Institute for Public Policy Research

SCIENCE OR STAGNATION?

NEXT STEPS FOR LIFE SCIENCES POLICY IN ENGLAND

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October 2022

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ABOUT THIS PAPER

This paper advances IPPR's charitable objective of advancing physical and mental health.

ACKNOWLEDGEMENTS

The authors would like to thank Takeda, who have financially supported this publication but have had no editorial control nor input into the content. The authors would also like to thank the experts who contributed to the interviews and roundtables we held as part of our research for this report.

The authors would also like to thank IPPR colleagues, including David Wastell, Liam Evans, Henry Parkes, Abi Hynes and Richard Maclean, for their contributions to this research.

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Citation
If you are using this document in your own writing, our preferred citation is:
Nanda S, Thomas C and Dibb G (2020) *Science or stagnation?: Next steps for life sciences policy in England*
http://www.ippr.org/publications/science-or-stagnation

SUMMARY

The UK lags behind global leaders on R&D investment. This is despite a recent, sudden ONS methodological change significantly revising up estimates of UK research investment, more through luck than judgement. UK gross domestic investment in R&D, accounting for ONS revisions, stood at an estimated 2.4 per cent of GDP in 2019. This is below the average for an OECD nation, and well below advanced economies as diverse as Sweden, Belgium, Germany, the USA, South Korea, and Israel, who have all exceeded 3 per cent of GDP. It would take over £60 billion extra R&D investment each year - from public, private and charity sources combined - for the UK to overtake Israel as the top-performing R&D nation.

Stagnation in the UK economy demands a more research- and innovation-intensive economy. Productivity growth has been low since the financial crisis; regional inequalities have widened since 1990; progress in health has stagnated since 2011; and broader public health has declined across key indicators since the pandemic. R&D and innovation are an important lever in answering this decline, further underlining the case to go further and faster.

As such, we need a new, stretching R&D investment target. To inform this, we model three scenarios: 3 per cent by 2027 (our minimum suggestion); as well as 3.5 per cent by 2030 (in line with better-performing OECD nations); and 5.4 per cent (as currently in Israel, representing genuine global leadership).

In recommitting the UK to global leadership on research, there is a particular opportunity to prioritise the life sciences. Health innovation has driven huge societal progress in the 20th century and helped us overcome the Covid-19 pandemic. The government has rightly featured science and innovation prominently in its approach to industrial strategy – from David Cameron's 'jewel in the crown' to Boris Johnson's 'science superpower'. But despite the UK's significant academic and infrastructure advantages – our competitiveness and our population health continue to get worse. To this end, new IPPR analysis shows:

- if the UK had maintained our 2010 share of global private life science R&D investment, it would have been £2.9 billion higher in 2016
- if life science manufacturing GVA had maintained its 2010 share of total manufacturing GVA, it would also have been £2.9 billion higher in 2021.

Number of strategies makes a poor KPI – these figures indicate we must do better in practice.

Doing better requires a more 'activist' government – with a role in enabling, funding and deriving value from life science research and innovation. On this basis, and in addition to a stretching new R&D target, we recommend the following.

First, that the government pulls a wider range of levers to support inward life science investment and greater innovation. There are many ways the government can intervene to better support the UK's life science (and broader research) ecosystem. If it hopes to increase R&D intensively in an increasingly competitive global environment, it needs to pull these levers hard, and consistently. This should include:

- ensuring a strong life science skills pathway, including through reform of the apprenticeship levy
- supporting the role of the NHS as a life science partner, including by increasing staff capability and capacity to engage in clinical research
- giving the NHS the foundations it needs to prioritise clinical research, by implementing an urgent retention strategy to increase workforce capacity
- addressing the significant difficulties currently faced by researchers in carrying out late-stage clinical trials.

Second, that the government goes further and faster on life science missions. The theoretical promise of missions is an ability to both catalyse greater R&D and innovation – and to ensure research and innovation is targeted at solving the UK's biggest health, social and economic challenges. While it is welcome to see the language of missions throughout the government's recent life science vision, there is much to do to ensure we can achieve the full promise of a missions-based approach. We recommend the government:

- sets out concrete targets and sub-targets for all missions
- recruits a senior mission director to provide profile and advocacy for each mission across government
- provides up front clarity on public funding and policy, tailored to each mission
- resets to much higher 'moonshot' levels of ambition.

Ultimately, the best research and innovation happens when all institutions and actors in the life sciences are given the means and support to play their part. Our vision for an activist government is partly about the government playing a more active and consistent role in achieving and catalysing the value of health research. But it is also about it enabling others – businesses, universities, charities, and civil society – to play their own role in a thriving life science ecosystem. This is the best way to ensure that R&D broadly – and life science R&D specifically - plays a progressive role in addressing the decline in UK health, economy, prosperity, and security.

1.
WHERE IS THE UK ON R&D?

Until just last month, the data suggested that the UK was performing very poorly on research and development (R&D) investment, compared to similar countries. As of 2019 – the latest year UK data is available via the OECD – the country was 6th among the G7 for R&D investment as a proportion of GDP, and had been every year since the turn of the millennium (OECD 2022a).

However, in early October, the ONS updated their methodology for calculating R&D spend. Motivated by a discrepancy between the amount of R&D spending suggested by tax credit returns, and as estimated by the Business Enterprise Research and Development Survey, they revised up their R&D estimates. The correction has had a huge impact – increasing estimates of private R&D spend in England by over fifty per cent, and by more in Scotland and Wales.

Inevitably, there are questions about such a sudden and impactful change in methodology. For transparency, these need swift answers. They include the following.

- Whether the new methodology double-counts public or charitable investment.
- Whether the new methodology is more liable to fraud from businesses claiming tax credits for activities that are not clearly research or development. HMRC accept that almost five per cent of claims are fraudulent.
- Whether, should other countries adopt similar methodologies, they would also experience an uplift (even if not as sizable as in the UK).
- Whether, as others have noted, the growth rate implied by the new methodology in the SME sector is genuinely plausible (Jones 2022).

However, that is not to say that the new methodology is not an improvement – only that it isn't an improvement without consequences. Any accuracy may come at the cost of an increased risk of overestimating R&D investment, where before we underestimated it. And, leaving aside questions of accuracy, one of the biggest consequences is that official figures will now likely show, by our calculations and others', that the UK has met its gross R&D target of 2.4 per cent of GDP – five years ahead of the deadline set by the Industrial Strategy White Paper (BEIS 2017).

A CAUSE FOR CELEBRATION?

It is easy to see why meeting long-term R&D targets might seem a cause for celebration. But there are two important factors that should moderate cheer among government and policy makers. The first is that, even with this methodological change, the UK's investment in R&D still does not compare favourably to those who are leading in this space. Gross domestic investment in R&D of 2.4 per cent of GDP still leaves the UK behind the latest

investment figures reported in Germany, Israel, the United States, South Korea, and below the top quartile of OECD countries (on latest data).

Indeed, to overtake the OECD-leading 5.4 per cent of GDP reported by Israel in 2020, the UK would need to invest over £62 billion more in R&D this year.

Secondly, and perhaps more importantly, meeting a target because of a methodological improvement – rather than because of any real uplift in private sector investment in R&D – is not really a win. The 2.4 per cent of GDP target was never meant to be an end, in and of itself. Rather, the target was meant to indicate that levels of R&D in the UK, however they were being measured, were not sufficient to support UK aspirations of global leadership on science. That is, the target was intended to provide a stretching goal, and a wider signal of the government's aspiration to invest in more research. Whether or not a methodology has changed, we are no closer to delivering on the spirit and purpose of the target.

Nor was the 2.4 per cent target ever meant to be the end of the UK's aspiration. The specific wording in the 2017 Industrial Strategy White Paper was as follows:

> "For the UK to become the most innovative country in the world we need a generational increase in public and private R&D investment. In this strategy we commit 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."

The target was meant to be a stepping stone towards the kind of aspiration seen in other nations, in comparison to which the UK was lagging ever further behind – most notably within the European Union, where the target for member state gross domestic R&D investment is already 3 per cent of GDP, as well as the US, Israel and South Korea.

DOES OUR ECONOMY STILL NEED MORE R&D?

A good starting point for considering our next step is consideration of whether we still need more R&D. And perhaps the central reason for successive governments' focus on science is its importance as an economic activity – and to the economy as a whole. The question is, does our economy still need more R&D, as we continue the transition to a new prime minister's regime?

Looking across economic indicators, our contention is that the importance of R&D has actively increased, not diminished. The new prime minister has inherited a country that has experienced significant stagnation – to its national economy, regional economies, population health, and national resilience. As the Resolution Foundation's Economy 2030 Inquiry puts it:

> ***"The UK has great strengths but is over a decade into a period of stagnation. The toxic combination of low growth and high inequality was posing challenges for low-to-middle income Britain's living standards even before the post-pandemic cost of living crisis struck. The task of the 2020s is to overcome this stagnation while wrestling with significant economic change."***
>
> Source: Bell et al (2022)

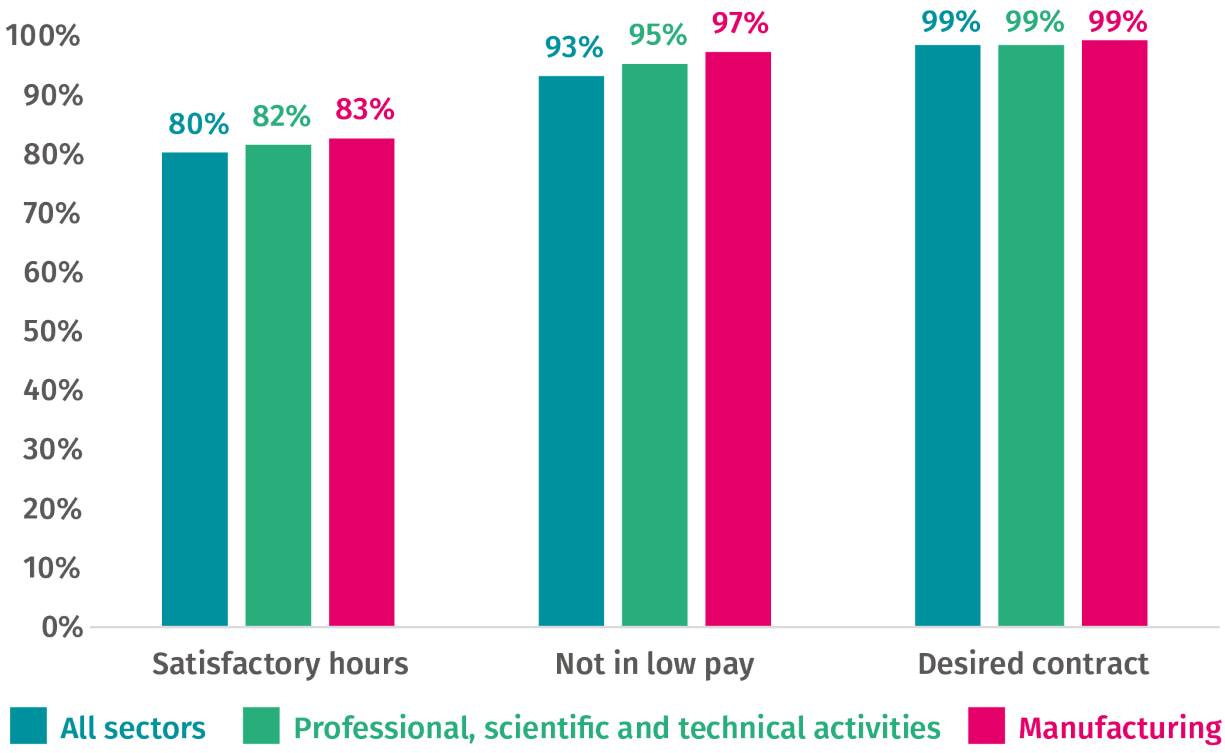
Across many metrics, the UK economy has performed poorly since the 2008 financial crisis. Productivity has grown by just 0.4 per cent per annum since the crisis, compared to 1.5 per cent in the pre-crisis period[1] (ONS 2022b). Real wages have fallen relative to their pre-crisis peak, whereas before the crisis[2] they grew by an average of 2.8 per cent per annum (ONS 2022c).

While there is no silver bullet to restore productivity – beyond a systematic reorganisation of the economy – science and innovation are among the most useful levers available. In many ways this is intuitive – if productivity measures how much we can produce for a set amount of capital and time, then innovation is integral to the calculation. Or as Richard Jones has put it, productivity 'is a problem of a decline in innovation, in its broadest sense' (Jones 2019).

On jobs, the data suggests that research and development jobs are, on average, high-quality. 'Manufacturing' and 'professional, scientific, and technical activities' score at or above average on all three components of job quality measured by the ONS – hours, pay and contracts (ONS 2019a).

Figure 1.1: Jobs in the manufacturing and professional sectors are high-quality

Share of employees in each sector by job quality component, UK, 2018



Source: Authors' analysis of ONS (2019a)

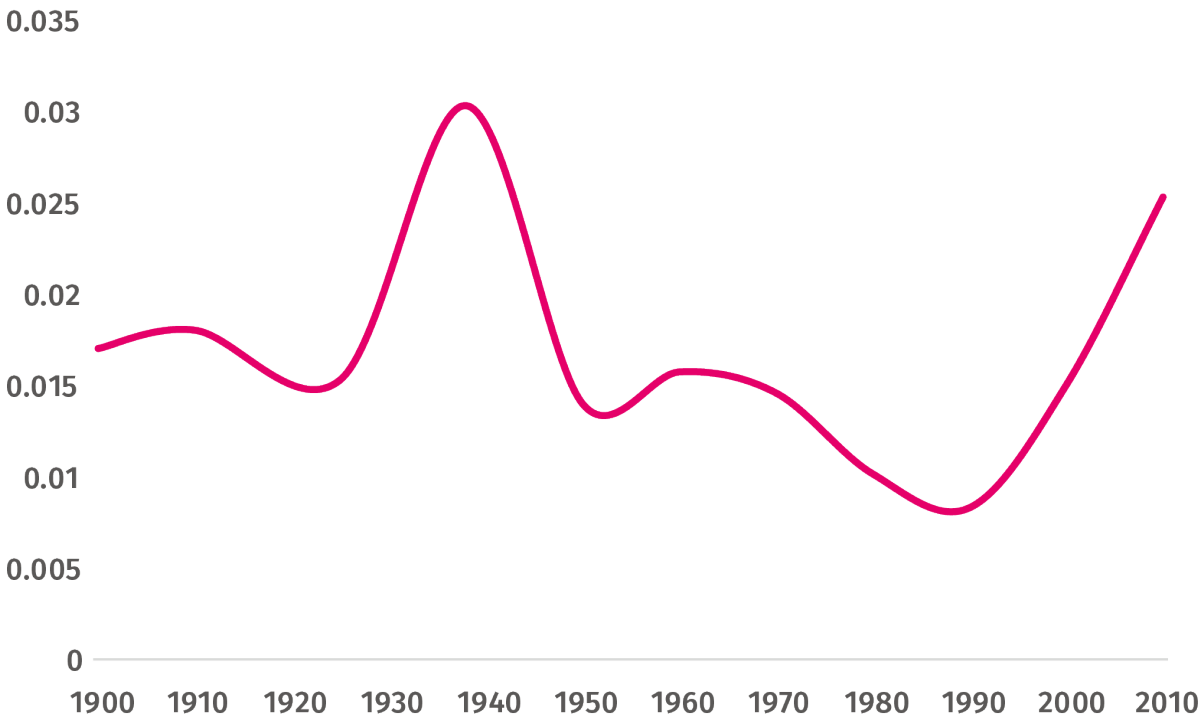
R&D can also support efforts to reduce regional economic inequality. The UK has long-standing regional inequalities, with research finding that these divides have worsened

[1] The period 2000 Q1 to 2008 Q2.
[2] The period January 2000 to February 2008.

significantly since 1990 (see figure 1.2). Separate evidence suggests that these inequalities have continued to widen since 2010 (Webb et al 2022). The government has responded to this by pledging to 'level up' the country and bring these inequalities down.

Figure 1.2: UK regional inequality has increased sharply since 1990

Theil index of interregional inequality, UK, 1900-2010



Source: Carrascal-Incera et al (2020)

Indeed, the government have already recognised the potential of R&D to correct this inequality – including in the Levelling-up White Paper. This set a target of increasing public investment in R&D outside the South-East by at least 40 per cent by 2030, as part of the goal of boosting 'productivity, pay, jobs, and living standards'. Vitally, this vision both recognised the potential of R&D outside of the South-East – and the fact that investment won't spread across the country without government willingness and intervention.

A STRETCHING NEW TARGET

On this basis, we strongly recommend the government commit to a new, stretching R&D target – signifying to the market, charities, global researchers, international partners, and academia that the country remains committed to doing more research than before. To support this, we have undertaken new analysis to inform both what a stretching target should look like – and what the government would need to invest to achieve it. We set out

three scenarios, each covering what public investment would be necessary and what we could expect that investment to 'crowd in', in the form of private investment.[3]

- **Somewhat ambitious:** Meeting 3 per cent of GDP by 2027, building on aspirations set out by the CBI, the European Commission and opposition political parties (albeit not in the context of the ONS' revised R&D estimates).

- **More ambitious:** Meeting 3.5 per cent of GDP by 2030, which would bring us to around the level of R&D investment in Sweden, the USA, and Taiwan.[4]

- **Genuinely world-leading:** Meeting 5.4 per cent of GDP by 2030, putting the UK firmly in a global leadership position, and meeting standards set by South Korea and Israel.

The lower-ambition model would meet the minimum target for EU member states and would be sufficient to bring the UK towards, or just within, the top quartile of the OECD. The moderate-ambition scenario would comfortably bring the UK into the top quartile of the OECD. The highest-ambition would represent a genuinely world-leading effort from the UK.

Our modelling shows that meeting the lower-ambition scenario would still require some significant extra investment by government. Compared to baseline projections of R&D spending, we estimate that public investment in research would need to increase by £200 million more in 2023, £400 million in 2024, £600 million in 2025, £800 million in 2026 and £1 billion in 2027. Based on evidence that public investment 'crowds in' private investment, we estimate that this would increase private investment by £800 million in 2027.

The moderate ambition scenario is more in line with the level of aspiration implied by the original 2.4 per cent target in 2027. To meet it, we estimate that government would need to increase public investment in R&D by £8.5 billion by 2030. We estimate that this would crowd in £8.3 billion further private investment in the same year. In the highest-ambition scenario, government would need to increase public investment by £43.1 billion by 2030. We predict a substantial crowding-in effect of £41.9 billion of private sector R&D investment.

[3] In our baseline, we assume that industry and non-industry investment will grow in line with March 2022 GDP forecasts. Additionally, we include the 2021 spending review allocation for public R&D spend, and commitments to spend £20 billion on total public R&D by 2024/5, and £22 billion by 2026/27. We further assume that public investment crowds-in private investment at the rate estimated in BIS (2015). There is some uncertainty over how the ONS' updated figures on R&D performed in UK businesses relate to R&D expenditure by sector of funding. Here, we have assumed that the update relates to R&D both performed in and funded by UK businesses. This is a conservative approach – the actual amount of additional R&D expenditure required to meet these targets may in reality be higher.

[4] Albeit without considering the potential for these nations to also increase their R&D investment by 2030. The US is, in particularly, on a sharp upwards trajectory on gross domestic R&D.

Table 1.1: More public investment is needed each scenario

Projected public and charity R&D expenditure, 2023-30 (£bn)

Non-industry spend		2023	2024	2025	2026	2027	2028	2029	2030
Current trajectory (baseline)		22.5	24.0	25.1	26.2	27.3	28.4	29.7	30.9
Additional required	Scenario 1	+0.2	+0.4	+0.6	+0.8	+1.0	+0.5	+0.5	+0.6
	Scenario 2	+1.1	+2.1	+3.2	+4.3	+5.3	+6.4	+7.5	+8.5
	Scenario 3	+5.4	+10.8	+16.1	+21.5	+26.9	+32.3	+37.7	+43.1

Source: Authors' analysis of ONS (2021a), ONS (2022a), OBR (2022a), OBR (2022b), HM Treasury (2021b), ONS (2022d), BIS (2015), World Bank (2022a)

Table 1.2: We project greater public investment 'crowds-in' greater private investment

Projected private R&D expenditure, 2023-30 (£bn)

Industry spend		2023	2024	2025	2026	2027	2028	2029	2030
Current trajectory (baseline)		49.1	52.7	55.8	58.7	61.7	64.7	67.6	70.6
Additional required	Scenario 1	+0.0	+0.1	+0.3	+0.5	+0.8	+1.0	+0.9	+0.8
	Scenario 2	+0.0	+0.6	+1.6	+2.8	+4.1	+5.5	+6.9	+8.3
	Scenario 3	+0.0	+3.2	+8.1	+14.1	+20.7	+27.6	+34.7	+41.9

Source: Authors' analysis of ONS (2021a), ONS (2022a), OBR (2022a), OBR (2022b), HM Treasury (2021b), ONS (2022d), BIS (2015), World Bank (2022a)

Given this strong relationship between R&D and private investment, this modelling is also indicative of the value of state investment in making the UK a more attractive place for private investment. This is significant – as it stands, compared to other countries, the UK has low private sector investment as a proportion of GDP (see Dibb 2022). In 2019, the UK fell below Canada and Italy to have the lowest private sector investment in the G7 as a proportion of GDP. In the last decade, the UK's highest ranking in the OECD for private sector investment was 2016, when it ranked 28th. This is often a challenge that government have used to justify cuts to corporation tax. This analysis suggests that R&D investment may be a more effective lever. We discuss optimising the UK's capacity to attract private investment in the context of the life sciences in chapter 3.

2.
WHY FOCUS ON LIFE SCIENCE?

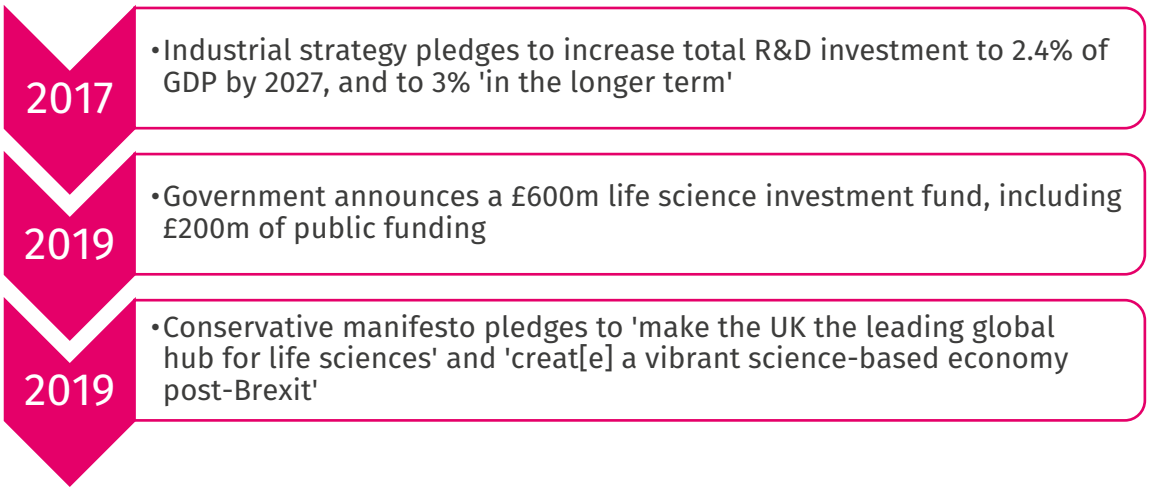
In the 20th century, health research and the life sciences were the engine behind huge gains in human health and national prosperity. Advances in childhood immunisation underpinned remarkable gains in longevity. Medical inventions like antibiotics, insulin and statins have allowed previously unimaginable progress on major killers like cardiovascular disease, infectious disease and diabetes. In public health, research that has enabled lifesaving interventions from better hand hygiene to better sanitation to lower smoking rates through tobacco control.

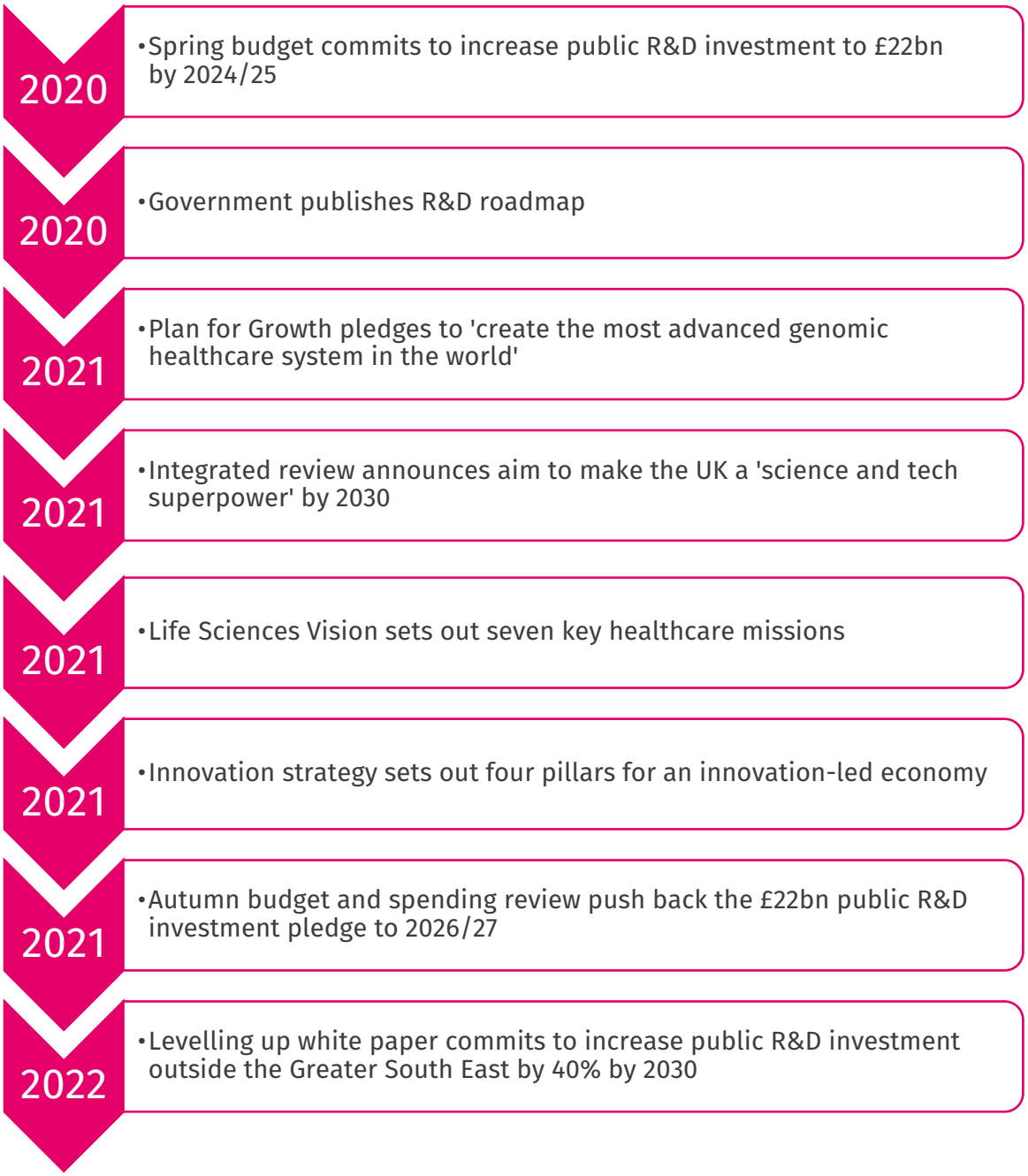
The Covid-19 vaccination has provided a reminder, in the 21st century, of the continued, transformative potential of science. In the UK, the introduction of the vaccine coincided with the UK mortality rate going from among the worst in the world to below the Western European average (Wang et al 2022). Studies of the vaccine's economic value are nascent, but one study put the figure at $5 trillion USD in the US alone (Kirson et al 2022).

Rightly, then, the life sciences have featured as a major priority for successive prime ministers, within their wider prioritisation of R&D. David Cameron called them the 'jewel in the crown of the economy'; Theresa May put them at the heart of the country's new economic strategy; and Boris Johnson pledged to supercharge UK science. This level of priority has led to a range of policy ambitions, targets and visions concerning life sciences and broader research and innovation policy over the last 10 years.

Figure 2.1: Timeline of life sciences-related policy announcements

Policy announcements relating to the life sciences sector, 2015-22





Source: Chemistry World (2015), BEIS (2017), BEIS (2019), The Conservative Party (2019), HM Treasury (2020), BEIS (2020), HM Treasury (2021a), Cabinet Office (2021a), BEIS & OLS (2021), BEIS (2021a), HM Treasury (2021b), DLUHC (2022)

THE RIGHT FOCUS

There are significant benefits possible from focusing on life sciences, as a core pillar within a wider commitment to thriving R&D. These support the recent prioritisation of life science as a sensible strategic priority:

Return on investment: The literature shows that life science research investment generates a generous return on investment. £1 of public investment generates the equivalent of between £0.22 and £0.28 in returns, every year, in perpetuity (King's Policy Institute 2021; Pollitt 2019).

NHS productivity: The health sector represents around 10 per cent of the UK economy – and this share is growing. However, productivity gains in health and care have relied on doing more with less, an idea that is increasingly difficult to justify – given high NHS pressures and worsening overall outcomes. Science, and the innovation it generates – from personalised medicine, to genomics, to artificial intelligence, to better public health interventions – offers a mechanism by which strategic investment can drive both productivity and patient outcomes.

Driving private investment: The UK is among the worst advanced nations when it comes to inward private investment. No sector invests more in R&D, globally, than the life sciences (Thomas et al 2020).

Societal benefits: Health is critical for the labour market and for individual prosperity. The sharp rise in the number of people excluded from the labour market due to long-term illness is testament to this fact. Health innovation can support benefits in individual and national prosperity.

Existing strengths: The UK already has strong life science infrastructure, including cross-sector partnerships, leading academic institutions, specialised clusters and world leading public institutions. A strategic focus on life science offers an opportunity to build on, and from, these strengths.

Gross value added (GVA): Recent analysis has calculated the GVA of the life sciences at £36.9 billion (ABPI & PwC 2022).

Above and beyond that, the UK's stagnating health makes a compelling case for focusing on life science. As Figure 2.2 shows, progress rates of sickness and mortality across all health conditions has stagnated since 2011 – and may even have begun to reverse.

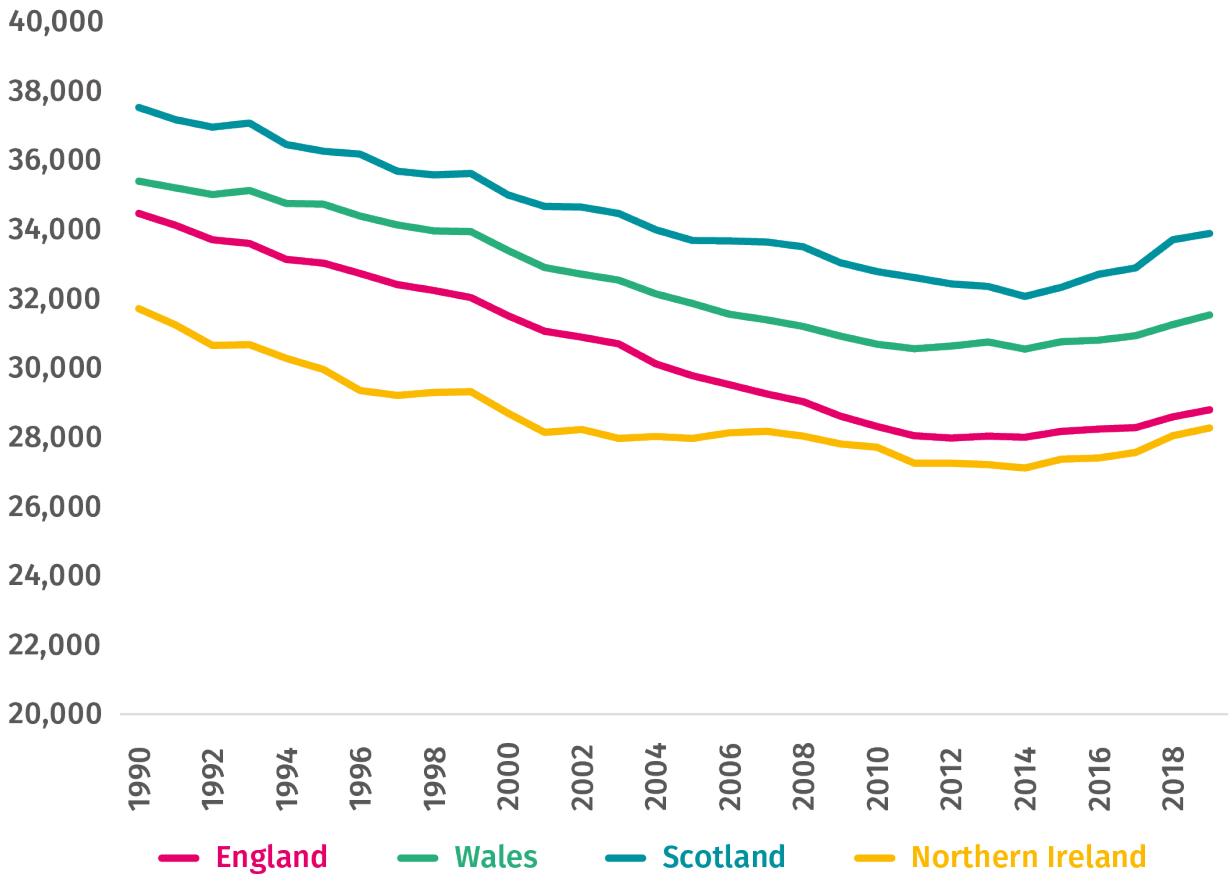
BOX 2.1: LIFE SCIENCE STRENGTH

Industrial strategy means focusing on areas where the UK has big strategic advantages. This is clearly the case in the life sciences where we have:

- genuine world leading institutions, including the golden triangle
- huge potential in the regions, including an exciting data science cluster in Greater Manchester, infectious disease cluster in Merseyside and a health ageing cluster around Newcastle
- a genuinely national health provider in the NHS, with unrivalled data and partnership potential
- innovative business, from big industry to a vibrant community of health-focussed SMEs across the country, with huge potential for scale.

Figure 2.2: Progress in health has stagnated since 2011

Rate of Disability Adjusted Life Years lost per 100,000 people by country, all causes, 1990-2019



Source: Author's analysis of IHME (2021)

While research is not the only important variable in reversing this trend – health service funding, ability to spread innovation, public health, and wider levels of socioeconomic inequality are fundamentally important – greater innovation evidently has a role in supporting better health.[5]

This is demonstrated by experience – as already outlined, the power of innovation is clear in the health improvements made in the 20th century. But it is also supported by a range of more recent evidence. Investing in better healthcare technologies saves lives through prevention, earlier diagnoses and more effective treatments (NHS 2019). A 2021 study found that technological progress in healthcare was responsible for half of the total increase in life expectancy in the US between 1965 and 2005 (Fonseca et al 2021). In 2020, IPPR research found that optimising innovation[6] in the UK could save 20,000 lives from dementia, stroke, cardiovascular disease, and cancer (Thomas et al 2020). And embedding research activity into the NHS can help to ensure that new innovation is adopted into the healthcare system, and more broadly is linked to better health outcomes for patients (NHS 2019).

There is exciting innovation in both biomedicine and on the social drivers of health. On the former, gene and cell therapies are providing a source of treatment for conditions – like rare cancers and eye conditions – for which we previously had little recourse. Elsewhere, schemes like the Peckham Pantry – which adapts the food bank model to provide a more dignified experience – is effectively tackling food poverty and poor nutrition. And The Liminal Space's 'Night Club' is tackling the health consequences of shift work – by bringing together the night-time economy and sleep experts to develop better working practices and standards.[7]

THE UK'S DECLINING COMPETITIVENESS

The change in the ONS' methodology introduces some uncertainty in the exact level of UK life science R&D investment. However, best evidence is not encouraging. It remains true that in the years since the financial crisis, our competitiveness as a place to do research has declined – our analysis suggests that the UK's share of global R&D investment fell from 4.2 per cent in 2014 to 3.4 per cent in 2019 (authors' analysis of World Bank 2022a, World Bank 2022b, ONS 2021a, ONS 2022d).[8] Had we maintained our 2014 share of global R&D investment, our R&D investment in 2019 would have been £18 billion – or 26 per cent – higher.

Moreover, the UK share of global private R&D investment in life sciences – and the proportion of UK manufacturing GVA contributed from life science manufacturing – have both declined over the last decade (or the latest period for which data is available; see Figure 2.3). If the UK had maintained our 2010 share of global private life science R&D investment, it would have been £2.9 billion higher in 2016; if life science manufacturing GVA had maintained its 2010 share of total manufacturing GVA, it would also have been £2.9 billion higher in 2021 (authors' analysis of Carnall Farrar 2019, ONS 2022e).

[5] This relies on research being followed by adoption and diffusion.
[6] Reaching levels seen in other, comparable countries.
[7] Already adopted by big employers like the Co-op, John Lewis and Thames Water.
[8] This accounts for the ONS methodology change

BOX 2.2: WHY DOES LESS R&D MATTER?

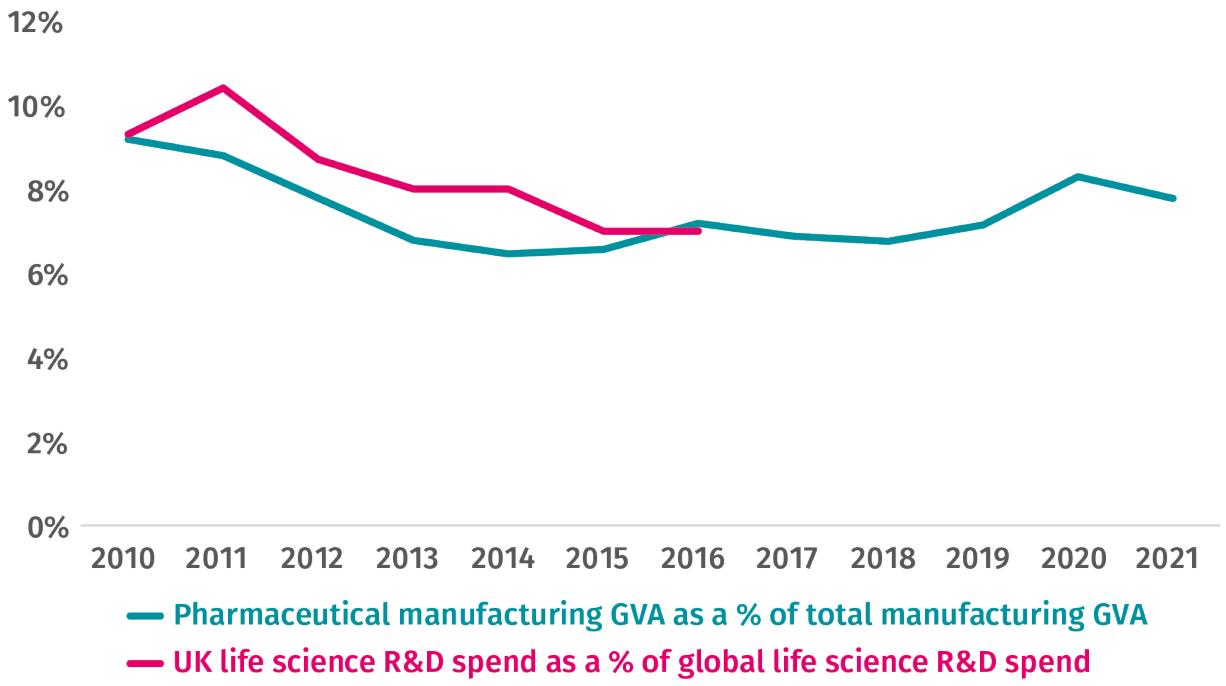
If the UK does less research, it's likely to reduce the sum of research done globally. That means less innovation in total; less focus on UK needs and priorities in the innovation developed; and less economic benefit from science as an industrial activity. Life science in the UK has been behind huge advances historically, including:

- the smallpox vaccine, which has saved immeasurable lives
- blood transfusions
- aspirin
- effective tuburculosis treatment.

And much more. R&D is about our capacity to deliver discoveries on this scale - in our own enlightened self-interest, and to the benefit of the world as a whole.

Figure 2.3: The UK's competitiveness in life sciences has declined over the last decade

Percentage of UK GVA from pharmaceutical manufacturing and percentage of total global life science R&D spend spent in UK, 2010 to latest [accounting for ONS revised R&D investment figures]



Source: Carnall Farrar (2019), ONS (2022e)

Beyond R&D investment, the UK is behind on several competitiveness indicators which matter in investment decisions taken in global boardrooms:

- **Clinical trial recruitment:** The UK is only fifth of ten comparable countries on the share of patients recruited to global studies (all clinical trial phases).
- **Speed of trials:** The UK is seventh of ten comparable countries on the time it takes from receipt of core package to the first patient enrolled in a clinical trial.
- **GVA:** The UK is middling on the global exports of both pharmaceutical products and medical technology products (BEIS et al 2022).

Despite the clear strengths of UK academia and infrastructure, much more is needed to ensure that the UK is world's most attractive place to do science. The rest of this paper explores what, beyond direct public investment, the government can do to achieve that in practice.

BOX 2.3: METHODOLOGY

In this briefing, we investigate what policy levers relevant to the life sciences sector are available to government, and which hold the most potential for improvement. To answer these questions, we held expert roundtables, with a total of 20 participants from the life sciences sector across business, the public sector, charities, and academia – as well as a small number of in-depth interviews. We asked participants the following questions.

1. What are the current barriers to life science R&D investment, and what would a good policy approach look like?
2. What are the roles of different actors in the life sciences eco-system (businesses, government, charities, universities)? Are these relationships currently functioning as they should?
3. A future government might look to take a partnership approach between businesses and government in the life sciences sector. What should the role of such partnerships be? What aims should it seek to achieve?
4. What would the implications of a mission-based approach to the life sciences be for your organisation? What are the pros and cons of such an approach?

A list of participating organisations can be found in the **appendix**.

3. THE ACTIVIST STATE

If we accept that R&D in general, and the life sciences in particular, are important focus points for the new government – then the question becomes how best can policy optimise the environment for science, and draw in investment in an increasingly global environment?

The short conclusion is that the UK is unlikely to lead in an increasingly competitive, global life science market unless it has a clear sense of the role of government within the health research ecosystem – and a mechanism to deliver policy in keeping with its role. This has been recognised to some extent by government, who have made increasing reference to notions like partnership and collaboration. But despite the flurry of strategies, a coherent role for government has yet to be put forward in practice - or consistently reflected in policy and strategy.

In orthodox economic theory, the role of government is little more than fixing market failures – and otherwise, getting out the way lest it 'crowd-out' the market. There is strong evidence to suggest this approach is limited, including in the life sciences. Firstly, there is strong evidence on the importance of the role of the state in supporting R&D more broadly. This is especially the case in sectors such as health with a high public value, where the total value of the innovation is unlikely to be fully captured by any single firm. An Industrial Strategy Council report into the lessons from the development of the Oxford/Astrazeneca Covid-19 vaccine found that long-term and patient public support for the life science sector in the years before the pandemic was critical to the success of the vaccine programme (ISC 2021). And our analysis in box 3.1 shows the economic impact that public-led R&D investment can have, both directly and by crowding in additional investment from the private sector. Sussex et al (2016), upon which our analysis is based, find that a 1 per cent increase in public sector health R&D expenditure is associated with an 0.81 per cent increase in private sector health R&D expenditure.

More recently, a wave of new evidence has pointed towards the power of government in achieving and unlocking value - as a collaborator with business, academia and civil society (Mazzucato 2011). We need only look to the government's active involvement in the space race, DARPA, the technology in the iPhone, or the creation of the Oxford vaccine to see how important its role can be.

Through our qualitative work, we identified a number of potential different 'characterisations' government could embrace, in conceptualising how they work with the health research sector.

1. **Withdrawal –** The government could look to do less on life sciences, freeing up space for other actors. This is consistent with the more orthodox notion of government we set out above.

2. **Funder** – the role of government is to provide public funding for R&D investment, and to ensure that private businesses face the right financial incentives to carry out useful research.

3. **Enabler** – government goes beyond a pure funding role, and plays an active part in ensuring that the wider policy and infrastructure environment is conducive to research and innovation.

4. **Activist** –government is not *just* a funder or enabler, but an agent with objectives for social and economic change in its own right. It uses the policy levers available to it to pursue these objectives, *and* to support others to do the same.

Previous IPPR research on the economy as a whole has concluded that an activist government carries the most potential to deliver growth, reduce inequality, and contribute to regional rebalancing (e.g. Jacobs et al 2017). In this model, a government would work in partnership with the private sector, universities, civil society and charities to achieve set health, social and economic goals – and solve clearly defined 'wicked problems'. This is the best approach to set the health sciences sector up for success and reap the maximum economic and societal benefits.[9]

As such, the government should provide support and facilitate a good policy environment for research. In return, it should expect, and work with, the life sciences sector to contribute to wider societal or economic objectives: to deliver a healthier society; to narrow health inequalities; to pre-empt and tackle major public health challenges; to prepare for future health disruption; or to level-up productivity, through more life science investment and activity in the North of England. We cover how to achieve the former in this chapter, and how to achieve the latter in chapter 4.

THE ACTIVIST GOVERMENT IN PRACTICE – PULLING ALL THE LEVERS

In our qualitative research, we explored how the government can best support and create an optimal policy environment for research and innovation to occur. We found consensus that the UK, in an increasingly competitive global environment, needs to pull all the levers available to it hard. Specifically, we identified five key themes where policy change is clearly needed, and where 'pulling all the levers' could be embedded by the next prime minister.

1. The NHS as an innovation partner

Our findings

The healthcare system itself was identified as a key player in the life sciences ecosystem, alongside businesses, government, charities and universities.

The UK's particularly centralised model of healthcare is a potential unique selling point in terms of life sciences research – it offers the possibility of bringing together population health data in a single unified manner. This could be used to help us compete with other countries to attract R&D investment. However, participants generally felt that we were

[9] This is not to say that government is not embodying this in any form. Investment and strategies are sign of a commitment to funding and enabling, while the life science missions provide some attempt to seek value. But it is not a full-blooded commitment to this vision and role of government, providing opportunities to do better. And our qualitative work showed a strong perception across the sector that the strategy is not sufficiently translating into consistent policy implementation.

failing to take advantage of this opportunity at the moment. There was widespread frustration around the barriers to using NHS data in life sciences research.

Some participants also argued that there were issues with the quality of the data held by the NHS. There was widespread acceptance that issues of public concern around privacy and profitability needed to be dealt with, and that there was a key role for government in helping to create a system that addresses these concerns while also allowing data-enabled research to occur.

NHS capacity was also identified as an issue: both in terms of workforce, and in terms of infrastructure – the spaces and equipment needed to carry out research. Participants noted that this issue underpinned progress towards other goals, such as the government's healthcare missions (see chapter 4).

The NHS' organisational structure was also referenced, with some participants arguing that fragmentation was an issue that made it harder for businesses selling new technologies to engage with the health system. In particular, the number of secondary care providers, and the need for firms to engage with them at an individual level, was cited as a problem. Participants did not feel that integrated care systems provided an adequate solution for this issue – they have not yet matured towards a network-based approach that links integrated care systems (ICSs), datasets, and research institutions.

Finally, participants argued that, at present, there was a lack of emphasis on the importance of research and innovation in the incentives faced by NHS staff. Instead, it was argued, there should be financial rewards for the use of innovative methods and technologies, through systems such as the quality and outcomes framework for GP practices; as well as a reflection of time spent engaging with research in the metrics used to determine career progression for staff.

Implications for policy direction

Clearly, the crisis in NHS capacity will need a solution, if the UK hopes to lead on research. Current capacity constraints are having a huge impact on the bandwidth of NHS leaders to prioritise science; on clinical research time; and on patient-facing activities like recruitment of clinical trials. Earlier this year, IPPR outlined a blueprint for the NHS – based on workforce recruitment, the right resourcing, extra capacity and more prevention (Thomas et al 2022).

A workforce strategy is particularly important. There are several ways this could be improved.

- The cap on medical and nursing students could be raised or removed.
- The NHS could set up inclusive programmes to support recruitment of the increasing number of people economically inactive due to a long-term condition.
- International recruitment in health and care could be liberalised further.

A lower level of aspiration would be a return to sustainability; the NHS will struggle to find time for research and innovation while firefighting. A higher level of aspiration would

be to build bespoke time into NHS job plans, to deliver research and support clinical trial recruitment.

We also agree with the need identified by participants to build the systems needed to ensure that NHS data can be used effectively in research, whilst balancing this with the objectives of protecting patient privacy and ensuring that the value generated by patient data is fairly distributed. And we support the aim of incorporating activity around innovation into NHS staff incentives. Easy, immediate wins could include adding innovation and research to NHS competency and appraisal frameworks – or reforming the clinical excellence award to reward those with demonstrable evidence of leading research or innovation implementation.

The new ICSs could mature in ways conductive to better research and innovation diffusion. This is likely to rely on data-enabled relationships – between healthcare leaders, research institutions, research charities and business. We recommend each ICS sets up a research and innovation board within each footprint, designed to facilitate new networks, to breakdown siloes and to Inform strategy. This would support wider aspirations towards delivering Trusted Research Environments.

Finally, the NHS has a role as a user of innovation. The government's own data shows that UK usage of new medicines is lower than other countries, while difficulties in the spread of innovation have been noted by independent research. This is a challenge – both in translating science done within the NHS into real patient benefit, but also in making the UK an attractive place to invest in research. In line with previous IPPR recommendations, we suggest the government delivers a strategy for the spread of innovation – based on the following.

- Ensuring there is bespoke time built into roles to work on adoption and spread.
- Creating bespoke innovation roles, particularly around technology.
- Aligning incentives to innovation adoption, where they currently push risk aversion. This could include job descriptions, clinical excellence awards, hire decisions and promotion decision processes.
- Providing access to small pots of money to adapt innovation to local settings and care pathways.
- Reintroducing networks and peer support forums to support innovation and lesson sharing (see Thomas et al 2021).

2. The business environment

Our findings

Many participants stressed the importance of the general business environment, citing factors such as patient access to and uptake of medicine, medicine pricing, and the tax structure faced by businesses. They argued that this was more important than the R&D environment specifically – including factors such as public funding, skills and

infrastructure – in determining decisions over whether to locate research activity in the UK versus elsewhere. High inflation, and a generally deteriorating growth outlook, were referenced as negative factors affecting the UK business environment and prospects for private sector investment.

Skills were most regularly brought up as an important factor in making the UK a better environment for life sciences research. The education system, apprenticeships, and the post-Brexit immigration system were all pointed to as potential policy levers to help improve this. The regional aspect of skills was also stressed – investing in skills in less well-off parts of the country will not necessarily help improve economic outcomes in those areas if those who receive the training then move to a different part of the country. And skills gaps among regulators were referenced as a potential barrier to getting a good regulatory environment to facilitate innovation.

Finally, participants pointed to regulatory uncertainty as a barrier to private R&D investment. Uncertainty around the Brexit transition process and its implications for medical product regulation, delays in engaging with NICE, and uncertainty around future VPAS[10] rates were all cited as difficulties facing businesses.

Direction for policy

We are sceptical about oversimplistic claims that increases in business investment can be achieved through tax reductions alone. Recent literature fails to find evidence of a positive growth impact from cuts to tax on business profits, and in fact there is evidence that they can have the opposite effect (Hope and Limberg 2022; Gechert and Heimberger 2022; Berg et al 2018). IPPR's recent research on corporation tax found that cuts had not fuelled investment or growth (Dibb 2022). One potential reason is that the reduced capacity of government to do other things that matter – ensure NHS capacity is sound, increase skills, improve education – are undermined.

However, there is a clear need for government to reduce the uncertainty faced by businesses. We suggest two more immediate opportunities. First, it can provide more confidence in the supply of skilled workers. As previously argued by IPPR, policies could include the following.

- Devolution of technical education to cities (Round 2018).
- Establishing a body to help retain postgraduates in cities and regions (ibid).
- Improvements in business support for workforce training (ibid).
- A scheme setting new standards for apprenticeships most key to the life sciences (ABPI 2019).

There are particular opportunities for apprenticeships policy to better support a life science skills pipeline. Yet overall apprenticeship numbers have been falling – with

[10] VPAS (the Voluntary Scheme for branded medicines Pricing and Access) is an agreement between the Department of Health and Social Care and the Association of the British Pharmaceutical Industry, which puts a cap on the growth of the total NHS branded medicines bill.

apprenticeship starts 40 per cent down among under-25s in the last five years. The clearest policy would be reform of the apprenticeship levy – large amounts of which go unspent – along with greater flexibility to spend this on non-apprenticeship training, or on training elsewhere in the supply chain. Equally important is financial support for apprenticeships – from cost-of-living to relocation. A government wage subsidy could help incentivise more apprenticeship schemes, while supporting apprentices themselves.

The government should also take the opportunity to reform VPAS. While the principle of a set medicine bill is useful – it gives certainty on what can be afforded, while allowing the NHS to adopt new innovative medicines each year – the scheme is not designed to be an aggressive, short-term cost control mechanism. As much as we conclude that tax cuts are unlikely to be the silver bullet to private investment they are sometimes presented as, we equally suggest that a high, industry-specific tax like VPAS is unlikely to be sustainable in the long-term – or compatible with an attempt to create a more research-focused, innovation-led, and competitive business environment.

The current scheme is almost at its end – providing the government an opportunity to better align the scheme with comparable countries. Principles for a future scheme should include ensuring businesses have more predictable information to plan for rates, that long-term relationships are prioritised over aggressive short-term cost containment, that patient and public views are incorporated in scheme decisions and design,[11] and that there is a greater level of transparency in decision making. A failure to do this would be a fundamental threat to the UK's reputation as a place to invest in research in a competitive global hierarchy.

3. Public sector capabilities

Our findings

Theories on public purpose increasingly stress the need to think about public sector capabilities, to help ensure it has the tools to identify and achieve value. In their 2019 paper, Mazzucato and Kattel ask:

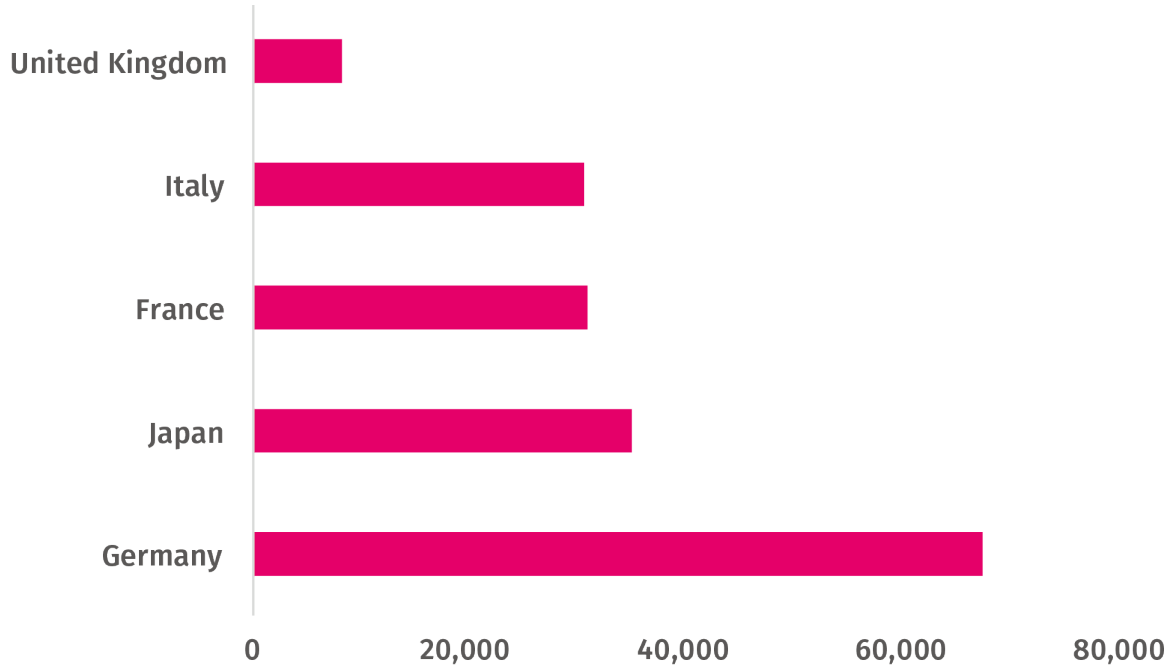
> ***"To tackle societal challenges, we must first admit that socio-economic issues do not have a single correct solution. Rather, such issues require continuous discussion, experimentation and learning, each of which requires specific sets of capabilities. Does the public sector have the capabilities for such learning and experimentation?"***
>
> Source: Mazzucato and Kattel (2019)

Our roundtables highlighted a variety of areas where public sector capabilities could be built. Most pressing was healthcare professional capacity to participate in clinical research. This point is accurate to the data – the UK has among the lowest public sector researcher capacity of any comparable nation. Figure 3.1 below shows this for all R&D, across the G7 – for the five countries that report on this indicator.

[11] Including on the trade-offs between immediate cost savings (reinvested in care) and long-term levels of research and access to healthcare innovation

Figure 3.1: The UK has far less public sector researcher capacity than comparable nations

Government researchers, total headcount, 2018



Source: OECD (2022b)

This corresponds to over eight times fewer government researchers than Germany – and between 3 and 4 times less than Italy, Japan and France. As such, we agree that building more capacity within government for health research (from clinical to public health) is a vital priority.

Direction for policy

The government has recognised the need for a well-trained, well-supported clinical research workforce – including in 2021's *Saving and Improving Lives* White Paper. Yet, healthcare professionals face limited time to do - and development pathways to progress in – clinical research. We endorse the Cancer Research UK and Academy of Medical Science recommendations on creating time for clinical research, including the following.

- A new programme to support small scale research in the NHS workforce, to build opportunities and confidence
- A pilot programme where a small proportion of funded staff time is allocated to clinical research
- Regular reviews of research awareness among health service staff and patients, delivered either at a Trust or ICS level, and compiled as an annual national dataset.

Source: Peckham et al (2021)

CASE STUDY: SKILL MIX, CLINICAL RESEARCH AND COVID

International studies have indicated that skill mix provided England some flexibility to react to the Covid-19 pandemic, when it first struck (Pitchforth et al 2021). One of the most effective deployments of skill mix was that used to support the research efforts led by the UK chief medical officers (CMOs). NHS trusts were asked to prioritise studies with CMO approval – with clinical research nurses, doctors and midwives deployed to support these efforts. This supported not only vaccine development, but also the epidemiology that informed the UK's public health response. This indicates that clinical research skills not only have value to routine research efforts, but also support national resilience and pandemic preparedness.

4. The research pipeline

Our findings

Participants were generally more positive about early-stage research, where the UK tends to be more successful. They commented that the government's existing policy mostly related to early-stage research. They argued that a lack of patient capital was partly responsible for this, with new technologies being developed in the UK but then being developed and commercialised elsewhere.

Relatedly, difficulties in performing late-stage clinical research trials[12] were flagged by many participants as a particular issue for UK competitiveness in late-stage research. Participants described the process as slow and costly, and referenced difficulties in recruiting patients to participate. They described barriers in allowing patients to take part in trials from home, rather than having to travel in to a major health centre – with implications for the regional distribution of research activity. They also described excessive requirements for demonstrating that a piece of research was successful at different scales. Such views are backed by OLS competitiveness indicators data already cited in this report, indicating the UK has room for improvement around clinical trials.

Direction for policy

For Phase 2 trials, the UK ranks 5th globally and 3rd in Europe, but drops to 7th for Phase 3 trails (Sloggett 2021). This is underpinned by continued pandemic impact – UK research activity didn't recover as quickly as Spain or Italy – and historic challenges with speed of trial set-up in the UK. Indeed, the UK was 7th of 10 (among comparator countries) when assessed on speed of transitioning from core package reception to patient enrolment (ibid).

The emphasis placed by participants on this latter point – difficulties performing clinical trials – means that we see it as a particularly important issue for the government to address. Indeed, it was one of four priorities set by the UK on taking the G7 chair. We welcome the government's recent review of UK clinical research delivery (DHSC et al 2021; MHRA 2022), and hope that significant action is taken in this area as a result.

[12] That is, trials where larger numbers of patients are treated with potentially life-saving treatments.

4.
THE VALUE-SEEKING STATE

As well as considering the role played by government in supporting life sciences, an activist government should have a stated interest in linking innovation and growth of the sector to broader social and economic objectives, and to solving 'wicked problems'. To achieve this, policymakers should take a mission-based approach to life sciences policy and industrial strategy, as advocated for by Mariana Mazzucato and by the IPPR Commission on Economic Justice, among others (Mazzucato and Willetts 2019; Kibasi et al 2018).

The classic example of a mission is the US government's 1960s goal of putting a man on the moon. However, today this approach is being adapted by governments to address more complex problems. A mission-based approach to industrial strategy starts with a 'grand challenge' – a major social, environmental or economic problem that policymakers wish to solve (Mazzucato and Willetts 2019). Examples of this could include climate change; regional inequality; or the demographic challenge of an ageing society.

Under this grand challenge sit missions – specific, targeted goals such as reaching net zero carbon emissions by 2050; or every area of the UK containing a globally-competitive city by 2030. Under these sit sub-missions. For example, for a mission to reach net zero, sub-missions that sit under this could include developing cost-effective battery energy storage systems, or a programme to install loft, cavity and solid wall insulation in homes across the UK.

A mission-based approach to industrial strategy can be contrasted with the 'national champions' approach taken to industrial strategy by British policymakers in the mid-20th century. Here, governments approached industrial strategy with the goal of building up specific individual companies in strategic sectors to be competitive in global markets – in other words, a 'picking winners' approach (Owen 2009). In a mission-based approach, instead of picking winners, government picks problems, and then takes an agnostic approach to the means and actors needed to solve it (Mazzucato and Willetts 2019).

WHY IS A MISSION-BASED APPROACH DESIRABLE?

There are several reasons why a mission-based approach to industrial strategy is desirable.

1. Missions can help align activity with broader social goals

A mission-based approach can help better align policymaking to broader social goals that are not currently well provided for. This can include ensuring that drivers of morbidity have a flourishing research pipeline, to help revitalise stalling healthy life expectancy – or that diseases which primarily affect poorer people get their fair share.

2. Missions communicate a sense of the strategic direction of travel of government

Private sector innovation is often a long-term investment. Policy churn and constant refreshing of strategies can harm the certainty firms need. On the other hand, nations like South Korea have been able to achieve remarkable increases in innovation intensity by pursuing a long-term, consistent approach, characterised by closer strategic partnership between state and firms (Nature 2020). Unlike individual policy changes, mission-based policymaking gives a sense of the government's vision for the overall direction of policy. This creates more certainty for other actors – firms, investors, universities, charities – leading to increased levels of investment and lower borrowing costs for firms working on relevant activity.

3. Missions can focus minds, break down silos, and coordinate policymaking

A 2015 Health Foundation report found that the use of concrete, measurable targets in the NHS had "provided strong incentives to improve quality of care", though they also highlighted risks around unintended consequences such as gaming and disproportionate focus on areas that are easy to measure (Berry et al 2015).

Silo effects – a lack of effective coordination between different parts of government – are a well-known phenomenon (e.g. Scott and Gong 2021). And policy areas are often interrelated – for example, policy concerning car use and active travel; or social care and the NHS. A lack of action in one policy area can sometimes prevent change being made in another. When tackling problems that span several policy areas or government departments, taking a mission-based approach can therefore be more effective than aiming to tackle the problem in each area in isolation.

This is particularly important in a crisis. The Industrial Strategy Council's report into the Covid-19 vaccine programme specifically cited the benefits of a mission-based approach in ensuring the success of the programme (ISC 2021).

4. Missions can lead to unexpected solutions and spill overs

Innovation is inherently uncertain, and solutions to complex or 'wicked' problems may come from research in unrelated fields – the so-called 'spill overs' of innovation. We know that this is particularly true when researchers collaborate across disciplines to solve problems. For example, the World Wide Web was a spill over of subatomic physics research at CERN. In the life sciences field, the research into mRNA technology accelerated by the Covid-19 vaccine may lead to new treatments for HIV, malaria, and the flu (Nature 2021).

Compared to more prescriptive approaches to industrial policy, a mission-based approach may be preferable, as it allows for the possibility that government may not have the information needed to determine which actors are best placed to solve a given problem, or which technologies are the most promising. When designed well, missions can spur researchers from diverse fields to work together towards novel solutions and create potential spill over technologies.

5. Missions can give a sense of purpose

Missions can help to give people a sense of purpose. Where there is public buy-in for the vision policymakers have chosen to pursue, people may be more willing to make sacrifices in service of tackling a large social challenge. An example of this is the widespread adherence to lockdown measures during the Covid-19 pandemic, in service of wider social goals such as keeping the health service functioning, keeping each other safe, and helping to end the pandemic.

6. Missions can increase funding for R&D by crowding-in new investment

Finally, well-designed missions can help increase overall funding for R&D. In the past, it was believed that public funding for innovation would 'crowd out' the private sector and reduce funding overall. Yet there is growing evidence that by fostering future growth opportunities and being an early investor in uncertain areas, public funding can lay the foundations for and 'crowd in' the private sector (Deleidi and Mazzucato 2021). Charity research funding can also crowd in investment, stressing their important (and unique) role in the UK health research ecosystem.

WHAT SHOULD A MISSION-BASED APPROACH LOOK LIKE?

A 2018 European Commission report by Mariana Mazzucato proposed five key criteria for policymakers to use when designing missions.

1. Bold, inspirational with wide societal relevance.
2. A clear direction: targeted, measurable and time-bound.
3. Ambitious but realistic research & innovation actions.
4. Cross-disciplinary, cross-sectoral and cross-actor innovation.
5. Multiple, bottom-up solutions.

Source: Mazzucato (2018)

THE GOVERNMENT'S APPROACH TO LIFE SCIENCE MISSIONS SO FAR

Starting in 2017, the UK government has incorporated missions into their approach to industrial policy and industrial strategy. In 2021, the government published their vision for the life sciences sector (BEIS and OLS 2021). This included four themes.

1. Building on the new ways of working from COVID-19 to tackle future disease missions.
2. Building on the UK's science and clinical research infrastructure and harnessing the UK's unique genomic and health data.

3. Supporting the NHS to test, purchase and spread innovative technologies more effectively, so that cutting-edge science and innovations can be embedded widely across the NHS as early as possible, and rapidly adopted in the rest of the world.

4. Creating the right business environment in the UK in which companies can access the finance to grow, be regulated in an agile and efficient way, and manufacture and commercialise their products in the UK.

Source: ibid

It also included seven 'healthcare missions', focussed on specific diseases or technologies.

1. Improving translational capabilities in neurodegeneration and dementia.

2. Enabling early diagnosis and treatments, including immune therapies such as cancer vaccines.

3. Sustaining the UK position in novel vaccine discovery development and manufacturing.

4. Treatment and prevention of cardiovascular diseases and its major risk factors, including obesity.

5. Reducing mortality and morbidity from respiratory disease in the UK and globally.

6. Addressing the underlying biology of ageing.

7. Increasing the understanding of mental health conditions, including work to redefine diseases and develop translational tools to address them.

Source: ibid

And the Industrial Strategy Council reported that a mission-based approach had been taken in the government's strategy to developing a vaccine during the Covid-19 pandemic (ISC 2021).

Although it is positive that the government has taken a mission-based approach as part of its vision for the sector, this section of the vision falls short of what we would expect from a set of missions to guide life sciences policy.

Applying the framework from Mazzucato (2018) above, we can observe a few things. Firstly, they are insufficiently concrete. Language such as 'improving' or 'reducing' is used, but the vision does not specify to what level and under what timeframe. This can be contrasted with the approach taken to mission-setting in the government's 2022 Levelling Up White Paper, where numerical targets were given in at least some instances.

Secondly and relatedly, they lack sufficient ambition. We should be setting our sights higher – particularly given the level of ambition contained in the government's own rhetoric (see figure 1.1). For example, on vaccine development, we should go further, and aim to be prepared to deal rapidly with future pandemics, and avoid future lockdowns.

Thirdly, they lack detail in how they would be implemented. While the vision sets out a series of components that would sit under each of these seven missions, these are similarly unspecific. As IPPR have recommended previously, the next step should be working with partners across the missions to set out 'mission statements' – action plans, outlining key milestones and policy levers for progress (Thomas et al 2022).

And finally, our roundtable experts reported patchiness in how seriously different missions are being taken by government – some missions are more well-defined than others, are more well-funded, and appear to have more senior buy-in within government than others. It is important that the missions have consistency. One next step could be to appoint a senior 'mission champion' for each, providing senior leadership and advocacy, in a similar model to the NHS' clinical directors.

APPENDIX

ORGANISATIONS THAT PARTICIPATED IN EXPERT ROUNDTABLES AND INTERVIEWS

- AbbVie
- Alzheimer's Society
- Association of British HealthTech Industries
- Association of Medical Research Charities
- AstraZeneca
- Bristol Myers Squibb (BMS)
- British Heart Foundation
- Cancer Research UK
- Carnall Farrar (CF)
- European Cooperation in Science and Technology
- Gilead
- GSK
- Janssen
- Lane Clark & Peacock LLP
- National Institute for Health and Care Excellence
- NHS Confederation
- Sanofi
- Shelford Group
- Takeda
- Tony Blair Institute for Global Change
- University College London

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