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THE NATIONAL RESEARCH AND INNOVATION SYSTEM IN THE UNITED KINGDOM: A BRIEF HISTORY

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ABSTRACT

What is new?	This paper provides a walk through key elements and decisions in recent UK research and innovation policy, up to September 2023.
What was the approach?	The paper uses the relevant policy documents of the period, and draws on the author's lived experience.
What is the academic impact?	The paper provides a context for other studies of Research Management and Administration, enabling other researchers to connect to relevant parts of policy development.
What is the wider impact?	The paper provides research management practitioners with the context in which policies are developed, and the interconnections that will influence future policies. It is a form of practitioner's literature survey, albeit not comprehensive.

Keywords: Research Policy; UK; Research and innovation

INTRODUCTION

The UK research and innovation system has evolved over many decades, if not centuries. Whilst we are most aware of the recent policies and developments, many aspects are rooted in the past. Having a knowledge of the history of the development of research and innovation policies, and what has worked or not, is important in dealing with the current environment and in creating or influencing future policies. Not least because some of the institutions involved were founded many years ago and their intertwined history influences current practices.

There are increasing similarities between national systems, as governments engage with the research and innovation sectors as part of their economic development policies. This can be seen across the world, regardless of the nominal status or maturity of a country or its economy. In some cases, policies have been traded back and forth, especially in the area of research assessment, but also in those of research integrity and research impact, and there is regular dialogue between countries' policy-makers.

This paper provides a necessarily selective reflection on the evolution of the UK research and innovation system up to September 2023, in particular as it affects universities.

The paper draws on material prepared for the Australasian Research Management Society's accreditation module on 'The National Research and Innovation System in the United Kingdom'.

Outline of the UK Research System

Before providing the history, it is worth providing an overview of the system and the main players, to provide context to the rest of the paper.

In 2021 the UK spent £66.2 billion on research and development (ONS, 2023). Over two thirds (71%) of that R&D expenditure takes place in businesses, with 23% in higher education institutions (mostly universities). Only 5% takes place in government organisations, mostly Research Council Institutes, reflecting a lack of governmental research capacity in comparison to many other countries.

Statistics up to 2019 (ONS 2021) had showed that R&D spend represented about 1.7% of its gross domestic product (GDP), well behind the OECD (Organisation for Economic Co-operation and Development) average of 2.4%. However, for the 2020 and 2021 statistics, the Office for National Statistics (ONS) has introduced some changes to its methodology that have had the effect of increasing the estimates of R&D spend by both businesses and higher education. The estimated spend has thus moved from £38.5 billion in 2019 to £61.8 billion in 2020 and £66.2 billion in 2021. In publishing these last two years' figures the ONS has not provided the equivalent figure for the proportion of GDP, but there have been suggestions that the spend represents 2.4-2.8% of GDP (Research Professional, 2023). The 2022 estimates (to be published in 2024) will hopefully remedy this omission. R&D spending targets are discussed further later in the paper.

The 2019 data also showed that businesses funded just over half (54%) of the expenditure, with a further 14% coming from overseas sources. This is likely to be substantially split between overseas businesses and the European Commission. The UK government funds about 27%. Figure 1 illustrates these figures.

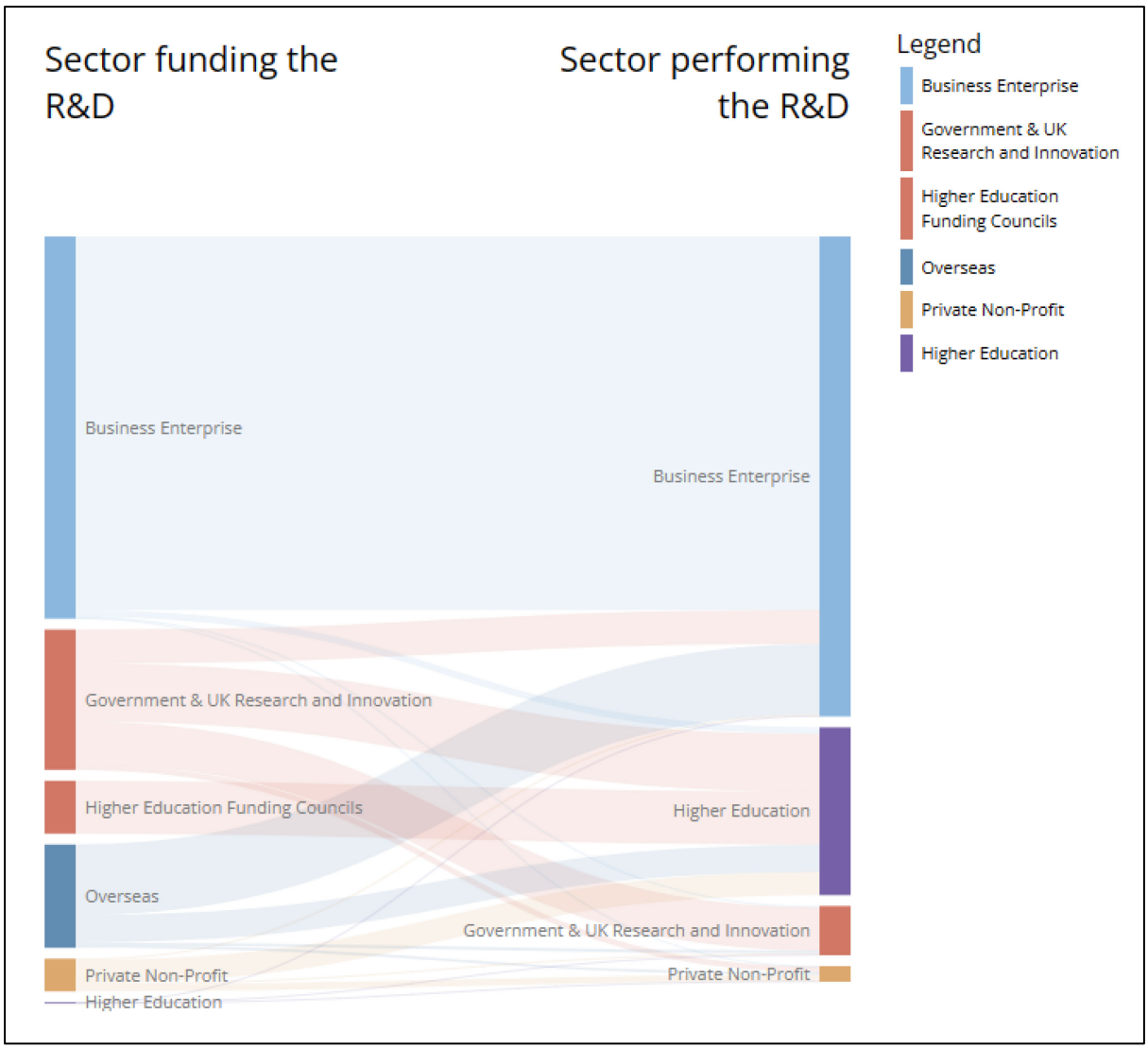

Figure 1: Flow of UK R&D Funds, 2019 (ONS, 2021)

The funding of research in universities operates through the Dual Support System, under which institutions receive core funding for research from government and funding for individual projects from a range of types of organisations. The core funding is allocated on a formulaic basis informed by periodic research assessment (currently the Research Excellence Framework), and is known as quality-related research funding, or QR. It is allocated by the four national funding bodies for England, Northern Ireland, Scotland and Wales, which each have a slightly different approach. There are also core funds for innovation or knowledge exchange provided by each of the four national funding bodies, again each using a different approach.

As well as QR, the UK government also funds individual research projects, programmes, fellowships and studentships through the seven Research Councils, innovation projects through Innovate UK, and policy-specific research through the relevant government department. Altogether, this amounts to two-thirds (66%) of the research funding received by universities (HESA, 2023).

In addition to government and business funding of research (the latter of which was about 11% of the total university research project funding in 21/22 (HESA, 2023)), the UK has a strong research charity sector, in particular in medical and social research topics. Charities provided about 21% of the research project funding received by universities in 21/22 (HESA, 2023).

The final major source of research project funding is the European Commission, principally through its Framework Programmes (currently Horizon Europe, the ninth, which runs from 2021 to the end of 2027). This has amounted to about 12% of research project funding received by universities in the past, but in the context of the withdrawal of the UK from the European Union is subject to some perturbation and was at 10% in 21/22 (HESA, 2023).

Government and the Politics of Research and Innovation

The research and innovation environment that exists today includes elements from different time periods. The earliest in the common era is that of the Haldane Principle, relating to a 1918 report on the machinery of government chaired by R.B. Haldane (UK Government, 1918). This has been held to suggest that research funding decisions should be made by researchers rather than by politicians. It has underpinned much of the recent framework for UK government investment in basic research via the Research Councils, and has finally been embodied in legislation in the Higher Education and Research Act 2017 (UK Parliament, 2017). Section 4 of the UK Parliament's Commons Select Committee on Innovation, Universities, Science and Skills' report (UK Parliament, 2009) provides further background and history.

The UK government makes policy through Green Papers (for discussion or formal consultation), White Papers (as policy statements or as proposed legislation) and Acts of Parliament (usually derived from a White Paper, which is translated into a Bill for debate in and approval by Parliament, and finally receiving Royal Assent). Substantive government policy specifically in relation to research and innovation does not occur too frequently, although the topic does tend to feature in the Budget and related financial or fiscal policies. Of course, the nature of research and innovation is that it can and should be present in all areas of government, not only as a topic in its own right (the distinction between science for policy, compared to the policy for science).

As well as the UK government and Parliament, there is a level of devolution to three of the constituent countries of the UK. However, the level of devolution and the structures involved differ for each of the three. Scotland has a Parliament (1998), with the greatest levels of devolution; Wales had an Assembly (1998), followed in 2006 by a Welsh Assembly Government; and Northern Ireland has an Assembly (1998) (suspended at the time of writing in September 2023). There is no separate constitutional body for England. The different approaches at UK level and national level create variations in policy and funding across the UK.

The 1993 White Paper, Realising Our Potential (UK Government, 1993), introduced both the current structure of the UK's Research Councils (with the exception of the Arts and

Humanities Research Council, which was created in 1998 as the Arts and Humanities Research Board before becoming a Council in 2005) and sowed the seeds of the current impact agenda: 'All the Research Councils' missions will be reformulated to make explicit their commitment to wealth creation and the quality of life.' Specifically, it laid down three objectives for each of the Research Councils: high-quality research; post-graduate training; and enhancing the UK's competitiveness and quality of life. Here is the mission of the Economic and Social Research Council from the White Paper, as an example:

> *'To promote and support high-quality basic, strategic and applied social science research, and related post-graduate training to increase understanding of social and economic change, placing special emphasis on meeting the needs of the users of its research and training output, thereby enhancing the United Kingdom's industrial competitiveness and quality of life.' (UK Government, 1993)*

The White paper (under the ministerial responsibility of William (now Lord) Waldegrave) also included an explicit statement supporting the Haldane principle, 'that day-to-day decisions on the scientific merits of different strategies, programmes and projects should be taken by the Research Councils without Government involvement.' (UK Government, 1993)

A change of government (from Conservative (John Major) to Labour (Tony Blair)) in 1997 and the continuation in power of that Labour administration until 2010 (latterly led by Gordon Brown) allowed for a significant increase in investment in research and innovation on the back of a belief that such investment would support economic growth. A related factor in this period was that the Minister for Science and Innovation, Lord David Sainsbury, served in that position from 1998 to 2006. Such longevity in a ministerial post is very rare, and provided significant political stability. That Sainsbury was also a significant donor to the Labour party has been suggested to mean that he had influence above his nominal ministerial rank; and as he was not a career politician, he was not seeking advancement in the normal way.

2010 saw a change of government (Labour to a Conservative/Liberal Democrat coalition; Cameron/Clegg) and a new Minister of State for Universities and Science, David (now Lord) Willetts. As with Sainsbury, he served for an extended period (2010 to 2014), again bringing stability and a perception of understanding of the research agenda. He was also responsible for Higher Education as part of a wider brief, and in that part of his brief was responsible for an increase in student fees and greater marketisation, for which some see him in a less favourable light than for his research-related policies.

The responsible Minister from 2015 to the beginning of 2018 was Jo Johnson. He was responsible for piloting the Higher Education and Research Act 2017 (UK Parliament, 2017) through Parliament, which has consolidated government research and innovation funding in a single body (UK Research & Innovation, UKRI) and, more controversially,

introduced further market and regulatory reforms to the provision of higher education. It is worth noting that Johnson was part of the team that wrote the Conservative Party's 2015 election manifesto, which included some of the HE reforms.

Then came a period of 'rotating chair' for science ministers. Johnson was succeeded by Sam Gyimah (January 2018 to November 2018), after the former fell foul of the then Prime Minister's (Theresa May, 2016 to 2019) wish to have a review of Higher Education (and was moved to the political desert of the Department of Transport). Gyimah himself resigned at the end of November 2018 in protest at the Prime Minister's Brexit deal. Johnson also resigned from the Government in November as a consequence of the Brexit deal. Gyimah was replaced by Chris Skidmore (December 2018). Skidmore was moved to the Department of Health & Social Care in July 2019 to make way for the reappointment of Jo Johnson as the Minister under the new Prime Ministership of his brother, Boris Johnson (2019 to 2022). Jo Johnson only stayed for six weeks, before remembering his opposition to Brexit and resigning. Skidmore was moved back to be the Minister for Universities, Science, Research and Innovation in September 2019, until February 2020. Amanda Solloway (February 2020 to September 2021) followed Skidmore, and she was followed by George Freeman (September 2021 to July 2022). Freeman resigned from office in July 2022 during a bizarre period of British politics in which the ruling Conservative party forced their Prime Minister (Johnson) to resign, then elected the shortest-serving ever PM (Liz Truss, 45 days, September to October 2022). Nus Ghani was appointed science minister (September 2022 to October 2022), before George Freeman regained the reins in his second term (October 2022 to date), under new Prime Minister, Rishi Sunak.

Whilst there have been variations in detailed policy, and notwithstanding the period of turbulence just described, the area of science, research and innovation has seen more consistency in government policy, across the major parties, over the last thirty years than most. The focus has been on economic and, to a slightly lesser extent, social development.

Government Policy Statements on Research and Innovation

As already noted, formal government policy statements on research are relatively rare. In 2004 the government published a Ten-Year Science and Innovation Investment Framework (UK Government, 2004), which was perceived at the time to be a bold set of statements and ambitions. In comparison, the equivalent Science and Innovation Strategy in 2014 (UK Government, 2014) was not greeted with much enthusiasm. Admittedly, getting the balance right between governmental vision and practical reality, between enabling and not micro-managing can be difficult. Economic and political circumstances also play a part: grand rhetoric cannot usually be backed up by significant investment when times are hard. Equally, research and innovation tend to take place over extended periods, whereas politics is increasingly short term and reactive.

An Industrial Strategy was published in 2017 (UK Government, 2017a). This publication (formally a White paper, but not leading directly to legislation) followed substantive consultation. The strategy aimed to 'boost productivity by backing businesses to create good jobs and increase the earning power of people throughout the UK with investment in skills, industries and infrastructure.' One can see in this statement that the focus was on productivity (the UK performs poorly in this respect in comparison to its major competitors and has done so for a long time; see OECD information (OECD, 2023) and, as an example, Expert Market's 2023 ranking (Expert Market, 2023)), and the solution is through business.

The strategy identified five foundations of productivity: ideas, people, infrastructure, business environment, and places. It also set out four 'grand challenges': artificial intelligence and the data economy; the future of mobility; clean growth; and an ageing society. There was much for the research and innovation community to engage with, and there were significant funds available: in parallel with the strategy the government created the National Productivity Investment Fund of £31 billion (subsequently increased to £37 billion), from which £5 billion (increased to £7 billion) was to be invested in R&D over five years through the Industrial Strategy Challenge Fund. However, this direction of travel worried some, who feared that research would need to be more applied, more utilitarian, and that areas of the social sciences and the humanities might struggle to attract funds from these sources. Other voices countered that technology is used by and affects people, and hence that these subject areas will be vital in making best use of technology in tomorrow's society. The nature of the grand challenges also touches on many subject areas and disciplines, rather than being aligned to any in particular. That speaks to the need for collaborative, interdisciplinary and inter-sectoral working.

The Industrial Strategy also illustrates the pervasive nature of research and innovation: nominally it sat with the (then) Department for Business, Energy and Industrial Strategy (BEIS). But to be meaningful and to deliver something of this nature needs the wholesale engagement of almost every other part of government. It therefore requires very long-term support, not just to create, launch and fund it in the first place, but also to see it through. Whether that's politically achievable is the constant challenge.

The change of Prime Minister in late 2019 brought with it a change in approach. There was a lot of rhetoric (also referred to as 'boosterism', using terms such as 'world-leading' and 'science superpower'), with many grand statements and nominal commitments, often with research and innovation in the mix. The Covid-19 pandemic refocused everyone's attention and finances, but research and innovation maintained (and extended) its high profile.

An example of this approach came in the UK Research and Development Roadmap (UK Government, 2020a), which included statements about cutting unnecessary bureaucracy and 'pursu[ing] ambitious 'moonshots''. It discussed a range of topics in the form 'Where are we now?' and 'What are we going to do?' This provided a set of descriptions of the current state of play, but little detail on what woud happen. Rather,

each topic had a set of questions. The final section reiterates that 'This Roadmap is the start of a conversation', which made it somewhat disappointing.

One high-profile element mentioned in the R&D Roadmap, was that of a new body responsible for innovation, with fewer restrictions than other public bodies. This became the Advanced Research and Invention Agency (ARIA), which was finally approved in 2022 (UK Parliament, 2022), with a budget of £800 million over four years.

In 2021, the Industrial Strategy was replaced with 'Build Back Better: our plan for growth' (UK Government, 2021a). This had considerable similarities to the previous Industrial Strategy, with pillars of infrastructure, skills and innovation, but also with ambitions relating to levelling up (i.e. trying to reduce the variations in social and economic performance across the country), the net zero transition and creating 'Global Britain'. This reflected a range of political interests and agendas, not only that of economic productivity. The innovation pillar makes particular reference to life sciences, digital and creative, clean energy, fintech, plus defence-related activities. However, this policy paper came without the direct funding allocations. That reflected both the post-pandemic economic and fiscal situation, but also that those in power were less minded for government to identify specific areas of innovation for investment.

Also published in 2021 was the government's R&D People and Culture Strategy (UK Government, 2021b), which had been announced in the UK Research and Development Roadmap (UK Government, 2020a). This focused on people, culture and talent, and was framed as a call to action. Whilst welcomed in some respects, it was also criticised for lack of sufficient specific details. It was based on the government's 'vision of a more inclusive, dynamic, productive and sustainable UK R&D sector in which a diversity of people and ideas can thrive to drive economic and societal benefit for the UK'. It committed to a 'new deal' for postgraduate research (PGR) students, support for flexible, cross-sector training programmes, a good practice exchange, and the narrative CV.

Notwithstanding the criticisms, one can see some effects of the Strategy, such as the increased focus on research culture in the initial decisions for the REF 2028 (UKRI, 2023a) and the promotion of the narrative CV, the résumé for research and innovation, or R4RI (UKRI, 2023b). The new deal for PGR students is taking somewhat longer to emerge.

The final substantive government publication on research and innovation to mention is the Pioneer Prospectus (UK Government, 2023a), driven by the post-Brexit environment, discussed below. The Prospectus outlines the government's approach if the UK had not been able to associate to the EU's Horizon Europe R&D programme. Whilst this will not now be needed to replace involvement in Horizon Europe, there are elements of it that some are keen to see funded, as they go beyond Horizon's relationships with Europe.

GERD Targets

What is the right amount that a country should invest in research and development (R&D)? There's no simple answer to this, of course, but comparisons are made between countries, and targets are sometimes set for the spend on R&D as a percentage of a country's gross domestic product (GDP), also known as GERD (Gross Expenditure on R&D). In 2000, the EU countries agreed in the Lisbon Declaration their ambition to increase the Union's GERD to 3% of GDP by 2010, from about 1.6%. The UK signed up to that ambition (its GERD was at about the same level as the EU average), but subsequently reduced its target to 2.5% (as stated in the 2004 Science and Innovation Investment Framework (UK Government, 2004)) and then stopped mentioning a target. Then, as part of the 2017 General Election campaign, all three major UK political parties (Conservative, Labour, Liberal Democrat) made statements about GERD targets. The consequence was that the 2017 Industrial Strategy included a commitment to 'reach 2.4 per cent of GDP investment in R&D by 2027 and to reach 3 per cent of GDP in the longer term, placing us in the top quartile of OECD countries.' (UK Government, 2017a)

The government has not announced any change at time of writing, but in the context of the revision of the ONS's approach to GERD estimates (noted earlier), it will either mean an upward revision of the target, or a congratulatory statement that the target has been met. The latter would be more concerning to the research and innovation community, as it might mean tighter funding allocations.

The Effects of Brexit

The final topic to discuss in this section is Brexit: the UK's decision to leave the European Union (EU). The referendum vote in 2016 was relatively close: 52% versus 48% on a 72% turnout; although in terms of voting areas (akin to constituencies) it was 69% to 31% in favour. In broad terms, researchers and their related communities tended to be more in favour of staying in the Union. This was not only through self-interest because of the research and innovation funding available from the European Commission and the flow of staff and students, but was also said to be because of their more international outlook.

Whilst absolute figures are not available, it is said that the UK got more from the Framework Programmes in research funding than its 'juste retour' (i.e. it received more than it put into the pot). UK universities received £812 million from EU sources in 2018/2019, representing 12% of their total research project funding (HESA, 2023). The UK total for all organisations was estimated to be in excess of £1 billion p.a. at that time.

In addition to R&D funding from Framework Programmes, research organisations also received funds from EU Structural and Economic & Regional Development Funds. These were focused on regeneration, and had been used to support major R&D infrastructure development as well support skills and business development. They operated on a devolved basis, i.e. via the UK government rather than a European Commission-based process.

The negotiations to leave took until the eleventh hour, being concluded in December 2019, with withdrawal taking place at the end of January 2020. Negotiations on the future trade arrangements, the EU-UK Trade and Cooperation Agreement (TCA) (European Commission, 2020), also went to the wire, taking until the very end of 2020, and became effective from the start of 2021.

However, it has taken more than two and a half years after that for the UK to be part of the EU's Horizon Framework Programme (to 'associate'), despite it being part of the TCA and both the UK government and the EU saying that is their preferred position.

Both sides blamed the other, with the Northern Ireland Protocol (the element of the TCA dealing with Northern Ireland) playing a central role. The UK and EU agreed the Windsor Framework in March 2023 (UK Government, 2023b), which it was hoped would lead to a rapid agreement for the UK to associate to Horizon Europe. It took a further six months, to September 2023, for agreement to be reached (UK Government, 2023c), with effect from the beginning of 2024. The negotiations had revolved around the cost the UK will be required to pay and how that would be adjusted depending on the success of UK participants in winning funds. As well as Horizon Europe, the agreement also included association to Copernicus (earth observation), but did not include Euratom (nuclear research). On the latter, the UK government decided to fund its own fusion research programme.

In parallel with the Horizon negotiations, the UK government developed a 'Plan B', in case association was not possible. This was eventually published as the Pioneer Prospectus (UK Government, 2023a), as already discussed.

EU structural funds have been replaced by the Shared Prosperity Fund (UK Government, 2022a). The R&D sector, especially universities, remain concerned at both the size of the budget, and the Fund's terms of reference, which make larger R&D infrastructure less likely to be funded.

Government Funding of Research and Innovation

In 1997, the then newly-elected Labour government introduced three-yearly Comprehensive Spending Reviews (CSRs) as a means of establishing base-line departmental budgets, the first being in 1998. It was through successive CSRs that the government injected substantial sums into the 'science base' (the term often used in government), both as one-off injections and as additions to the baseline. The CSR mechanism also provided a locus for a number of policy initiatives, many of which required funding, hence the link to the CSR and the crucial role of the Treasury (the UK finance ministry). Examples include the University Challenge Fund (£45 million) to provide seed corn for commercialisation of research and the Science Enterprise Challenge Fund (£25 million) to support entrepreneurship and enterprise development, both introduced in 1999.

The importance of having Treasury understanding of and backing for particular policies cannot be overstressed, given the need for fiscal support. Indeed, many of the major

policies from this period onwards have been jointly authored by the Treasury with the relevant government department.

It is worth noting that the responsibility for research and innovation has shifted between departments, and the responsibilities and names of those departments have been changed – see box. The decision about juxtaposition of research with industry or with education can have significant effects on related policy priorities. Equally, whether in a university context student funding and research funding reside in the same place or in different ministries can have major effects. These placements also differ in the three devolved nations.

Government Departments Responsible for Research or Science

DTI: Department for Trade and Industry, created in 1995 and which became the Department for Productivity, Energy and Industry for a week in 2005, before changing to the Department for Business, Enterprise and Regulatory Reform in 2007

DIUS: Department for Innovation, Universities and Skills, 2007–2009

BIS: Department for Business, Innovation and Skills, 2009–2016

BEIS: Department for Business, Energy and Industrial Strategy, 2016–2023

DSIT: Department for Science, Innovation and Technology, 2023–Present

OST: Office for Science & Technology, located in the Cabinet Office 1997–2007, and then moved to DIUS to become the Office for Science and Innovation

DES / DfE: Department of Education and Skills, and then Department for Education, which before 2007 was and from 2016 is responsible for Higher Education

TSB: Technology Strategy Board, which became Innovate UK and is now part of UK Research and Innovation

UKRI: UK Research and Innovation, the umbrella body from 2018 for the seven Research Councils, Research England and Innovate UK, reporting to DSIT

Two policy initiatives of this period are worthy of discussion: the Joint Infrastructure Fund (JIF) and the Transparent Approach to Costing (TRAC).

Joint Infrastructure Fund

The Joint Infrastructure Fund (JIF) was created in 1998 with a budget of £600 million, jointly provided by the government (through the Research Councils) and the Wellcome Trust. As suggested by the name, this fund was to invest in substantive research infrastructure, with many new buildings being supported. A further £150 million was invested in 1999 via the national funding bodies. It was replaced in 2001 by the Science Research Investment Fund (SRIF), also jointly funded by the Wellcome Trust. Both schemes required at least 25% of the total costs to be met by the recipient institutions (see UK Parliament, 2002 for further information).

JIF is notable not just because of the substantial injection of new funds, but also because of the joint nature between government and a medical charity. Whilst the Wellcome Trust has long been influential in research terms, this was a move into macro policy, which continues to today. The difference between JIF and SRIF is also interesting: JIF was based on proposals, whereas SRIF was a formula-based allocation that had to be supported by detailed plans. The shift in approach was partly because of the perceived significant waste of time, effort and money in putting in detailed proposals that were not funded. This switch, from proposals to allocations and back again to proposals can been seen in other parts of policy.

Transparent Approach to Costing

Alongside these funding schemes, and perhaps more important, was the introduction of the Transparent Approach to Costing (TRAC). This was originally intended as an exercise to understand the balance of cost between teaching and research, and hence the potential flow of funds from one to the other (the government's concern had been that research funding might be subsidising teaching, which was laughable to universities). A survey was introduced as a pilot in 1999, but so many institutions wanted to take part that it soon included the substantial majority. The results did not support the original concern, but rather demonstrated that research was running at a significant (multi-billion pound) deficit if one factored in the full economic costs of the activity. This led to the creation and formal introduction of TRAC in 2000; the current guidance and a brief history can be found at the TRAC website (TRAC, 2018).

The reports and analysis written in the context of TRAC and to make the case for JIF also provided evidence that led to the government recognising the systemic shortfall in funding for research, and agreeing to invest on an on-going basis to plug the gap. This did not come without strings, and the university sector needed to make changes and operate in different ways. In particular, research needed to be costed on a full economic cost (FEC) basis (regardless of who was funding it), and the Research Councils would fund a defined proportion of the FEC (set at 80%, with ambitions to increase to 100%, which has not transpired).

The introduction of FEC has been challenging for universities, for individual researchers, and for the Research Councils. At its root is the proposition that the major deficit shown by TRAC was caused by over-trading (selling at much less than full cost) and under-investment in facilities and people. FEC was introduced in 2004, with the Research Councils funding projects (but not all activities, such as postgraduate research students) based on FEC from late 2005. In order to fund this and to prevent a reduction in the volume of research, a significant increase in annual allocation was phased in, amounting to about £300 million per annum.

Despite the annual TRAC reporting and the introduction of FEC, the deficit for research remains, with the most recently reported figure being for 2021/2022 at £5 billion, representing a recovery rate of 69% of full economic costs (Office of Students, 2023).

(For information, the overall position across all activities showed a deficit of £2.2 billion, or 4.8% of turnover.)

Research Capital Funding

Funding for research and innovation continued to grow until 2010, when the effects of the global economic slowdown took effect. The new coalition government introduced 'austerity' measures, which generally meant reductions in public spending. Funding for science and research fared better than most areas, with a 'flat cash' settlement, rather than a cut. Whilst this meant the same amount of cash in the budget, it did mean a real-terms reduction over time because of the effects of inflation.

Whether by design or in error, this settlement applied to the revenue budget and not to the capital budget, which was severely affected. In due course, this was addressed, and additional funds were allocated to capital spending. However, these new allocations were typically more targeted and operated on a competition and match-funding basis.

The major capital scheme that was introduced (2012) was the UK Research Partnership Investment Fund (UK-RPIF) (UKRI, 2019). Institutions can apply for £10 million to £50 million from the fund, which has to be matched from private sources, whether businesses, charities or individual donations (i.e. not public funding), by at least twice the amount being requested. So, one needs a scale of ambition, and some very good, well-developed partnerships. By the middle of 2019, the first six rounds of the scheme have allocated over £900 million to 53 projects running between 2014 and 2021, attracting over £2 billion of investment from businesses and charities (UKRI, 2022); the seventh round was launched in July 2022.

Whilst this addresses the need for research buildings and major equipment or facilities (which can be opened by politicians), there remains a potential gap for support of 'smaller' infrastructure. Universities do also receive formula-based research capital funding, the mechanism for which varies slightly between the nations of the UK. In England, for 2023/2024, £107 million has been allocated in proportion to institutions' research project income from the Research Councils (via the Higher Education Research Capital (HERC) England mechanism) and £113 million has been allocated through the HEI Research Capital England mechanism in proportion to the QR funding and non-Research Council research project income (UKRI, 2023c). The reason for this slightly confusing structure is to do with the origins of the funding, as some comes from a UK-wide budget and some comes from an England-only budget.

Additional Funding, New Commitments and Some Constraints

It has been suggested that the flat-cash settlement of 2010, seen at the time as positive relative to other public funding settlements, was a last-minute agreement following sustained policy lobbying, and that the quid pro quo included the introduction of 'impact' into the national research assessment process (the Research Excellence Framework from 2014 onwards; see REF (2014) and REF (2021)).

However, the effects of inflation over time started to be felt and arguments were being made for a real-terms budgetary increase. Towards the end of 2015, as part of his Budget, the then Chancellor (the UK Finance Minister), George Osborne, announced a real-terms increase in 'science' funding and the creation of the Global Challenges Research Fund (GCRF) (UKRI, 2018). GCRF was a £1.5 billion fund operating over five years to 'support cutting-edge research that addresses the challenges faced by developing countries'. This welcome announcement included two interesting sleights of hand. First, the GCRF would account for more than the real-terms increase over the five-year planning period. This meant that the 'core' science budget would reduce in cash terms, thus potentially meaning a redirection of that budget. Second, GCRF was deemed to be part of the government's Official Development Assistance (ODA) commitment, which meant that the funds were actually coming from the overseas development budget (the government had committed to spend 0.7% of Gross National Income on overseas aid). It also meant that all GCRF-funded projects and activities were required to be ODA-compliant, an additional regulatory requirement.

Moving on a year, Osborne's successor as Chancellor, Philip Hammond, announced in late 2016 the creation of the Industrial Strategy Challenge Fund (ICRF) (UK Government, 2017b), at £4.7 billion (subsequently extended for a further year and increased to £5.2 billion). This also represented a substantial uplift in funding, again with a set of targets in mind. This might be seen as a transition to a more directed or managed mode funding of research and innovation. Certainly, the ICRF-funded projects needed to be business-led or driven by business needs, and there was significant concentration on innovation, not on 'basic' research. One might also have noticed that the ICRF was announced and then started to disburse funds before the Industrial Strategy was published, illustrating that sequential policy processes are not always necessary!

The changes in government leadership noted earlier included bold statements about doubling funding for R&D to £18 billion a year (Science Business, 2019), which was incorporated in their 2019 election manifesto. In the first budget after the election, the then Chancellor (Sunak) announced that R&D spending would increase to £22 billion by 24/25 (UK Government, 2020b). This was later amended to be £20 billion by 24/25 (UK Government, 2021b), with £22 billion being reached by 26/27, reflecting the financial headwinds facing the government.

Research and innovation activity was, of course, subject to pressures and constraints as a consequence of the Covid-19 pandemic. Funding and activity were in some cases redirected towards the response, and organisations and systems had to adapt rapidly. The role that research, development and innovation played in that response helped to maintain and promote its position in political and policy terms.

Reviews

The creation (in 2018) of UK Research and Innovation (UKRI) brought about by the 2017 Higher Education and Research Act 2017 (UK Parliament, 2017) was to a large extent the consequence of a review of the Research Councils by Professor Sir Paul Nurse (UK

Government, 2015). As with all public bodies, UKRI is subject to triennial reviews, with its first being led by Professor Sir David Grant, and published in 2022 (UK Government, 2022b). Grant raised concerns about staffing levels, efficiency, systems, and governance. The government is yet to respond in detail (as of September 2023).

Nurse was commissioned to undertake a second review, this time of the R&D landscape (UK Government 2023d). He made observations about the financial sustainability of public funding for university research, that not all aspects of end-to-end research costs are adequately covered, and warned of a "long trajectory of decline" for government-funded institutes and public sector research establishments (PSREs). The government is yet to respond in detail (as of September 2023).

A third review was that of research bureaucracy, undertaken by Professor Adam Tickell (UK Government, 2022c). This had its roots in the UK Research and Development Roadmap (UK Government, 2020a). Tickell suggests seven principles for reducing unnecessary bureaucracy: harmonisation, simplification, proportionality, flexibility, transparency, fairness, and sustainability. He makes recommendations around the themes of assurance, applying for funding, grant implementation and in-grant management, digital platforms, institutional bureaucracy, and communications. The government is yet to respond in detail (as of September 2023).

Implications for Research Managers

This article has attempted to describe the evolution of the UK policy environment, showing that some of the current major initiatives are rooted in decisions made or discussions held some time ago. Being aware of and able to track developments over such timescales is a key skill for a research manager, as it enables us to predict future policy paths and avoid previous mistakes. This includes understanding the shifting sands of political responsibility for the relevant policy briefs.

Governmental drivers for research and innovation are not always the same as those of researchers. As institutions seek to address the governmental agendas, research managers may need to help both their institution and individual researchers to navigate the differences. Equally, research managers can seek to influence governmental operational mechanisms so that they have fewer negative effects on the delivery of research itself.

The role of research and innovation in supporting economic development has been at the centre of recent policy. This has led to additional funding in constrained economic times, but also requires research managers to enable more directed research and to manage cross-sectoral partnerships. This highlights the need for many forms of soft as well as technical skills.

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