructure owned by universities is also deteriorating. Research England estimates that around £5.6 billion would be required to restore university-owned research infrastructure to a fully operational condition. It has also estimated that English universities are currently spending £1.82 billion each year on their research infrastructure, with £758 million of that spent entirely on maintenance. UKRI provided universities with £233 million of funding in 2025-26 to spend on new and existing research infrastructure this year (£59 million of which can only be spent on maintaining existing infrastructure) (paragraphs 3.4, 3.6 to 3.8).

14 **Across our case studies, there are examples of sites exploring innovative approaches to ensure infrastructure adapts to technological changes.** These include modular and adaptable workspaces on the polar research ship *RRS Sir David Attenborough*. The John Innes Centre (which supports research in plants and microbiology) has upgraded its facilities to let scientists control environmental factors such as temperature more flexibly and precisely. CoSTAR (Convergent Screen Technologies and Performance in Realtime) – which supports the UK creative industries – demonstrated its innovative approach to facilitating collaboration between industry and academia, leading to valuable knowledge transfer. UK Biobank – which stores biological samples and health-related data – outlined how improving the capacity of the site will enable it to increase the richness of the data available to researchers (paragraph 3.9).

15 **Some research councils monitor how research infrastructure is being used well: this good practice could be shared within UKRI to support decision-making.** UKRI has a framework for monitoring and evaluation but has not issued specific guidance about how the performance of research infrastructure should be monitored. Across the case studies, we saw a variety of approaches to monitoring inputs, outputs, outcomes, and impacts. There are some examples of good practice: for example, the Arts and Humanities Research Council developed a quarterly reporting template for the CoSTAR Network which collects qualitative and quantitative data. However, DSIT told us that the lack of a consistent approach makes it harder for DSIT to understand the entire research infrastructure landscape and report publicly on the impact of research infrastructure (paragraphs 3.11 to 3.15).

Conclusion

16 Academic and private sector researchers depend on publicly financed research infrastructure to make scientific advances and develop innovative products and solutions to global problems. Since we last reported, DSIT has started providing a clearer direction on the technologies it believes are particularly strategically important to the UK, and its expectations about how much money UKRI should spend supporting the government's policy priorities. UKRI has also introduced a more consistent and professional approach to funding research infrastructure, for example ensuring all projects have strong investment cases, meaning these projects have made, and will continue to make, significant contributions to global science. DSIT and UKRI have also shown that the UK government can take action quickly in particularly fast-moving and strategically important areas.

17 While UKRI and DSIT now have a clearer understanding of future infrastructure requirements than they had previously, UKRI can still do more to manage its research infrastructure as a portfolio – including balancing acquisition of new capabilities with maintenance and renewal of existing infrastructure – some of which can no longer be used for its intended purpose. There is also scope for UKRI to improve the value for money of its infrastructure projects by ensuring they adhere more closely to good practice, particularly around addressing over–optimism at early stages of project delivery.

18 Recommendations

a **Strategic oversight: governance, strategic direction, and oversight of research infrastructure.** UKRI – working with DSIT and other government departments where appropriate – should:

- assess how existing research infrastructure can be used to support strategic government priorities and innovative companies;
- determine the appropriate balance between research activities and spending on infrastructure for each of the priority-focused programmes it is establishing; and
- ensure that UKRI internal funding opportunities allow the priority-focused programmes to develop research infrastructure in line with their priorities, enabling contributions from other government departments and the private sector where appropriate.

b **Strategic oversight: improving portfolio management.** UKRI should take a broader view of portfolio management than it does currently, focusing on managing its projects so that they, collectively, achieve UKRI's objectives. It should look to introduce more flexibility into how it manages projects such as staged funding, and it should explore whether there is scope to manage the portfolio in a way which reflects UKRI's desire to take on more risk where this is justified by the potential reward.

c **Commissioning research infrastructure: improving business cases to support innovative research infrastructure.** DSIT should build on its current work on business cases and issue authoritative guidance specific to research infrastructure projects to ensure the projects it is responsible for approving understand what information decision-makers need.

d **Maintaining and utilising research infrastructure: improving financial management for maintaining and operating existing research infrastructure.** UKRI should improve its financial management capabilities by developing frameworks which allow it to better understand the relative merits of spending on new infrastructure, maintaining existing infrastructure or directly funding research. UKRI should explore whether there are any internal financial management arrangements which hinder this, noting that all UKRI spending is classed as capital spending.

e **Maintaining and utilising research infrastructure: sharing good practice on research infrastructure management.** UKRI should share good practice on ways to proportionately monitor the operation, successes, and challenges in the research infrastructure it invests in, and how to use this information to support future funding decisions.

Part One

Strategic oversight of research infrastructure

1.1 This part covers:

- the research infrastructure landscape;
- how DSIT and UKRI determine what infrastructure to fund; and
- how UKRI manages the infrastructure portfolio.

Research and development funding landscape

1.2 The Department for Science, Innovation & Technology (DSIT) is responsible for just over two thirds of the government's research and development (R&D) spending. In 2024-25, DSIT spent a total of £12.64 billion on R&D, split between the department and its arm's-length bodies such as UK Research and Innovation (UKRI), the Met Office and the UK Space Agency. UKRI is DSIT's primary R&D delivery body, spending 75% of DSIT's total R&D budget in 2024-25.

1.3 UKRI is a non-departmental public body established in 2018 by combining seven disciplinary research councils, Research England (which supports research and knowledge exchange at higher education institutions in England) and Innovate UK, which supports business-led innovation (**Figure 1**). UKRI's purpose is to invest in research and innovation on behalf of the government to "advance knowledge, improve lives and drive growth".

Research infrastructure funding

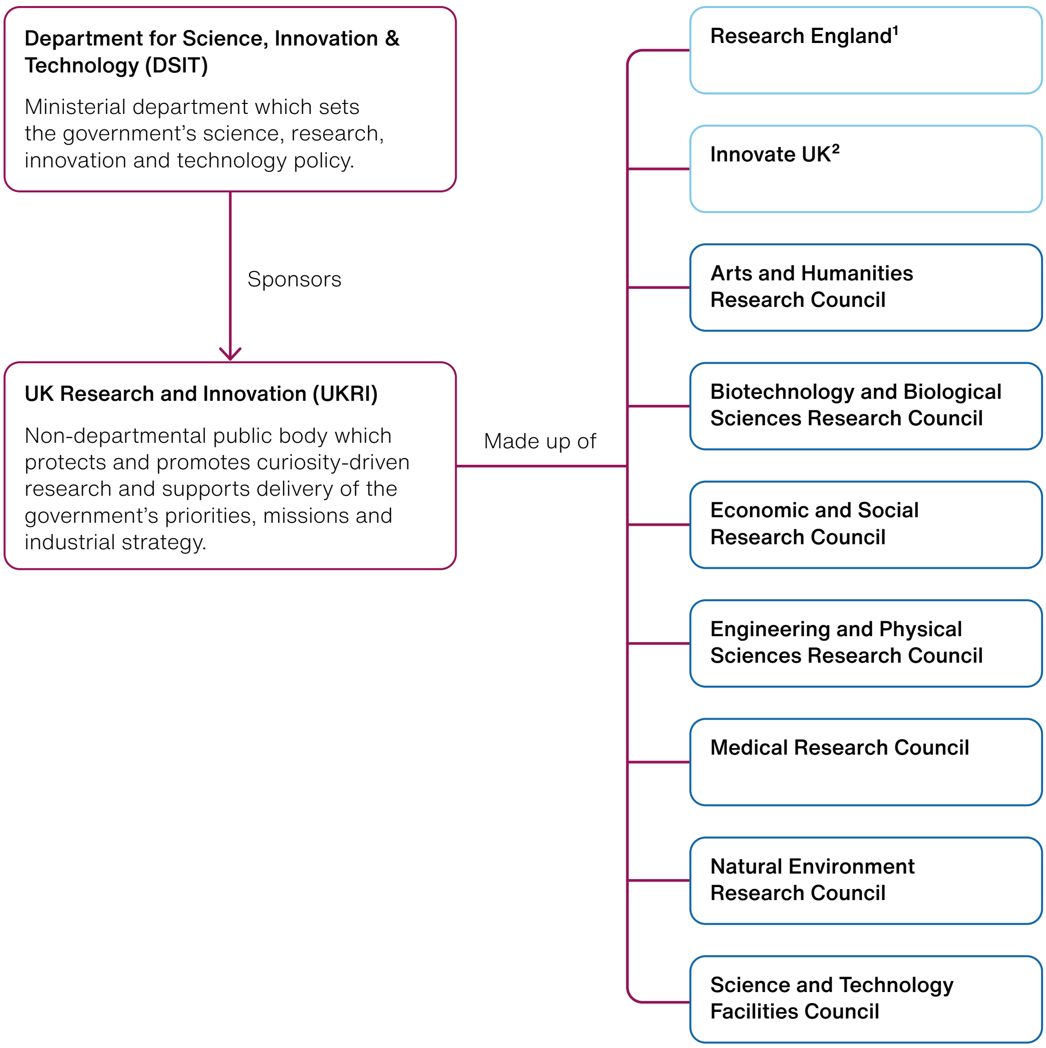
1.4 Research infrastructure includes all the facilities, equipment, resources and services used by researchers to carry out research and innovation activities. It includes:

- physical infrastructure, such as research ships like the *RRS Sir David Attenborough* as well as smaller laboratories or items of equipment such as CoSTAR's (Convergent Screen Technologies and Performance in Realtime's) interactive audio and visual technologies to enhance live performances;
- 'knowledge-based' resources including archives of information (such as UK Biobank, which stores biomedical data from 500,000 people), or 'cohort studies', which follow a group of people over time; and
- digital infrastructure, such as high-performance computers.

Figure 1

Organisation of UK Research and Innovation (UKRI) as of December 2025

UKRI funds research and development on behalf of the Department for Science, Innovation & Technology (DSIT)



- UKRI component with cross-cutting responsibilities
- Research council focused on a specific discipline

Notes

1 Research England funds higher education institutions in England.

2 Innovate UK funds business-led innovation.

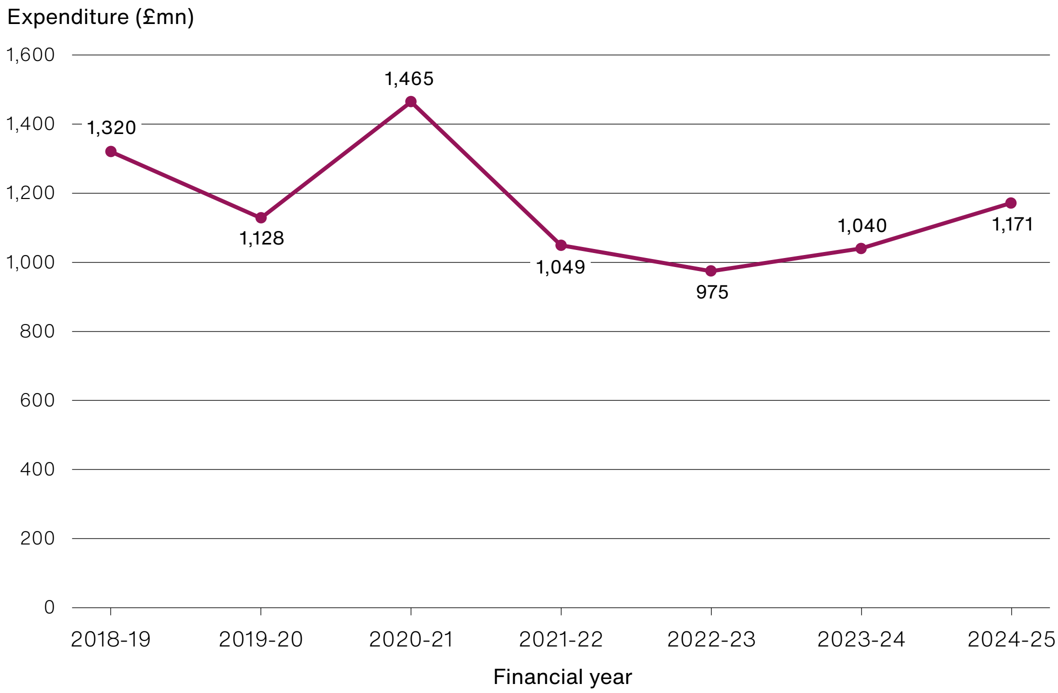
Source: National Audit Office analysis of the Department for Science, Innovation & Technology and UK Research and Innovation annual report and accounts 2024-25

1.5 High-quality, accessible and internationally competitive research infrastructure plays a critical role in the government reaching its ambition for the UK to be "one of the top three places in the world to create, invest in and scale-up a fast-growing technology business by 2035". Most of the DSIT's group funding for research infrastructure goes through UKRI, with £1.17 billion of UKRI's total R&D budget spent on research infrastructure in 2024-25 (**Figure 2**).

Figure 2

UK Research and Innovation (UKRI) spending on research infrastructure between April 2018 and March 2025 in real terms (2024-25 prices)

UKRI expenditure on research infrastructure has increased each year since 2022-23



Note

1 Expenditure is presented in real terms, in 2024-25 prices. We used the GDP deflator series published by HM Treasury in January 2026 to convert expenditure in prior years to this price base.

Source: National Audit Office analysis of UK Research and Innovation expenditure information

1.6 In 2016 we examined how DSIT's predecessor, the Department for Business, Innovation & Skills (BIS), planned, prioritised and evaluated its capital spending on science projects. We found that BIS did not have a clear process for prioritising projects, that its spending decisions were not consistently supported by good quality information, and that it was not systematically assessing what its portfolio of projects was achieving. We recommended BIS take a more structured and strategic process for proposing projects, identifying priorities and taking funding decisions to optimise the value of its portfolio of investments. The Department for Business, Energy & Industrial Strategy (which replaced BIS) subsequently commissioned UKRI to conduct a systematic review of the research infrastructure landscape. It published two reports in November 2019, which assessed the existing landscape and future opportunities.[3] UKRI expects to publish an update in 2026.

1.7 Since April 2022, UKRI's research infrastructure budget has been split between multiple funding lines (**Figure 3** overleaf). These are:

- World Class Labs (allocated to the research councils and Research England);
- Infrastructure Fund (a UKRI-wide budget);
- Digital Infrastructure (a UKRI-wide budget);
- Carbon Zero Fund (funding for decarbonisation of the UKRI-owned estate which includes offices as well as research infrastructure); and
- Legacy Infrastructure.

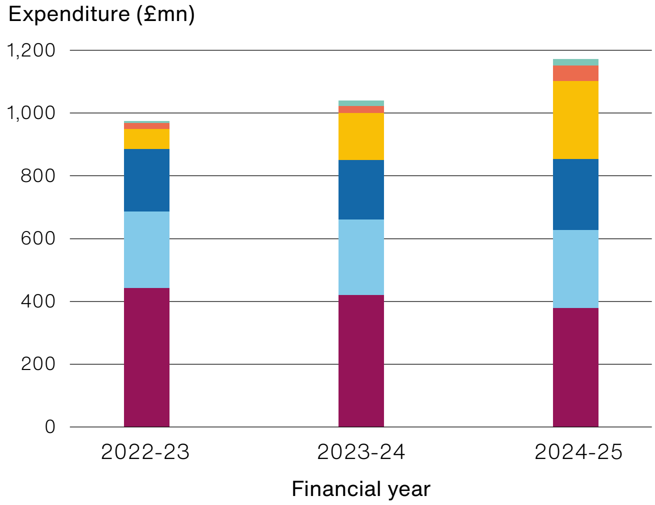
1.8 The largest of the UKRI funding lines is World Class Labs, representing £628 million of UKRI spending in total in 2024-25. This funding can be used to purchase new equipment, maintain existing infrastructure or pay for the creation of new 'knowledge assets' that could be used by future researchers. The funding is made up of two components with different governance arrangements. The research councils spent £379 million in 2024-25; they used several different mechanisms to spend this money in line with their priorities (including direct allocations to institutions and competitive grant awards). Research England received £249 million – most of which was then passed on to universities in England to spend on facilities and equipment in line with their own priorities. DSIT also provides formula-based funding for the devolved administrations to pass on to Scottish, Welsh and Northern Irish universities: in 2024-25 it provided £25.5 million, which was match-funded by the devolved administrations.

3 UK Research and Innovation (UKRI), *The UK's research and innovation infrastructure: Landscape Analysis*, November 2019; UKRI, *The UK's research and innovation infrastructure: opportunities to grow our capability*, November 2019.

Figure 3

Breakdown of UK Research and Innovation (UKRI) spending on research infrastructure between April 2022 and March 2025 in real terms (2024-25 prices)

The Infrastructure Fund accounts for almost all the increase (in real terms) in UKRI's spending on research infrastructure in recent years



	2022-23	2023-24	2024-25
World Class Labs – disciplinary research councils	444	421	379
World Class Labs – Research England	243	240	249
Legacy infrastructure	198	190	227
Infrastructure Fund	65	150	248
Digital research infrastructure	18	23	48
Carbon Fund	6	16	20
Total expenditure	**975**	**1,040**	**1,171**

Notes

1 This information reflects the funding lines UKRI uses to manage and report its spending on research infrastructure. UKRI took a different approach prior to 2022-23, meaning that financial information prior to this period is not comparable with the information shown here.

2 Expenditure is presented in real terms, in 2024-25 prices. We used the GDP deflator series published by HM Treasury in January 2026 to convert expenditure in prior years to this price base.

3 Figures may not sum due to rounding.

Source: National Audit Office analysis of UK Research and Innovation expenditure information

1.9 The second largest source of funding for infrastructure is the Infrastructure Fund, representing £248 million of UKRI spending in 2024-25 (it spent £451 million in total between April 2022 and March 2025). UKRI introduced the Infrastructure Fund in response to our recommendation that there should be a more structured and strategic process for proposing projects, identifying priorities and taking funding decisions.[4] UKRI uses the Infrastructure Fund for projects which are too big to be funded by individual research councils or Innovate UK. Its remit is to "support investments in new, large-scale infrastructure that encourage step changes in research and innovation capability", and it can also be used to fund decommissioning of existing infrastructure. The Infrastructure Fund cannot be used for operating costs. UKRI's research councils are responsible for these costs where UKRI owns the infrastructure. Before UKRI established the Infrastructure Fund, larger projects were initiated infrequently when BIS had sufficient budget. UKRI spent an average of £205 million (in 2024-25 prices) on these 'legacy infrastructure' projects over the last three years. We have previously identified that uncertainty about what funding will be available makes it less likely that organisations will achieve value-for-money outcomes.[5]

1.10 UKRI has increased the amount it spends through the Infrastructure Fund as it has approved more projects, and the projects are spending more as they ramp up. It allocated £386 million for the Infrastructure Fund at the start of 2025-26 (as of January 2026 it expected to spend £353 million of this). In future, spending on new projects may be offset by stopping spending on projects as they are completed; however, none of the approved projects has been completed yet. UKRI told us that it had previously assessed it should be spending around £400 million per year (in 2020 prices) on new infrastructure through the Infrastructure Fund (equivalent to £470 million in 2024-25 prices). This was the 'steady state' it wanted to reach that would allow it to fund an appropriate number of projects. However, following the 2025 Spending Review, UKRI only allocated an average of £265 million per year (in 2024-25 prices) over the four years between 2026-27 and 2029-30 to the Infrastructure Fund. This will mean it is not able to fund as many projects as it would like – particularly as it believes that the cost of building infrastructure has risen by more than the average rate of inflation.

4 Comptroller and Auditor General, *BIS's capital investment in science projects*, Session 2015-16, HC 885, National Audit Office, March 2016.
5 Comptroller and Auditor General, *Lessons Learned: a planning and spending framework that enables long-term value for money,* Session 2024-25, HC 234, National Audit Office, October 2024.

1.11 UKRI has agreed to provide £2.04 billion of Infrastructure Fund funding to 30 projects (in some cases this is conditional on the projects developing a satisfactory business case, though other projects are nearing completion). The four largest projects will receive £947 million (47%) of this: three of these projects will carry out major upgrades to the John Innes Centre, Diamond Light Source and UK Biobank while the fourth will create a new digital infrastructure to make it easier to access the UK’s collections of natural science specimens. We discuss the John Innes Centre and UK Biobank upgrades further in paragraphs 2.6 to 2.10 and in Figure 7. The Infrastructure Fund has also provided £66 million to 15 other projects to conduct preliminary activities before the main funding decision is taken.

1.12 UKRI also provides some funding for international research infrastructure (such as the CERN particle accelerator), which is typically too expensive or challenging for any one nation to fund by itself. It pays the UK’s ongoing annual subscriptions – which cover both operating costs and the costs of new equipment or upgrades. However, DSIT leads on overall policy and the government’s strategic position on participation, including decisions about whether to change the UK’s level of financial contributions and whether it should leave or join significant international collaborations. International projects can also receive funding through World Class Labs or the Infrastructure Fund.

1.13 DSIT provides a comparatively small amount of research infrastructure funding directly. In 2022-23 and 2023-24 it used underspend from elsewhere in the department to offer small grants to research organisations. In 2022-23 it awarded a total of £30.6 million to 15 Public Sector Research Establishments (PSREs) and cultural organisations.[6] The following year it awarded £38.3 million of grants to 30 not-for-profit research and innovation organisations, most of which were not eligible for UKRI’s World Class Labs programme (some organisations received grants in both years). These grant funding opportunities have not been repeated in subsequent years. DSIT also provides capital funding to the PSREs it sponsors (the National Physical Laboratory and the Met Office). The National Physical Laboratory expects to spend £17.1 million in 2025-26 maintaining and upgrading its site; DSIT provides the Met Office with loans and capital grants for its satellite and supercomputer programmes.

6 PSREs are typically government-owned organisations which carry out research themselves in support of government’s objectives.

UKRI's management of the Infrastructure Fund as a portfolio

1.14 The government's guidance for project delivery defines portfolio management as "ensuring that current activities, plus the programmes, projects and other related work, as a whole, deliver the desired outcomes and overall benefit, regardless of the performance of individual components".[7] UKRI does not manage its research infrastructure estate as a single portfolio in line with this definition. Its research councils remain responsible for operational funding – including maintenance – as well as smaller upgrades funded through their respective World Class Labs budgets (see paragraph 1.8). The Digital Research Infrastructure Programme forms a separate portfolio. However, UKRI is seeking to apply portfolio management techniques to the Infrastructure Fund in a more comprehensive way – particularly when it comes to prioritisation.

1.15 We have previously outlined what we see as the core elements of a successful portfolio.[8] These are:

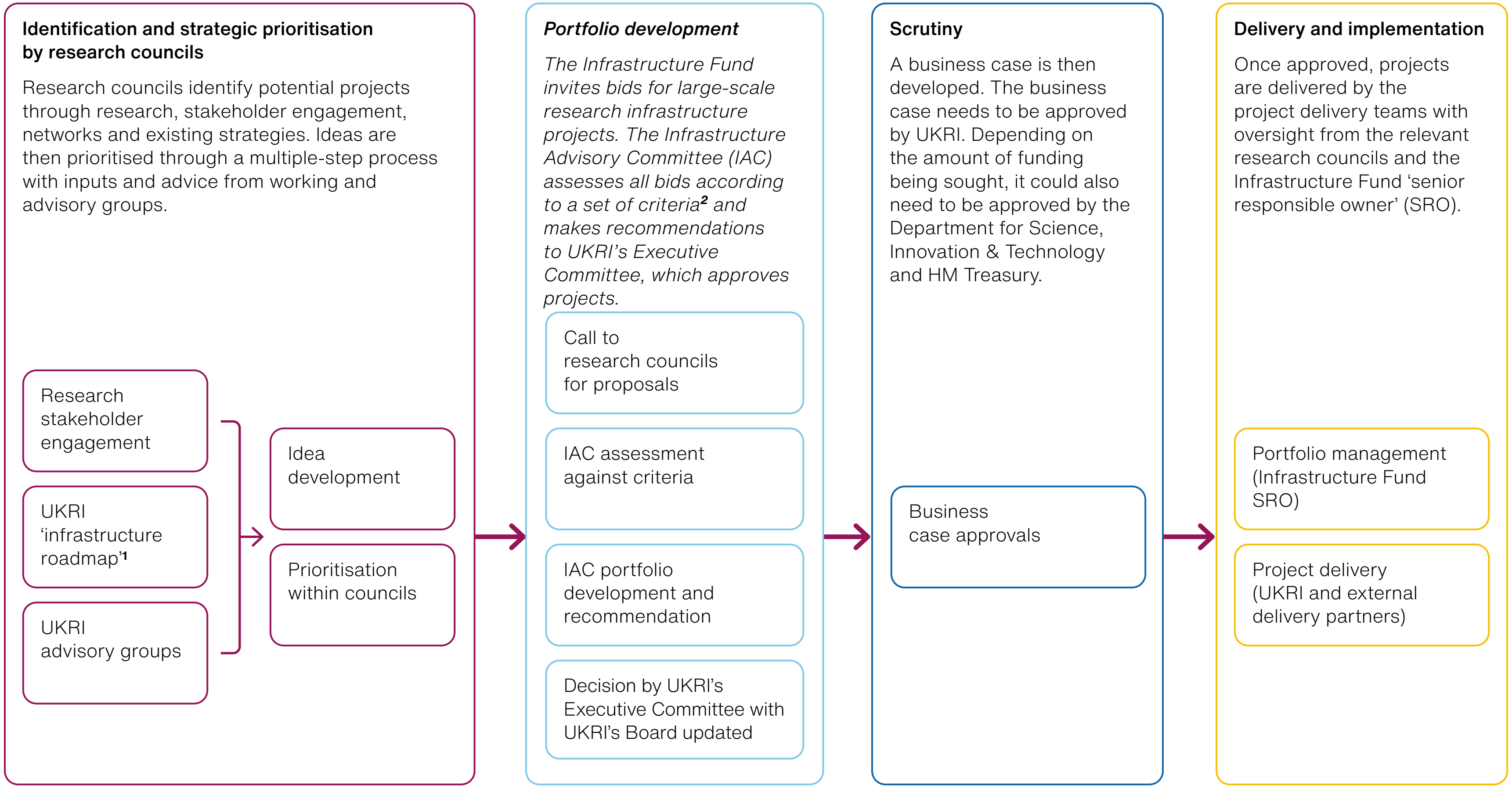
- a clear and consistent understanding of the portfolio's objectives alongside clear accountability;
- information collected and structured in a way that helps understand performance at a programme and portfolio level to inform any necessary changes;
- planning and reprioritisation supported by a clear understanding of the funding and capability needed to deliver the portfolio;
- a centralised function to provide the overarching governance and assurance required for a portfolio to be managed as a whole;
- alignment with strategic objectives through understanding how activities interrelate; and
- a cross-portfolio view of risk to allow the full impact of risk to be assessed and mitigated.

1.16 Although not a comprehensive portfolio, we have seen examples of good portfolio management practices being applied around the Infrastructure Fund projects. In December 2024, UKRI developed a governance framework for the Infrastructure Fund. This outlines the fund's purpose, including how it fits with UKRI's strategy, roles and responsibilities, as well as processes for managing financial and other resources, risk, stakeholder engagement, and benefits. UKRI now has a more structured and strategic approach for identifying, prioritising and selecting research infrastructure projects to fund (**Figure 4** overleaf).

7 HM Government, *The Teal Book: Project delivery in government*, April 2025.
8 National Audit Office, *Good practice guide: Framework to review portfolios*, January 2022.

Figure 4
Prioritisation and decision-making processes for the Infrastructure Fund as of December 2025

UK Research and Innovation (UKRI) has a structured process in place for selecting which research infrastructure projects should be funded by the Infrastructure Fund



Notes

1 UKRI produced its first 'infrastructure roadmap' in 2019 to identify opportunities and guide its decision making. This is available at: www.ukri.org/wp-content/uploads/2020/10/UKRI-201020-UKinfrastructure-opportunities-to-grow-our-capacity-FINAL.pdf

2 The IAC assesses infrastructure proposals against the following criteria: research and excellence; the proposal's strategic importance; its potential for impact; whether it results in a step change in capability; how feasible it would be to deliver; its accessibility to the wider community; and its environmental sustainability.

3 The graphic presents a simplified version of the prioritisation, assurance and decision-making process for the Infrastructure Fund. The process is not necessarily linear and may take place iteratively with some variations depending on the project or research council.

Source: National Audit Office analysis of the *UKRI Infrastructure Fund Portfolio Management Framework* and associated documents

1.17 UKRI has established a clear governance structure for Infrastructure Fund projects. The UKRI Executive Committee is responsible for approving new projects, following advice from an advisory committee made up of members nominated by each disciplinary research council, Innovate UK and Research England (as well as other internal and external members with relevant expertise). There is a 'senior responsible owner' (SRO) who is responsible for financial management of the Fund's projects (including contingency management and reprofiling of spending between financial years), although they may not increase a project's budget. The SRO is supported by a team which supports routine governance processes. This team collates projects' self-assessments of performance and risk for all Infrastructure Fund projects on a quarterly basis – including where the project is delivered by third parties (such as the John Innes Centre).

1.18 The SRO has limited opportunities available to reallocate funding between projects. Project business cases include a contingency to cover possible cost increases, with projects only authorised to spend 50% of this contingency: the SRO's approval is required before they can spend the remainder. However, the total contingency available to the SRO is limited due to project over-optimism (see paragraph 2.8). UKRI's governance framework states that the SRO would have delegated authority to reprofile spending between projects, allowing in-year underspends to be transferred to a project which could utilise additional funding to make faster progress. However, UKRI suspended this authority between November 2023 and July 2025 because UKRI anticipated spending more than its available budget and needed to reduce expenditure. This meant that Infrastructure Fund projects, between them, spent £81 million (18%) less than planned in 2024-25 and 2025-26 as some projects were proceeding more slowly than planned. UKRI has stated that projects will still receive the entirety of the approved budget. However, it has not adjusted the Fund's total budget in subsequent years, meaning there will be less available for other projects. The team managing the portfolio was also unable to initiate new projects during this pause.

1.19 We did not see evidence of UKRI slowing or stopping research infrastructure projects to enable more strategically important projects to proceed until December 2025, when UKRI decided not to fund four projects which it had previously approved and publicly announced (using the same process set out in Figure 4).[9] These projects had received relatively small amounts of funding to carry out preliminary activities. UKRI did this because the budget it had allocated to the Infrastructure Fund over the Spending Review period (from 2026-27 to 2029-30) was too small to continue to fund all the projects which had received full or conditional approval. It also allowed UKRI to accommodate other projects which it believed were more strategically important and the National Cryogenic Facility – which is a particularly high priority for DSIT (see paragraph 2.17). Some research councils told us that it is not clear to them which areas are priorities for research infrastructure investment which can result in funding being spread thinly across different disciplines.

9 These projects are two international projects (the second phase of the Large Hadron Collider 'beauty' enhancement and the Electron Ion Collider project), the Critical Mass UK project, to develop a national mass spectrometry infrastructure, and RUEDI, a project intended to allow observation of chemical processes.

Coordination between DSIT and UKRI

1.20 DSIT’s ambition is that science and technology should support economic growth, create jobs and improve people’s quality of life. It has identified six ‘frontier technologies’ which it believes will be particularly important. These are:

- advanced connectivity technologies (improved data transmission methods such as 6G mobile networks);
- artificial intelligence;
- cybersecurity;
- engineering biology (development of biology-derived products which are superior to or more sustainable than existing products);
- quantum technologies (including quantum computing); and
- semiconductors.

DSIT has sought to develop its knowledge about each of these technologies, including understanding their infrastructure requirements.

1.21 We have previously reported on UKRI’s use of research grants to support research and innovation.[10] We concluded that, in order to maximise value for money, DSIT and UKRI need to define more clearly the overarching outcomes they are seeking from research and innovation spending. The legislation which established UKRI requires it to follow the ‘Haldane Principle’; however, there is some ambiguity about the level of input DSIT should have in decisions about research infrastructure.[11] DSIT has generally limited itself to providing high-level guidance to UKRI about current government priorities, and only became involved in the later stages of business case approval processes for the largest projects. However, DSIT is developing a new framework for research and innovation infrastructure which it expects will support better strategic coordination and prioritisation across the landscape (including UKRI, government departments and research and innovation organisations).

10 Comptroller and Auditor General, *UK Research and Innovation: providing support through grants*, Session 2024-25, HC 875, National Audit Office, May 2025.

11 The Haldane Principle states that government ministers should decide overall funding levels, but the decisions on individual research proposals are best taken following an evaluation of the quality and impact of the proposals (such as a peer review process). However it also states that ministers “have a legitimate role in decisions that involve long-term and large scale commitments of national significance”, which include “the construction of large research facilities”.

1.22 In October 2025, DSIT allocated UKRI a budget of £38.6 billion over the four years between 2026-27 and 2029-30. It also set out three broad priorities for the R&D system – which it calls 'buckets' – and, in December, UKRI set out in more detail how it would align its activities and spending with these priorities.[12] UKRI will spend:

- £14.5 billion on curiosity-driven research – this is research which is unlikely to have economic value in the short-term but forms the foundation for later research and innovation; it includes grants applied for by researchers as well as the funding universities receive based on the quality of their research;
- £8.3 billion on targeted research supporting the government and society's priorities; and
- £7.4 billion to help innovative UK-based companies scale-up and grow.

UKRI intends to spend the remaining £8.4 billion – including £2.1 billion on infrastructure – on capabilities which will indirectly support DSIT's three priorities, such as by developing skills. UKRI also set out targets for spending on research linked to each of the sectors which the government's industrial strategy identified as having particularly high potential for growth – including the six 'frontier technologies' – and plans to establish cross-cutting programmes to oversee related research and innovation.

12 UKRI, *Budget allocations for UK Research and Innovation*, December 2025, December 2025.

Part Two

Commissioning research infrastructure

2.1 The Department for Science, Innovation & Technology (DSIT) and UK Research and Innovation (UKRI) produce business cases setting out why – and how – projects should be carried out. We reviewed the most recent business cases for a sample of research infrastructure projects which we used as case studies. This part looks at:

- how effectively DSIT and UKRI have used business cases;
- whether projects are achieving the intended outcomes; and
- how DSIT and UKRI responded to rapidly advancing computing technology.

Making the case for research infrastructure projects

2.2 Many government departments can draw on well-established methodologies to estimate and assess the benefits the government, and society will derive from increasing spending on a particular activity. In these situations, economic appraisal techniques such as benefit-cost ratios can be a useful tool for decision-makers as they allow alternative proposals to be quickly compared. There is strong evidence that spending on research and development (R&D) leads to good outcomes, but it is much harder to predict the benefits that will be achieved from spending on individual proposals. This is even harder for genuinely novel research infrastructure with potential to expand the boundaries of human knowledge – as opposed to infrastructure which duplicates, replaces, or extends an existing research capability.

2.3 HM Treasury is clear that the value for money of a proposal is a broad judgement that needs to consider the policy objectives and wider context as well as benefit-cost ratios. We found that all the research infrastructure projects in our sample could make a compelling strategic justification for funding. However, in some cases, this did not come across clearly in the business case's narrative: decision-makers would have needed other knowledge of the project to properly understand its merits. The economic cases we reviewed had clearly taken a considerable amount of time to produce, but UKRI's decision-makers do not primarily rely on benefit-cost ratios when determining which projects should be funded (they instead focus on qualitative assessments of projects' scientific merits). The economic cases also did not clearly set out whether there was any uncertainty about whether completing the project as planned would lead to the identified benefits. This information could help UKRI determine the level of risk across its portfolio of projects. DSIT has stated that it wants to "encourage thoughtful risk taking where there are significant benefits and to enable innovation".

2.4 Our observations are consistent with those made by Lord Willetts in his recent review of DSIT's business case processes.[13] He particularly emphasised the importance of concise business cases, to ensure that decision-makers could focus their attention on the right issues and reduce the burden and time to make decisions. Prompt decision-making is particularly important for research infrastructure given the pace of technological change and, in some cases, the need to respond to what other countries are doing. The review also called for fewer, but broader, business cases covering wider programmes and providing clear authority to spend in line with the programme's objectives. This would facilitate more agile decision-making where required and allow the programme to manage similar projects as a portfolio – allowing more high-risk activities to be undertaken without necessarily increasing the risk that the programme fails to achieve its objectives.

2.5 DSIT subsequently developed a new business case template, accompanied by guidance intended to simplify the process and increase focus on those elements that are most important when making investment decisions. The template sets an expectation that the main body of business cases should be a maximum of 12 pages long so decision-makers can easily find the relevant information. Information which is less essential for making decisions – such as confirmation that the project has complied with relevant standards – can be provided in annexes. The guidance highlights that clear information on risk and uncertainty provides particularly important context for decision makers.

13 Lord Willetts, *Independent review of the DSIT business case and approvals process*, February 2024.

Outcomes from larger research infrastructure projects

2.6 Many of the projects which UKRI has funded are likely to achieve the intended outcomes on time and within the agreed budget. Of the 24 projects underway in December 2025 and funded by the Infrastructure Fund, 14 (58%) reported that they expected to achieve their agreed outcomes and were not facing any major issues which significantly threaten delivery.[14] However, there are some projects – including among our case studies – which will not achieve as much as originally planned. UKRI's policy is that it would use the same prioritisation and approval process set out in Figure 4 to determine whether there should be a significant increase to project budgets (individual research councils could choose to fund a smaller increase). The project to upgrade the John Innes Centre responded to rising costs by reducing the project's scope meaning it will be less able to support research than envisaged when the business case was approved. The John Innes Centre upgrade is the largest Infrastructure Fund project: UKRI expects to provide it with £368 million of funding (a £50 million increase above the £318 million amount UKRI approved in 2022). The project to upgrade the FAAM Airborne Laboratory would not have delivered the full scope set out in its business case, even before UKRI decided in February 2026 to decommission the aircraft (**Figure 5**). This project had already spent £46 million of its £49 million budget.

2.7 The National Audit Office has previously identified 12 factors which impact the complexity of a project's delivery environment and the risks to successful delivery.[15] Four of these factors are particularly relevant to research infrastructure projects.

- Financial impact: The potential impact of cost increases may be more than delivery partners can easily absorb. UKRI may not be able to carry out sufficient assurance over cost estimates produced by delivery partners.
- Implementation complexity: Research infrastructure typically involves the use of business practices or technologies which are new to the organisations involved. Paragraphs 2.16 to 2.18 discuss how the National Quantum Computing Centre (NQCC) addressed the particularly high degree of technological novelty.
- Relations with delivery partners: Several of the research infrastructure projects we have looked at (such as the John Innes Centre upgrade and the ARCHER2 supercomputer) have a complex delivery structure where UKRI does not manage the project or operate the infrastructure.
- Organisational capability and performance: Research councils and delivery partners are often not able to draw on experience delivering similar projects due to the bespoke nature of research infrastructure and the length of time between major upgrades.

14 These 24 projects are those projects which UKRI has approved or conditionally approved and which had received Infrastructure Fund funding in 2025-26. Five additional projects were approved in December 2025, and one other project is not due to start until 2026-27. UKRI has also provided smaller amounts of funding to 15 other projects to carry out preliminary activities.

15 National Audit Office, *Good practice guide: Delivery Environment Complexity Analytic (DECA)*, November 2022.

Figure 5
Upgrading the FAAM Airborne Laboratory aircraft

UK Research and Innovation (UKRI) spent £46 million on a Mid-Life Upgrade (MLU) to an aircraft before deciding to decommission it instead

The FAAM Airborne Laboratory is a unique aircraft which first flew in 1981 and was converted to perform its current atmospheric measurement role in 2004.[1] The aircraft is owned and funded by one of UKRI's research councils while the National Centre for Atmospheric Science (part of the University of Leeds) is responsible for managing the aircraft.

In 2021, UKRI approved a business case to carry out an MLU which aimed to extend the aircraft's life to 2040, improve its environmental performance and enable it to carry out new types of atmospheric research experiments. The MLU project received £49 million from the Infrastructure Fund and reported it had spent £46 million of this as of December 2025.

However in February 2026, UKRI decided to stop providing funding to operate the FAAM Airborne Laboratory after the current maintenance contract expires in March 2026. This means that the aircraft will not fly again, although UKRI believes that around 81% of the instruments developed as part of the MLU could be used to support land or sea-based experiments.

UKRI decided to stop funding the aircraft because it believed it did not represent value for money, was no longer a good strategic fit and because continuing to fund it would require the Natural Environment Research Council to make significant cuts to other areas of research. It anticipated that the aircraft would be increasingly expensive to support, with a risk that it would not be possible to keep the aircraft flying after 2029. In the medium term, UKRI believes it may be possible to use 'uncrewed aerial vehicles' or more advanced sensors to carry out atmospheric research.

Even before UKRI's decision to stop funding the aircraft, the MLU would have taken longer than planned and would not have delivered all the scientific benefits set out in its business case. The project had been due to end in March 2026 before its duration was extended by 12 months in February 2024. The extended period of unavailability was one of the factors which led UKRI to conclude that the scientific value of the aircraft did not justify the cost of extending the maintenance contract.

The MLU's 2021 business case concluded that the project was "very low risk" even though it had not yet carried out detailed feasibility studies. This was far too optimistic and did not take account of the fact that other government projects to upgrade ageing (and already modified) aircraft have faced significant challenges which only became apparent after detailed technical studies had been carried out.

In particular, designing the new fuel system was much more challenging than expected while the cost of installing a key instrument (which the business case specifically committed to installing) rose considerably. This meant that the project had to prioritise which instruments would be installed; it reported in December 2025 that it had spent £9.5 million on developing instruments which it no longer planned to install as part of the MLU. The detailed design of the new fuel system was only submitted for regulatory approval in December 2025 and would not have been installed and tested until late 2026. The project team's focus on the fuel system meant that instruments required for the 2025 research programme were not installed on time: some of these experiments did not take place.

Note

1 The FAAM Airborne Laboratory was previously known as the Facility for Airborne Atmospheric Measurements.

Source: National Audit Office analysis of UK Research and Innovation and National Centre for Atmospheric Science information

2.8 We found that assessments of delivery risk, as well as financial risk and contingency varied in quality. In particular, the FAAM Airborne Laboratory and John Innes Centre's business cases seriously underestimated project risk, meaning that the intended outcomes were not achievable. These business cases were both approved before the projects' design was suitably mature (in 2021 and 2022 respectively). UKRI determined the maximum available budget even earlier, in 2020. Some of the business cases we reviewed clearly set out how much contingency was available and provided an appropriate justification of why this was likely to be sufficient. Others had little or no contingency and did not explain why the project team expected that the budget requested would be sufficient to achieve the project's objectives.

2.9 We have previously observed that costs are more likely to rise if project sponsors have vested interests in ensuring projects are funded (which can lead to over-optimism not being challenged or even to deliberate underestimation).[16] As the Infrastructure Fund allocates funding to projects based on proposals developed by the sponsoring research council, its projects are particularly exposed to this risk. This may have been even more pronounced before the Infrastructure Fund became a well-established funding mechanism (meaning that the research councils could anticipate it would continue to be available and understood that initial allocations would not be revised in the event of cost increases). A desire to see projects funded also disincentivises taking a phased approach, which could have helped the John Innes Centre upgrade project by aligning decisions with the project's delivery plan. Additionally, the cost of the second phase, to replace the main laboratory, would have been better understood as the laboratory's design would have been more mature and cost estimates would have reflected the prevailing economic conditions.

2.10 We saw positive examples of UKRI deliberately seeking to simplify projects' delivery environment – and so increase the likelihood that the project succeeds. In future, DSIT and UKRI's establishment of a National Supercomputing Centre at the University of Edinburgh (which already hosts the ARCHER2 supercomputer) could help it identify project risks earlier and improve coordination of the UK's network of supercomputers. ARCHER2 had been delayed by 18 months as it used advanced hardware and new software which required significantly more testing than expected. The UK Biobank project effectively managed risks by ensuring it used off-the-shelf technology where possible.

16 National Audit Office, *Survival guide to challenging costs in major projects*, June 2018.

Responding to rapidly advancing computing technologies

2.11 We looked at computing infrastructure in particular because of its importance to many scientific disciplines, and because it is a rapidly developing technology. DSIT, through UKRI, has typically funded a single 'national supercomputer' (currently ARCHER2) designed to be used by a wide range of users and a number of less powerful computers. DSIT and UKRI believe that researchers continue to need access to supercomputers which are able to carry out modelling or simulation tasks as well as computers optimised to run artificial intelligence (AI) algorithms. In the near future quantum computers, which process information in a fundamentally different way, have the potential to transform computing.

2.12 The UK's supercomputers have lagged behind those available to researchers in other countries in recent years; DSIT and its predecessor departments did not fund the step-change in capability that multiple reviews since 2020 have recommended (**Figure 6** overleaf) until 2025. Two cross-government reviews in 2021 and 2023 both recommended that government should take a much more strategic approach – including publishing a plan setting out how existing systems would be replaced and starting to co-ordinate a fragmented landscape.[17] The government did not address these recommendations until July 2025, when DSIT and UKRI published the *UK Compute Roadmap*.[18] This does set out a plan to replace ARCHER2 and establish a network of National Supercomputing Centres intended to "build a coherent, federated ecosystem where the UK's computing capabilities are connected, strategic and globally competitive". However, ARCHER2 is expected to close in November 2026, at least 13 months before its replacement is turned on in December 2027. UKRI believes it will be able to reduce the impact on researchers by funding a small number of additional computer systems due to open in 2026-27 and prioritising researchers who would otherwise have used ARCHER2.

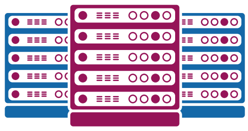
17 Government Office for Science, *Large-scale computing: the case for greater UK coordination*, September 2021; and Department for Science, Innovation & Technology, *Independent Review of The Future of Compute*, March 2023.

18 Department for Science, Innovation & Technology and UK Research and Innovation, *UK Compute Roadmap*, CP 1352, July 2025.

Figure 6

Development of the Next National Supercomputer

The UK's supercomputing capability has fallen behind other countries



The ARCHER2 supercomputer's performance has been measured at 19.5 petaflops, meaning it can conduct 19.5 quadrillion (1.95 x 10^{16}) calculations per second: when it opened in 2021 it was the 22nd fastest computer in the world.[1]

However, UK Research and Innovation (UKRI) already believed that an 'exascale' supercomputer (capable of one exaflop, or 1,000 petaflops: around 50 times as powerful as ARCHER2) would be the only system capable of resolving some scientific questions and was aware that other countries were already developing these systems. UKRI and the Department for Business, Energy & Industrial Strategy commissioned a business case for an 'exascale' system but did not approve it.

Subsequent reviews conducted in 2021 and 2023 reiterated the need: the 2023 *Future of Compute* review recommended that the government immediately start building a supercomputer capable of achieving 'exascale' performance by 2026.[2] It noted that the United States of America and China had already deployed these systems, and that the UK research system would suffer if UK-based researchers could not access world-class computers.

The Department for Science, Innovation & Technology (DSIT) and UKRI subsequently developed a proposal to build an 'exascale' system, but this was cancelled in 2024 because of short-term affordability challenges. They now intend to fund a new supercomputer which is expected to be turned on in December 2027, and available to researchers in early 2028. While this computer will be significantly faster than the ARCHER2 system it will replace, it will only achieve 'exascale' levels of performance in the best-case scenario. There is also likely to be a gap of 13 months between ARCHER2 closing and the new system being turned on.

DSIT has allocated £750 million to build the system and operate it over its five-year life (including contingency). These costs are much higher than the cost of ARCHER2 – in part because the new system could use up to eight times as much electricity.

Notes

1. The 'Top 500' rankings are based on information submitted voluntarily by supercomputer operators and do not necessarily include all the world's fastest supercomputers.
2. Available at: https://www.gov.uk/government/publications/future-of-compute-review/the-future-of-compute-report-of-the-review-of-independent-panel-of-experts

Source: National Audit Office analysis of Department for Science, Innovation & Technology and UK Research and Innovation information, as well as published global rankings available at www.top500.org

2.13 Supercomputers have a shorter useful life than other research infrastructure and often need replacing after around five years. The pace of technological advance means that suppliers are unwilling to continue to support older systems, and supercomputers become less capable of supporting research at the scientific frontier as they are overtaken by newer systems. For example, ARCHER2 was ranked 22nd in the world when it opened in November 2021, but has since slid to 88th position.[19] The fastest supercomputers are also becoming much more expensive: the Next National Supercomputer is expected to cost around 10 times as much as ARCHER2 to build and maintain. These factors mean that good planning, including timely, swift decision-making and effective risk management, is particularly important for computing projects. Any delays mean there are fewer opportunities to exploit their capabilities when they are at their fastest relative to competing systems: had ARCHER2 opened in May 2020 as originally planned, it would have been the 13th fastest computer in the world.

2.14 While supercomputer projects need to move quickly to take full advantage of the newest technologies, the supporting infrastructure may take longer to build, illustrating the importance of strategic planning. It can currently take several years to install a new grid connection: the Next National Supercomputer will only be able to be turned on in 2027 because the University of Edinburgh had previously paid to install a 30-megawatt grid connection at the site where it will be installed.

2.15 Quantum computers could in future be capable of quickly solving problems that even the most powerful 'classical' computers find extremely challenging. Because of the likely importance of quantum technologies (including computing) for the economy and national security, DSIT's 2023 *National Quantum Strategy* concluded "we are in a global race to develop and commercialise these capabilities".[20] For quantum computing to be commercialised, a supply chain capable of building quantum computers needs to be developed, and potential users of the technology need to become 'quantum ready' (aware of the technological opportunities and what they need to do to be able to take advantage of them).

2.16 The National Quantum Computing Centre (NQCC) was set up in 2020 to develop prototype quantum computers, provide developers with access to these prototypes and support commercialisation of the technology. It is still unclear which of several different technological approaches will be most useful – one of the NQCC's tasks is to identify the most promising technologies. To do this, it has funded seven prototypes made by different companies, which use five different technical approaches (six of these are hosted in its buildings, with the seventh located nearby). The NQCC believes that this breadth of understanding – coupled with the experience it has gained from developing quantum technologies – puts it in a globally unique position to understand the merits of different approaches and act as a 'trusted authority'.

19 Based on the 'Top 500' rankings, available at www.top500.org. These rankings are based on information submitted voluntarily by supercomputer operators and do not necessarily include all the world's fastest supercomputers.
20 Department for Science, Innovation & Technology, *National Quantum Strategy*, March 2023.

2.17 The NQCC was set up following expert advice that there was a "closing window of opportunity" for the UK to retain a competitive advantage. DSIT and its predecessor department, the Department for Business, Energy & Industrial Strategy (BEIS) and UKRI have all recognised the particular importance of speed and agility given this strategic context. BEIS and UKRI adapted their normal processes for approving expenditure, which allowed some works to start earlier. The business case also took a phased approach: there was a clear vision and scope of work for the NQCC's first five years of operation, with more indicative objectives and cost estimates for the subsequent phase. This was a sensible response to the very high uncertainty about when it will be possible to build a fully capable quantum computer and then commercialise the technology. UKRI has also recognised the particularly high potential of the National Cryogenic Facility (a DSIT priority project) to support quantum technologies. In December 2025 it agreed to conditionally approve this project to avoid holding the project up, although the proposal was less mature than other projects.

2.18 The NQCC itself has also moved quickly and with agility. It commissioned laboratory space in a nearby building to mitigate the impact of construction delays and revised a laboratory's specification to be able to take advantage of unexpected advances in one specific technology. However, the NQCC has found it hard to recruit and retain the staff it needs, in part because of the sector's competitiveness and a hiring freeze directed by the Science and Technology Facilities Council between September 2024 and September 2025. It has also found some UKRI frameworks and support functions have been less useful than it had hoped.

2.19 DSIT and HM Treasury have also ensured that the NQCC has more certainty over its long-term budgets than most R&D programmes. DSIT recognises that, in some cases, setting long-term budgets (of up to 10 years) can provide more benefits than would be achieved if budgets were only set for a shorter period of time (such as a Spending Review period). It considers that these situations include cases where long-term funding could help develop or maintain core national infrastructure, or support skills development (as is the case with the NQCC). HM Treasury approved a 10-year budget of "at least £287 million" for the NQCC's next phase in July 2025: the NQCC is currently one of two DSIT programmes to have this level of budget certainty beyond the current Spending Review period. DSIT told us that it will continue to consider further long-term funding arrangements where appropriate.

Part Three

Getting value from research infrastructure

3.1 This part sets out:

- the impact of research infrastructure;
- the condition of the research infrastructure estate, and how to ensure it continues to support cutting edge research; and
- good practice and dissemination of learning.

The impact of research infrastructure on society

3.2 The UK research and innovation system has a strong international reputation; ranking sixth in the 2025 Global Innovation Index. Research infrastructure is essential to maintaining the UK's world-leading position by providing the facilities and resources to enable high-quality research.

3.3 To examine the potential impacts and benefits of research infrastructure on society, we undertook six case studies spanning disciplines including quantum computing, medical research, biotechnology, and climate science. Each case study had either recently undergone, or is currently in the planning stages of, a major development or upgrade. **Figure 7** on pages 34 and 35 describes the case studies and shows the geographical spread of the infrastructure. There were examples from each of the case studies of the link between supported research and impacts for individuals, as shown in the following.

- **UK Biobank,** which provides access to biological samples and health-related data that has enabled vital research on common and life-threatening diseases. For example, using UK Biobank data, researchers developed a way of identifying people at higher risk of particular diseases. The approach has been piloted in the National Health Service (NHS) with early findings showing that full implementation in England could increase the detection of bowel cancer by 20% and double the detection of breast cancer, with potential to enable significant savings for the NHS.
- **The John Innes Centre,** which supports research in plants and microbiology, reported in 2022 that its work on delivering sustainable wheat productivity will allow farmers to increase yields and produce more food.

Figure 7
Case studies of research infrastructure funded by UK Research and Innovation that we examined in 2025

We explored six case studies that represent a range of research infrastructure disciplines and geographic locations

CoSTAR A C D J I

- The CoSTAR Network, made up of five labs, provides world-leading facilities and technology to support the continued growth of the UK's gaming, TV, film, performance and digital entertainment sectors.
- The Foresight Lab, a research lab looking at emerging trends across the creative industries, recently explored how the creative sector can help people respond to complex health challenges by using media, design, or storytelling to support wellbeing, foster connection, and offer new ways of seeing the world.

archer2 B

- ARCHER2, hosted by the University of Edinburgh, provides UK researchers with a supercomputing service.
- Researchers have used the ARCHER2 service to improve cloud modelling for better weather and climate prediction.
- Other researchers have used ARCHER2 to investigate how to reduce inefficiencies when there are large clusters of wind turbines. Research such as this will enable wind farms to be more efficient and produce more power.

uk biobank E

- UK Biobank's database includes blood samples, heart and brain scans, and genetic data of over 500,000 volunteer participants.
- The facility stores approximately 11 million samples at –80ºC to keep them preserved. It uses robotic machinery to collect samples for research.
- Blood samples donated by more than 50,000 UK Biobank participants allowed researchers to identify four proteins that are found at higher levels in the blood of apparently healthy people who would later be diagnosed with dementia, including Alzheimer's disease.
  - Researchers found that these four proteins were elevated in the blood of people more than 10 years before they were diagnosed with dementia – demonstrating the possibility of a simple blood test for dementia.

John Innes Centre – Unlocking Nature's Diversity F

- The John Innes Centre aims to address global challenges and contribute to improvement of health care, agricultural productivity, sustainable farming and biodiversity conservation.
- Scientists working at the Centre have produced a tomato enriched with a drug to treat Parkinson's disease. This could have a positive impact in developing nations where access to pharmaceutical drugs is restricted and also help people who suffer adverse effects due to the regular administration of the existing drug.

UKRI National Quantum Computing Centre H

- The National Quantum Computing Centre (NQCC) is a purpose-built centre which provides researchers with access to emerging technologies, focusing particularly on the challenge of scaling quantum computing.
- Quantum computing is a potentially transformative technology: the NQCC is responsible for ensuring that the UK maintains sovereign capabilities and becomes a 'quantum ready economy'.
- The NQCC is developing quantum hardware and software and provides a space for companies to demonstrate their technologies. It seeks to be a 'trusted authority', able to advise researchers, industry and the government.

G

- The *RRS Sir David Attenborough* is the first British polar research vessel to feature a 'moon pool', a vertical shaft running through the vessel and open to both the air and the sea.
- Sophisticated instruments and equipment capture important data to reveal the impact of environmental change on marine biodiversity.

Note

1 We have adjusted some locations of the case studies by up to several millimetres to improve clarity. Therefore, this map shows approximate and not exact locations.

Source: National Audit Office analysis of information provided by UK Research and Innovation and the bodies responsible for our case study projects. Office for National Statistics licensed under the Open Government Licence v3.0. Contains OS data @ Crown copyright and database right 2024.
RRS Sir David Attenborough image credit: British Antarctic Survey

- **The CoSTAR (Convergent Screen Technologies and Performance in Realtime) Network,** which supports the UK creative industries, recently identified how the creative sector can help people respond to complex health challenges by using media, design or storytelling to support wellbeing.
- Examples of research conducted on the **ARCHER2** supercomputer include simulations to improve the performance and safety of nuclear reactors, and models to help understand how airborne diseases spread indoors.

Physical condition of research infrastructure

3.4 The Science and Technology Facilities Council (STFC) – which operates a number of UK Research and Innovation's (UKRI's) largest research facilities – currently spends around £6 million per year maintaining its physical estate (which includes research infrastructure). This is much less than it needs to spend to maintain the condition of this infrastructure and ensure it continues to meet its standards: in 2023, STFC estimated that 45% of its estate was in an unacceptable condition. STFC estimates that the 'maintenance backlog' (the spending required to restore the estate to a satisfactory condition) is already around £360 million and this will rapidly increase if it does not change its approach.

3.5 STFC is currently in the process of planning a 20-year estate modernisation programme. This is intended to address maintenance backlogs, make its estate more useful to researchers and meet UKRI's 'net zero' commitments. Research infrastructure often uses very large amounts of energy, meaning that significantly reducing carbon emissions is a considerable challenge, but also an opportunity to reduce operating costs. STFC estimated that it would need to spend around £80 million to £100 million per year in order to modernise its whole estate. However, the budget which UKRI has allocated to STFC over the Spending Review period will require it to reduce its spending compared with its previous plans. UKRI has said that it expects STFC's key facilities to be funded "properly and sustainably" – which may mean that some facilities are decommissioned, rather than modernised. UKRI has more flexibility over how it uses its budget than other government departments: all UKRI expenditure, including that on day-to-day maintenance, is classified as 'capital' spending. UKRI told us it is encouraging research councils to submit proposals to the Infrastructure Fund for funding to decommission research infrastructure which is expensive to maintain and operate. It is also aware that it needs to make its estate more resilient to the impacts of climate change.

3.6 Universities are responsible for many of the UK's research infrastructure assets: the Department for Science, Innovation & Technology (DSIT) and UKRI rely on this infrastructure to achieve their strategic priorities and provide some funding, but they are not legally responsible for its condition. The higher-education sector faces financial sustainability issues: the Office for Students estimates that 45% of providers are on course to operate with a deficit (meaning they spend more than they earn in income) in the 2025/26 academic year.[21] It is likely that English universities are spending much less than is needed to maintain the condition of research infrastructure. Research England estimates that around £5.6 billion would be required to restore university-owned research infrastructure to a fully operational condition. It has also estimated that English universities are currently spending £1.82 billion each year on their research infrastructure, with £758 million of that spent entirely on maintenance.

3.7 Research England has found that the higher education sector is facing many of the same issues we identified in our most recent report examining how government departments are maintaining their buildings.[22] It has found that laboratories are old and no longer fit for purpose, that short-term 'reactive' maintenance is being carried out instead of preventative maintenance (which is usually better value for money). Some university buildings have had to be closed because of health and safety hazards such as asbestos or reinforced autoclaved aerated concrete (RAAC). And even though the overall condition of the university sector's research infrastructure is deteriorating, universities are adding to it (and the future maintenance burden) by building new facilities without disposing of obsolete or redundant facilities.

3.8 Research England provides universities in England with funding that can be used either for maintenance, to purchase new buildings or equipment, or to help universities collaborate with other organisations. This is part of the World Class Labs budget (see paragraph 1.8), and is allocated to universities by a formula: Research England provided £233 million in 2025-26 (£59 million of which can only be spent on maintaining existing infrastructure). In December 2025, UKRI set out its intention to change this fund from 2027-28.[23] One part of its funding for universities will continue to be allocated by formula but will be ring-fenced for spending on "sustaining current facilities": UKRI will use a competitive process to award funding for new equipment and facilities. It has not yet set out how much it expects will be available for either purpose.

21 Office for Students, *Financial sustainability of higher education providers in England: November 2025 update*, November 2025.
22 Comptroller and Auditor General, *Maintaining public service facilities*, National Audit Office, Session 2024-25, HC 544, January 2025.
23 UKRI, *Budget allocations for UK Research and Innovation*, December 2025.

Adapting research infrastructure for technology developments

3.9 Research infrastructure often has a long useful life; therefore, achieving value for money throughout its life often requires adaptation. Our case studies show research infrastructure operators have explored different ways of adapting facilities to take advantage of technological change and facilitate further research opportunities. Examples include the following.

- **Upgrading current infrastructure:** UK Biobank is constructing a larger site to double its capacity, with improved layout and robotics. This should increase the speed of sample retrieval fourfold, allowing for more repeat sampling from volunteers, and enabling more detailed research into areas such as how lifestyle or socio-economic factors may impact health.

- **Flexibility of space to allow for advances in technology:** *RRS Sir David Attenborough* has modular lab spaces which scientists can customise to their own requirements, and it is also possible to 'plugin' portable, containerised laboratories. As technologies and techniques change, the containers can be reconfigured to ensure research teams have the most up-to-date facilities. At the John Innes Centre upgraded horticulture facilities such as glass houses and 'controlled environment rooms' provide scientists with more flexibility in controlling factors such as temperature, light and water. This increased flexibility will enable scientists to undertake research under a wider variety of conditions.

- **Effective forward planning:** The ARCHER2 supercomputer, which is reaching end-of-life, is monitoring its utilisation to ensure it prioritises space for researchers carrying out the most demanding processing tasks which could not be done elsewhere in the UK system.

- **Facilitating collaboration to ensure appropriate infrastructure specifications:** CoSTAR Live Lab is based in Production Park, Wakefield: an industry hub for live music and film production. This site location provides greater opportunities for academia and industry to collaborate. Live Lab gains from mutually beneficial partnerships with industry such as technology companies providing technology free of charge to support Live Lab in its research, and Live Lab in return can provide feedback on the technology based on its testing and use.

- **Exploring additional use cases for the infrastructure:** The introduction of improved, satellite-based internet connections on *RRS Sir David Attenborough* has supported new ways of working as well as well-being improvements for staff. The British Antarctic Survey (which operates the ship) told us it is exploring using this technology to improve real-time data sharing. This could provide wider research benefits as well as reducing the numbers of scientists on the ship required for research, freeing up capacity on the ship for wider engagement.

Monitoring and reporting performance of research infrastructure

3.10 Understanding the efficiency and effectiveness of interventions and their impacts is critical to good decision-making. For research infrastructure this involves tracking a range of metrics such as efficiency and use of the facility, output measures such as number of scientific publications and number of stakeholders engaged, as well as outcomes and impacts to society. As part of the business case, research infrastructure projects are required to outline their approach to monitoring and evaluation. Operators of research infrastructure often report the results of ongoing monitoring alongside their annual accounts and more extensive approaches to determining scientific outcomes or impacts happen through evaluations of the research which are undertaken over longer periods.

3.11 Our review of six case studies found that UKRI does not have any specific requirements about what metrics research infrastructure operators should consider monitoring, or how frequently they should report these. We have found our case studies take different and, in some cases, fragmented approaches to monitoring outputs, outcomes and impacts. Bespoke metrics are often needed to reflect the specific objectives of research infrastructure and how it is used. However, UKRI also needs to collect data on a consistent basis in order to understand the research infrastructure landscape and inform investment decisions. UKRI does not currently have a central registry of information about the performance and condition of the infrastructure it funds. It told us that this information is available, but it is held separately across the different research councils.

3.12 We have found that some research councils monitor use of research infrastructure well, offering good practice that could be shared wider across UKRI to support approaches to monitoring and reporting. Good practice identified included:

- using a range of metrics to track a variety of performance and outcome measures;
- a clear and consistent approach to collating and reporting this information at regular intervals; and
- consulting research infrastructure operators when developing metrics and engaging further to understand the data they report.

3.13 Case study examples of good practice in monitoring and evaluation include the following.

- **CoSTAR Network:** Qualitative and quantitative measures across inputs, outputs, outcomes and impacts are collected and reported quarterly as part of a template developed by the Arts and Humanities Research Council (AHRC). Examples of metrics include descriptions of successes and challenges, engagement and outreach data, patent and job creation. The metrics were developed in consultation with those managing and operating each of the different sites, and AHRC holds regular meetings with the sites to ensure that the data are understood and to prevent misinterpretation. The monitoring team have shared their experiences from implementing this system across AHRC to support learning and are currently exploring the idea of expanding monitoring and reporting to further support decision-making.
- ***RRS Sir David Attenborough*****:** At the end of each cruise, science crews undertake a post cruise assessment to outline how well the British Antarctic Survey (which operates the ship) performed at supporting their project on board. Subject matter experts review the assessments and provide recommendations and feedback to the Natural Environment Research Council (NERC). NERC uses this information to support its decisions about where additional investment is necessary, and the British Antarctic Survey considers these findings and makes improvements where possible.

3.14 While UKRI has more general monitoring and evaluation guidance, it does not have any specific guidance on how to monitor research infrastructure. UKRI has an evaluation community of practice to support knowledge sharing and delivery of cross-UKRI training on evaluation, but research councils we spoke to were not aware of any opportunities to learn from others or share good practice about research infrastructure monitoring and reporting.

3.15 DSIT recognises that the monitoring and reporting of research infrastructure is highly fragmented, with no regular or formal monitoring in place across government infrastructure investments to understand performance, benefits, impacts, risks and opportunities. A lack of consistent approach makes it challenging for DSIT to have an understanding of the landscape and to report on the impact of research infrastructure to the public and relevant stakeholders. DSIT and UKRI are exploring how they could improve monitoring and reporting across the research infrastructure landscape.

Appendix One

Our audit approach

Our scope

1 This study examined how effectively the Department for Science, Innovation & Technology (DSIT) and UK Research and Innovation (UKRI) work together to develop and operate research infrastructure that meets the needs of the government, researchers, and industry. We examined:

- how well DSIT understands the research infrastructure landscape, how DSIT and UKRI determine what infrastructure to fund, and whether they manage infrastructure as a portfolio (Part One);
- whether DSIT and UKRI are working effectively to deliver the research infrastructure the UK needs – we particularly focused on how they use business cases, whether projects are achieving the intended outcomes and how DSIT and UKRI responded to rapidly advancing computing technologies (Part Two) and;
- whether existing research infrastructure assets are being used in a way which achieves the best possible outcomes – we considered what the research infrastructure is achieving, the condition of research infrastructure and how UKRI monitors research infrastructure (Part Three).

2 We drew on government guidance and on the following National Audit Office good practice guides and lessons learned reports to inform our assessment of value for money.

- *Good practice guide: Delivery Environment Complexity Analytic (DECA)*, November 2022.
- *Good practice guide: Framework to review portfolios*, January 2022.
- *Lessons Learned: a planning and spending framework that enables long-term value for money*, HC 234, October 2024.

Our evidence base

Interviews

3 Between March and December 2025, we conducted 15 interviews with UKRI – covering all the disciplinary research councils and Research England – and 12 interviews with DSIT officials. We set agendas for each interview based on our three key study questions and ancillary areas which needed clarification from our document reviews.

4 We triangulated findings from interviews with UKRI and DSIT documents and published evidence.

5 We held meetings with senior members of staff from the organisations responsible for our six case study projects and others involved with these projects.

Document Review

6 We reviewed documents against our study questions on DSIT's and UKRI's understandings of the existing infrastructure landscape and any assessments of the existing infrastructure's state of repair. We reviewed documents to understand DSIT's and UKRI's approaches to prioritisation, any financial information, governance processes, and meeting minutes.

Case studies

7 We carried out six case studies of publicly funded research infrastructure to help assess whether decisions to fund research infrastructure projects are supported by strategic ambitions and good quality information.

8 Each case study comprised:

- a site visit;
- interviews with the site manager and other key members of staff; and
- review of key documentation, such as business cases, operational and performance documents, and governance and assurance documents.

9 We purposely selected our case studies based on the following primary sampling criteria: type of infrastructure, lifecycle stage, geographical location, and national significance. Data and digital archival based case studies such as longitudinal cohort studies were not included in our scope.

10 The six case studies, and the research councils which sponsor them are as follows.

- ARCHER2 (Engineering and Physical Sciences Research Council and Natural Environment Research Council).[24] The Next National Supercomputer is sponsored by UKRI's Digital Research Infrastructure Programme.
- CoSTAR (Convergent Screen Technologies and Performance in Realtime) Network (Arts and Humanities Research Council).
- John Innes Centre Next Generation Infrastructure (Biotechnology and Biological Sciences Research Council).
- National Quantum Computing Centre (Engineering and Physical Sciences Research Council and the Science and Technology Facilities Council).
- *RRS Sir David Attenborough* (Natural Environment Research Council).
- UK Biobank (Medical Research Council).

11 We also make references in this report to the project to upgrade the FAAM Airborne Laboratory's atmospheric research aircraft. This is not one of our case studies, but we have referred to it where we identified similar issues to those seen in our case studies. We deliberately chose not to treat it as a case study because we were already aware from correspondence that the project was experiencing challenges, and including it in the case study selection process would have potentially biased the sample.

Business case review

12 As a follow on from our 2016 report, we asked our internal network of expert business case reviewers to review six business cases to determine whether issues identified from the previous study are still arising. All six business cases are from one of our case studies. *RRS Sir David Attenborough* was not included in the business case review as its business case was produced prior to 2016.

24 We used the published 'Top 500' rankings to assess the peak performance (RMax) of the ARCHER2 high performance computer relative to other computer systems. These rankings are published twice each year, in June and November. As they rely on voluntary submissions, they do not necessarily include all the fastest computers in the world. The rankings, as well as details of the methodology used, are available at www.top500.org.

13 The business cases reviewed were those for the ARCHER2 supercomputer, the CoSTAR Network, the John Innes Centre Next Generation Infrastructure, the National Quantum Computing Centre, the Next National Supercomputer, and UK Biobank Phase 2. We asked the network to review whether:

- business cases show clear strategic thought underpinning investment decisions and have explored different options to achieving capabilities;
- business cases have improved in areas identified as part of the 2016 study; and
- DSIT are taking on board recommendation from Lord Willetts's review of business cases – this was only relevant for the Next National Supercomputer's business case, as this is the only business case produced since Lord Willetts's review.

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