INSTITUTE FOR GOVERNMENT

Levelling up and innovation

How R&D and other policy can reduce regional inequality

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Summary

Innovation – broadly defined as the generation and diffusion of knowledge – is an important driver of economic growth. New ideas, better ways of making and selling things and well managed firms are the building blocks of innovation, and together work to make economies more productive. In terms of policy, innovation is most closely associated with scientific research and development (R&D), which targets the discovery and invention of new technologies and products. But innovation is also broader than that.

The levelling up agenda, too, is broad – the government wants it to be about more than simply improving economic outcomes. But it also recognises successive UK governments' failure to solve the 'productivity problem' – the first chapter of the white paper is dedicated to it. In this Insight paper we summarise the evidence, based on policy evaluations and case studies of past examples of initiatives equivalent to 'levelling up', of innovation policies that are most likely to improve productivity in

cities and regions outside the South East – one of the white paper's key 'missions'. We then explore how the government's current approach measures up, and offer our recommendations on steps it can take to ensure it, and the UK more generally, can make the most of innovation policy.

Our key findings are:

There is a clear link between R&D and economic growth

Most R&D is conducted by the private sector. A pharmaceutical company conducting clinical trials of a new drug or vaccine would, for example, constitute private sector R&D expenditure. The private returns, captured by the profits generated by new products, from R&D for businesses tends to be high on average – even up to 30%, often higher than many other forms of investment.

Innovation generates broad returns to society, justifying government intervention

Innovation generates benefits to society that spread beyond the original innovator. Work originally conducted by researchers to discover and understand mRNA was commercialised by Covid vaccine producers. Similarly, the technological developments made by companies like Apple and Microsoft have advanced the state of knowledge and contributed to innovation in other companies.

As a result of these broader benefits, the risk that the private sector would not invest in enough – or in the right kinds of – innovation provides a clear rationale for government intervention.

Government support can broadly take three forms. Tax credits allow businesses to deduct more than 100% of R&D costs, such as staffing, so lowering their tax burden; subsidies and grants are awarded directly to businesses to conduct R&D; grants to other institutions (such as universities) encourage R&D work, often initiated at an earlier stage than businesses would fund themselves. For each, there is good evidence that such support leads to more R&D – known as 'crowding-in' of additional private R&D investment following government support.

Where innovation happens matters, and it is regionally concentrated in the UK

Spillovers from R&D can spread far and wide – and ultimately globally – but businesses located close to source get more benefit, so where this happens matters. This is because knowledge sharing is enhanced when firms are based in the same area, for instance in regions with research-intensive universities. Such regional 'clusters' allow firms to trade more easily with each other, support specialist supply chains and mean researchers can easily move between firms.

UK R&D is regionally concentrated. Public funding is currently disproportionately spent in central London and the areas surrounding Oxford and Cambridge universities; these regions receive 45% of public R&D funding despite accounting for only 13% of the population.* This would suggest that government innovation policy could be a useful tool in levelling up places with below-average productivity outside London and the South East.

Competitively awarded grants are the best tool for using R&D policy to drive levelling up

Attempting to vary tax credits on a regional basis would be administratively complex and subject to avoidance risk. Grants work best when awarded competitively – for example, via UK Research and Innovation (UKRI) and other research councils, which work to the Haldane principle that academics rather than politicians should make final decisions about specific research projects. The R&D levelling up 'mission' – which sets a target for public R&D spending to increase outside the Greater South East by 2030 – should be more ambitious to ensure the *share* of spending, as well as the total amount, outside the South East increases. However, the government's plans to expand R&D spending principally via grants suggest the underlying strategy of encouraging innovation is aligned well to the evidence.

But additional public R&D spending alone will not achieve levelling up in every region

Countrywide evidence from the OECD shows that places need a strong enough business environment and workforce skills – termed "absorptive capacity" – to take advantage of new ideas.[1] This is also the case at the subnational level. Places that are intensive in R&D tend to generate 'clusters' of businesses that benefit, and a workforce with the necessary skills to use the new technologies. This means that initial public R&D investment should focus on places with existing capacity (for example, in Coventry, which has a big automotive R&D cluster), and the government should ensure other policies are in place so local areas can capitalise on more R&D. Three 'innovation accelerators' in the West Midlands, Greater Manchester and Glasgow are designed to increase the local economic impact of R&D, though as it stands the funding committed is minimal.

Government should encourage the sharing of good ideas, not just new ones

Despite its clear benefits to the UK's productivity levels, R&D, as a means of developing *new* ideas and practices, accounts for a relatively small share of the overall economy – mostly in manufacturing. But there is more to innovation than new ideas. In lower-tech sectors such as retail, accommodation and the arts, this will often look less exciting, involving the diffusion of existing ideas and practices (often through better management practices). But it is likely to be especially important for some of the lowest productivity places where these lower-tech sectors are big shares of the economy.

* This includes the three NUTS2 regions Inner London, East Anglia and Berkshire, Buckinghamshire and Oxfordshire.

Why governments should invest in innovation across the country

Innovation makes economies more productive

Innovation broadly concerns the role of knowledge – its creation and diffusion – in economic growth. 'Product innovation' is the focus of most scientific research and development (R&D) – the creation of new goods and services and improvement of existing ones.[2] It leads to more choice and better quality for consumers and thus contributes to economic growth by expanding and creating markets. For example, pharmaceutical companies undertake R&D to create new drugs they can sell (and people benefit from), while car manufacturers might make advances in the design of engines or other components.

Innovation can also encompass doing anything new that is an improvement on what came before. Productivity growth can be driven by making production processes more efficient – producing the same goods and services, but at lower cost. For example, a firm introducing new machines that are cheaper to run would be making an investment in process innovation. Improvements to the way businesses are managed may also constitute innovation and increase productivity.

There is evidence linking higher private innovation to economic growth

A large body of literature from sources including the OECD, government-commissioned research and academia has attempted to quantify the economic return from R&D spending. All point to a strong link between innovation and growth.

Businesses that engage in innovation receive a private benefit from it, principally the profits generated through commercialising new discoveries (sometimes protected for a fixed period by patent rights). For example, a company creating a new drug or improving the quality of its engines would gain profits from selling the product. A consensus in the literature points towards an average private net return on R&D investment between 20% and 30%, higher than most other forms of investment.[3,4,5,6,*] This then feeds into a stronger economy.

And the benefits spill over to society more broadly, justifying government intervention

The fact that innovation generates high returns does not, in and of itself, justify government action. If businesses get enough benefit (via higher profit) from innovating, they will do so without government encouragement, investing in the projects that are worthwhile and ignoring those that are not.

But the benefits of innovation spread far beyond the original innovator, which is why governments may try to encourage it. Society as a whole benefits from innovation as other businesses and researchers develop or make use of previous ideas and inventions.

* It is important to note that returns can be higher or lower than this central estimate due to differences between sectors, firm size and countries. A literature review on the subject conducted by the OECD found that estimates of the private return to R&D investment can be as high as 69% but can also be zero.

For example, a new technology that makes car engines more fuel-efficient will be adopted more broadly by competitor businesses, helping later to reduce emissions; new business practices or software systems will benefit many businesses long after early trials.

There will also be basic (early-stage) research that might not be especially profitable for the original researcher but that has a clear societal potential. The mRNA research and subsequent Pfizer-BioNTech and Moderna coronavirus vaccines are recent examples of this.

Technologies developed in one sector can also spill over into others. Personal computers, global positioning systems (GPS) and blood transfusions are all examples of innovations initially developed for the military but have since been adopted for commercial use.

The evidence suggests these 'spillover' benefits are larger than the private benefits that flow to investors. A literature review compiled by the US Bureau of Labor Statistics found that knowledge spillovers account for around two thirds of the total return to society from R&D, implying that the social return can be two to three times as large as the private return.[7]

There will be many projects where the overall social return is high but the private return is not high enough to justify private investment, particularly early-stage research – and this provides a clear rationale for government intervention.

Spillover benefits are stronger when businesses are close to the original innovation

Spillover benefits can extend globally. Early research by Microsoft and Apple in the US has clearly benefited those companies but also people and businesses in almost every country in the world. However, this does not mean that where innovation takes place is irrelevant. The evidence, for example, from the National Institute of Economic and Social Research shows that the spillover benefits are felt most by businesses close to the initial R&D activity (a famous example being 'Silicon Valley', home to Apple's headquarters and with strong ties to Stanford University, in California).[8,9]

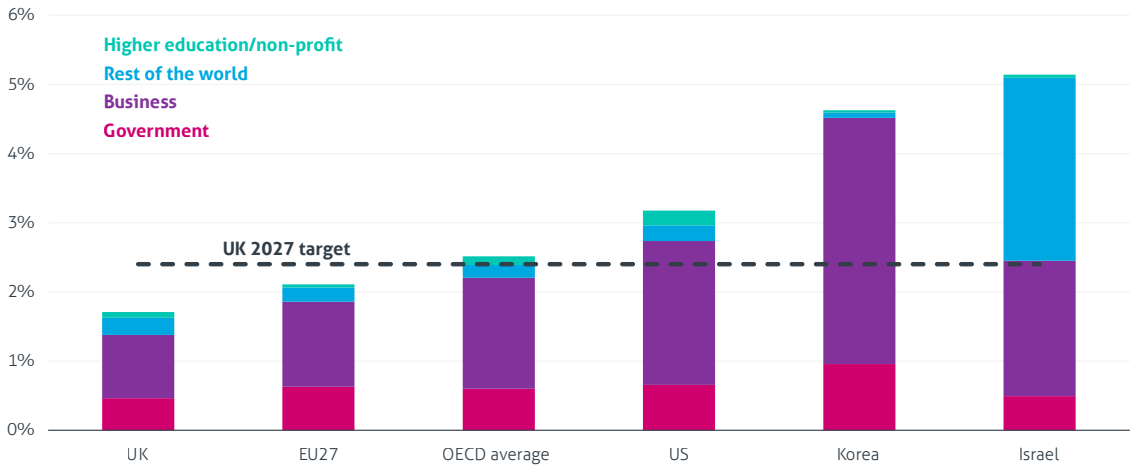
This is known as 'clustering', when businesses choose to be close to research to be better aware of it, to share expertise and to adopt technologies earlier, when the benefits might be greatest.[10] The UK also contains several R&D clusters such as the automobile hub in Coventry and Warwickshire, discussed in more detail below.

R&D spending in the UK is lower, and more regionally concentrated, than in other countries

The current level and geographic spread of R&D in the UK, combined with the evidence above of R&D's impact on growth, is a further reason to think that innovation might play an important role in making regions outside the South East more productive.

Total UK R&D expenditure was only 1.7% of GDP in 2019, far below the government's target of 2.4% – the OECD average – by 2027.[11] As Figure 1 shows, most R&D spending in all countries is funded by the private sector, but the UK lags behind comparator countries on both publicly and privately funded R&D.

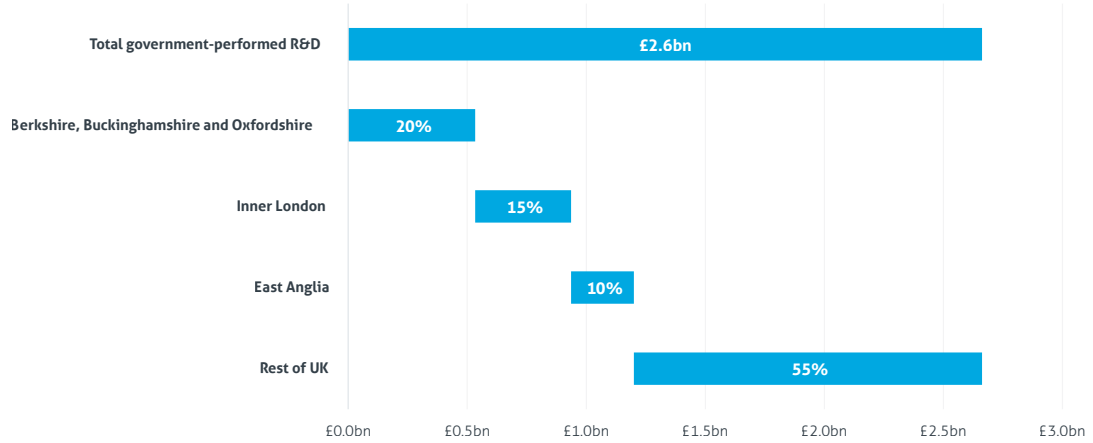
Figure 1 **General R&D expenditure in selected advanced economies, % of GDP**



Source: Institute for Government analysis of OECD main science and technology indicators, gross expenditure on R&D (GERD) as a percentage of GDP and percentage of GERD financed by government, business enterprise, higher education and non-profit sectors, and rest of the world. Note: Government-funded R&D excludes tax credits.

R&D work is also unevenly spread around the UK. For both public and private R&D, activity and spending is disproportionately located in the Greater South East: almost half (45%) of all R&D performed directly by government bodies happened in Berkshire, Buckinghamshire and Oxfordshire, Inner London and East Anglia, despite these making up only 13% of the UK population.[12] These areas also accounted for 28% of all business R&D in 2018.

Figure 2 **Distribution of government R&D by region**



Source: Institute for Government analysis of Office for National Statistics, Expenditure on research and development (R&D) performed in UK government by region (NUTS 2), 2019. Note: Inner London is the sum of the Inner London – West and Inner London – East NUTS2 regions.

Which innovation policies will work best?

There is clear evidence of the benefits of R&D and of the incentive for government to promote more of it. This section summarises the evidence on which innovation policies work best.

Direct grants and tax credits can help increase R&D at a national level

Governments can support innovation through three main funding channels: tax relief to businesses on their R&D expenditure, direct grants to businesses for particular projects, and grants to other institutions (such as universities) to conduct R&D that businesses do not provide. Evidence reviews by the What Works Centre for Local Economic Growth (WWCLEG) found strong evidence that all three can increase innovation activity.[13,14]

An R&D tax credit allows a business to deduct more than 100% of eligible R&D costs from taxable profits, providing an incentive for extra R&D spending. For example, in the UK, large businesses can deduct 125% of qualifying expenditure (mostly on staff and materials that contribute to R&D), while small and medium-sized businesses (SMEs) can deduct 230%.[15] This means that large firms can reduce their taxable profit by £1.25 for every £1 of qualifying R&D expenditure, and SMEs by £2.30.

Most impact evaluations on R&D tax credits looked at by the WWCLEG find a positive effect on reported R&D spending, and imply considerable crowding-in (that for every £1 of government money spent, more than £1 of extra private R&D takes place).[16]

Grants and subsidies to private businesses have also been shown to increase R&D spending and innovation, though there is less evidence on the extent of crowding-in from subsidies. Public funding tends to account for a small proportion of total R&D expenditure in businesses receiving subsidies so it is difficult to properly judge.[17] However, other research suggests that in OECD countries the effect on private R&D from grants and subsidies is similar to that of tax credits.[18]

Government spending on R&D to support research undertaken outside of the private sector – for example, by universities and the non-profit sector – also leads to more private sector R&D even though the link is less direct. University research tends to be more basic and early-stage than innovation carried out by private businesses. But government support for academic and basic research provides the foundations on which additional innovation can build.[19]

Returns on public R&D tend to be lower than private R&D, but are still high

Despite strong evidence that government support leads to more R&D, and separate evidence cited above on R&D's high returns in general, there is a surprisingly limited evidence base on the *direct* link between government support and productivity. A 2015 WWCLEG review found only three studies looking at the impact of tax credits and R&D subsidies on economic outcomes, and of those only one found a significant positive impact. Even where public funding does improve productivity, the returns tend to be lower than estimated for private R&D overall.[20]

This is not entirely surprising. Businesses will be naturally more inclined to take on high-return projects without government incentives, which means that the ones requiring government incentives tend to be those with less obvious lower private returns.

In addition, measurement problems may exacerbate the lack of evidence. Most analysis focuses on R&D undertaken by businesses, but some early-stage basic research (for example, conducted at universities) may have big social returns, with bigger benefits further into the future, that will be harder to capture in economic studies.[21,22] A paper commissioned by the business department in 2014 found that the delay between R&D investment and realising the economic returns from commercialisation are around one to three years for private investments but much longer for public investments.[23]

Overall, it is likely that publicly funded R&D has lower economic returns than private R&D, but that this still trumps other types of investment.[24] For example, a paper by the National Institute of Economic and Social Research found that public R&D can generate returns of up to 20% if well targeted, still higher than many other investments; for example, infrastructure.[*,25]

R&D tax credits are not place-based and so it is difficult to use them to level up

If the government wishes to use R&D policy to boost economic growth and productivity in 'left-behind' places it is not only evidence on the effectiveness of policies overall that matters, but whether they can be applied in a place-based way.

While the evidence that tax credits stimulate R&D is strong, in the UK and other advanced economies tax credits do not tend to vary geographically. In principle, tax credits could be varied across the country – for example, providing more generous tax breaks in some regions. However, this is unlikely to be a good approach. It would provide a strong incentive for businesses to declare R&D investment in that location, but it would be difficult to confirm whether that was where the R&D was actually taking place. Many R&D tax credit claims are made in London and the South East, where head offices tend to be based, even if the actual research takes place elsewhere[26] – so there is little reason to think tying tax credits to, say, the North East would necessarily guarantee clusters would spring up in that region.

Direct grants and basic research are more effective when bids are competitive

Grants and subsidies may be more obvious policy tools for a place-based R&D strategy, as project selection can be prioritised by location. The evidence base provides insights as to how this can be done well. According to both the WWCLEG and the former Industrial Strategy Council (ISC), competitively awarded bids are likely to work best.[27,28] Historical examples point to governments struggling to generate new clusters along the lines of Silicon Valley. The ISC found that this was the experience of Germany's industrial Ruhr region, where policy lacked cohesion, but was more successful in the services sector in Lille in France, where nearby universities and complementary policies in the cultural space made Lille a more attractive place to live.[29]

* The role of infrastructure policy in levelling up is the topic of a separate Insight paper: Pope T, Shearer E and Hourston P, *Levelling Up and Infrastructure Policy: How connecting the UK's cities could be the key to boosting productivity*, Institute for Government, 2022, www.instituteforgovernment.org.uk/publications/levelling-up-infrastructure-policy-evidence-review.

A competitive grant funding approach does not preclude a spatial focus. R&D funding criteria can explicitly give more weight to projects in underperforming areas, for example, or set overall targets for how much money should be spent out of traditional hotbeds of innovation. However, a competitive process ensures that the projects are driven by a sound economic rationale rather than solely political discretion. This does not mean that decisions on where R&D grants are spent are completely devoid of political influence, but the selection process should include the rigorous evaluation of the merits of a particular project.

One study that analysed the impacts of different types of R&D spending found greater impacts for funding through research councils, which have less influence from politicians.[30] Specifically, research council funding is based on the Haldane principle: that academics rather than politicians should make final decisions about specific research projects.[31]

R&D alone will not drive economic development in low-productivity places

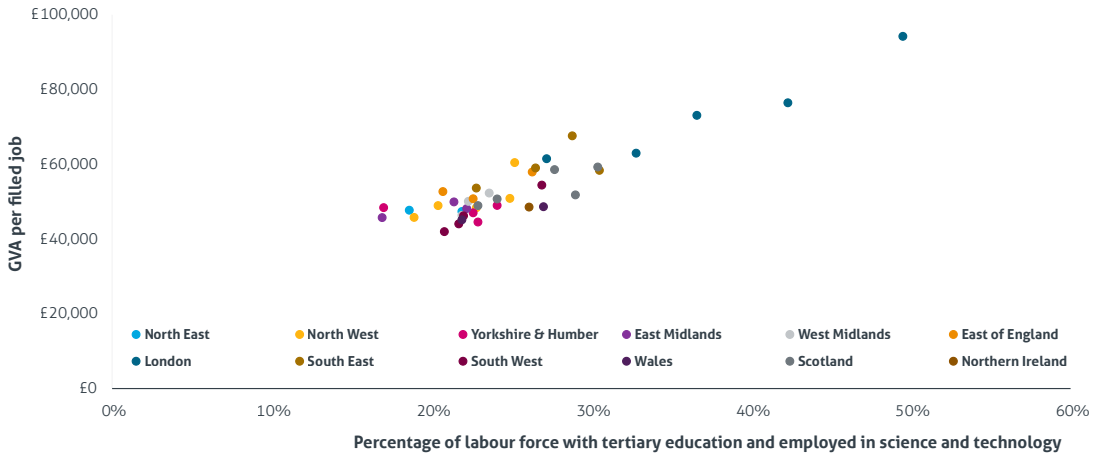
While government support for R&D can play a role in levelling up, it will not lift the productivity levels of left-behind places on its own. R&D (from a university, for example) will most benefit the local economy if that area is already equipped to make use of it – that is, through local businesses that know how to use initial research and a skilled workforce that knows how to use the resulting technology. This is known as 'absorptive capacity'.[32]

Such places tend to be developed clusters, where technological specialism is combined with a responsive business environment. This is true, for example, of the concentration of automotive manufacturing plants in Coventry and Warwickshire,[33] where the OECD has shown that automotive workers are 10% more productive than the sector's national average.[34]

The most important element of absorptive capacity is skills,[35] ensuring that the workforce is able to understand and implement the technology. International experience suggests that the private and social returns on R&D investment tend to be higher in countries with high-quality higher education systems.[36] This does not just mean more graduates; investing in intermediate (technician level) skills such as apprenticeships and on-the-job training is important too. This is especially important for ensuring that basic research at universities can benefit local businesses.

Some of the places the government wants to level up have higher absorptive capacity than others, making them better candidates for regional R&D investment. Figure 3 shows that there are some places that have a high existing R&D workforce and so would be a good candidate for more investment; for example, Derbyshire and Nottingham. At least initially, government R&D investment should focus on these places with high absorptive capacity. Over time, it could also expand the focus of investment but only if it could use other policies to improve skills and change the types of businesses locating there first.

Figure 3 **Productivity and share of skilled workers in science and technology across UK regions**



Source: Institute for Government analysis of Eurostat, human resources in science and technology by category and NUTS2 regions, 2019 and Office for National Statistics, subregional productivity: labour productivity indices by UK ITL2 and ITL3 subregions, 2019. Note: Shows ITL2 regions, colour coded by their larger ITL regions.

Innovation in other parts of the economy matters but is under-explored

Government innovation policy typically focuses on R&D – but this is not the main driver of innovation for most of the economy.[37] Though it is especially important for manufacturing, that sector accounts for only 10% of the UK economy; high-tech and science-oriented firms, which enjoy the highest returns on R&D, make up an even smaller share.[38,39]

For many lower-tech sectors (including non-tradeable services like restaurants and hairdressers), R&D as a means of generating new ideas is likely to be less important than using innovation to adopt existing good ones. For example, a restaurant might become more productive by adopting a more efficient booking system or by organising staff shifts more effectively. These sectors are less productive in the UK than in comparable advanced economies;[40] productivity in the UK's hotels and restaurants sector is particularly weak relative to comparable European economies. These sectors are also over-represented in some of the areas with the lowest productivity in the UK (see Figure 4). For example, in Cornwall and the Isles of Scilly almost half of jobs are in low-wage sectors, compared to 36% in Inner London.[41]

Policies to increase innovation and idea-sharing in these sectors could do much more to level up those places than attempting to spend public R&D funds there when there is likely to be little absorptive capacity.

Figure 4 **Share of output from low wage sectors and labour productivity**

Source: Institute for Government analysis of Office for National Statistics, regional gross value added (balanced) by industry: all ITL regions, 2019 and subregional productivity: labour productivity indices by UK ITL2 and ITL3 subregions, 2019. Note: low-wage sectors have at least one quarter of their employees earning less than two thirds of the median wage (agriculture, forestry and fishing; manufacture of food, beverages and tobacco; manufacture of textiles, wearing apparel and leather; motor trades; retail trade; accommodation and food service activities; administrative and support service activities; arts, entertainment and recreation; other service activities; activities of households).

Unfortunately, the evidence for what drives innovation in other sectors is generally less well developed, both conceptually and practically. The evidence that is available, such as from the ISC, suggests the adoption (rather than the creation) of the latest technology and diffusion of best practice is likely to be important.[42] One factor that is likely to drive this is better management skills, an area where the UK lags behind other countries according to the OECD.[43] A paper from the Joseph Rowntree Trust showed that deploying management practices such as performance-related pay or continuous improvement was effective in raising productivity in low wage sectors in other countries.[44]

How does the evidence compare with the government's approach?

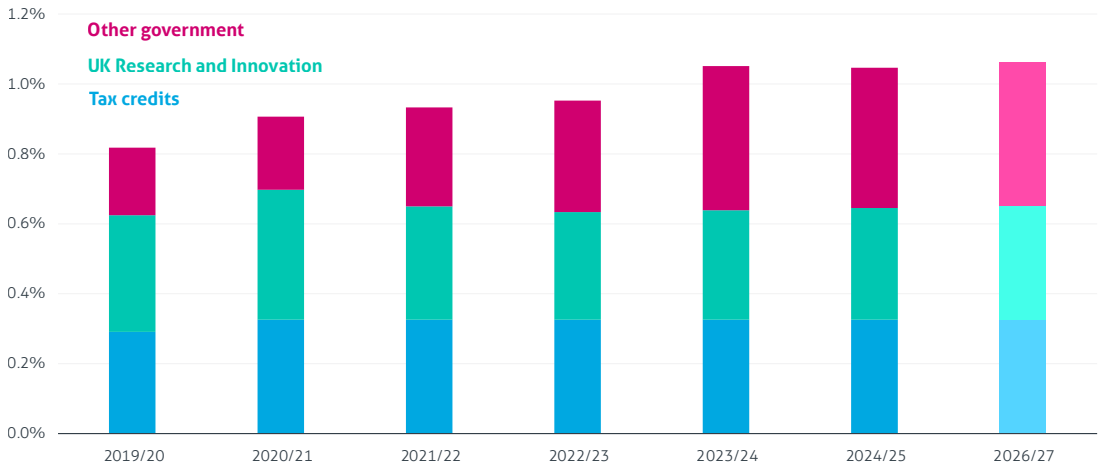
The government's approach

Substantial increases in R&D spending and reforms to R&D tax reliefs form the bedrock of the government's approach to innovation. The R&D 'mission' in the levelling up white paper is focused on spreading R&D spending more equitably across the country and 'crowding-in' private investment: by 2030 domestic public investment in R&D outside the Greater South East is to have increased by at least 40% and leverage in at least twice as much private sector investment.[45] To achieve this, the government has set a target for the business department to invest at least 55% of its R&D funding outside the Greater South East by 2024/25.[46]

The government has also set an economy-wide target that spending on R&D should reach 2.4% of GDP – the OECD average – by 2027, substantially above the current 1.7%. In the 2021 spending review the government committed to increase public

R&D spending to £20 billion by 2024/25 with an "ambition" for it to reach £22bn by 2026/27. This would be an increase of 48% in nominal terms (and 31% in real terms) from the £14.9bn in 2021/22, although on its own it would not be enough to reach the 2.4% target (which depends on large crowding-in of private R&D).[47,48]

Figure 5 **Government support for R&D (% of GDP)**



Source: Institute for Government analysis of HM Treasury, Autumn Budget and Spending Review 2021, Department for Business, Energy and Industrial Strategy, BEIS research and development (R&D) budget allocations 2021 to 2022 and BEIS research and development (R&D): partner organisation allocation 2022–2023 to 2024–2025, UK Research and Innovation, 2021/22 budget allocations for UK Research and Innovation, HM Revenue and Customs, Research and Development Tax Credits Statistics: September 2021 and House of Commons Committee on Science and Technology, Oral evidence: UK Science, Research and Technology Capability and Influence in Global Disease Outbreaks, HC 136, 2020 and Institute for Government assumptions. Note: UKRI is money spent by UK Research and Innovation. Other government is money allocated by government departments excluding spending by UKRI. We assume tax credit spending remains constant as a share of GDP throughout SR21. Figure for 2026/27 assumes government achieves its target to spend £22bn and proportional split between UKRI and other government remains constant from 2024/25.

In 2019/20, government support for R&D was around £18bn in total, of which around £6bn was indirect support via tax credits, and the remainder was direct spending on R&D via subsidies to businesses and grants (principally via research councils). From an international perspective, UK tax credits for R&D are generous for smaller businesses but slightly below average for larger businesses.[49] Spending on tax credits has increased substantially in recent years, but the government is concerned that an increasing fraction of the R&D supported via tax credits is happening abroad. It has announced reforms to tax credits to restrict support to UK-based innovation activity.[50]

Meanwhile, direct spending on R&D is set to increase quickly over the next few years, mostly through additional research council funding. The government has set a new organisational objective for UKRI to acknowledge its role in the levelling up agenda.[51] UKRI already has a place-based fund – the Strength in Places Fund – which allocates funding to support regional growth and encourage local innovation collaboration, although the government has not yet committed to extend its current funding cycle.[52]

The government has also announced plans for three new pilot 'innovation accelerators' in the West Midlands, Greater Manchester and Glasgow. Along with the advanced manufacturing catapult network that links manufacturing firms to the latest academic research, these are examples of the government supporting the development of

innovation clusters, investing in projects to diffuse R&D output in local economies. And the government has a Help to Grow management programme that funds practical management training and peer mentorship for the leaders of small and medium-sized enterprises.[53,*] A new Advanced Research and Innovation Agency (ARIA) is being set up to allocate funding (£800 million by 2025/26) for high-risk, high-reward research.[54]

More ambitious R&D targets would contribute meaningfully to levelling up

The high returns from private R&D investment suggest that the government's intention to make the UK more R&D intensive and the economy-wide 2.4% of GDP target has merit. Economies that are more innovative and do more R&D do tend to be more productive.

However, a target alone does not necessarily make this a reality. Encouragingly, the types of policy approaches that the government has committed to, including an ongoing commitment to tax credits and expanding grants, especially via research councils, have generally been shown to be effective at raising R&D investment.[55] The Royal Society of Arts has estimated that increasing R&D as planned would lead to an annual gain in GDP of £3bn (0.1% of GDP).[56]

But the government's R&D mission can and should be more ambitious to ensure more of the benefits are felt outside of the South East. Previous Institute for Government research has argued that the target specified in the R&D mission – to increase by at least 40% outside of the South East – will not necessarily change the regional split of public R&D spending; the increases in R&D spending confirmed at the previous spending review means that UK-wide budgets would have increased by that much anyway.[57] A more ambitious target is needed to ensure the share of R&D funding outside of the South East increases too.

As well as spreading the money more broadly, extra public R&D spending will need to be spent very well if it is to achieve the target of the mission of leveraging "at least twice as much investment from the private sector", which will be necessary to achieve the 2.4% economy-wide target. Overall government support for R&D is currently around 0.9% of GDP, half the size of total economy-wide R&D. In practice, this means other policies will be required if private R&D is to be stimulated to this extent.

Innovation policy is focused more on R&D than other complementary investments

As noted, not every part of the UK is equally placed to receive R&D funding, so the government needs to target any new innovation polices well – particularly when relating to the skills of the local workforce.

The government has prioritised spending more on R&D outside the Greater South East. But its 'innovation accelerators' suggest it is aware of the importance of developing the broader ecosystem in other regions. However, with only £100m of funding behind

* There is also a business contribution of £750m.

the accelerators, they are unlikely to make a meaningful difference. More detail from government is required on how innovation accelerators will operate in practice and how they will work in partnership with business, universities and local government.

And the government should focus more on innovation in lower-tech sectors

While there is much more academic study of 'what works' in R&D policy, the government should not neglect opportunities to innovate in lower-tech sectors and improve the dispersion of ideas and knowledge. Past Institute for Government research has shown that the UK's productivity slowdown cannot be attributed to sectoral contribution – the reduction in productivity growth is not simply due to the increasing share of low productivity sectors in economic output. There is good evidence that even low-tech sectors can be strong drivers of productivity growth.[58]

As previously mentioned, the areas that the government is interested in levelling up are likely to have a large share of low-wage sectors in their local economy where non-R&D forms of innovation such as newer or better booking and management systems are likely to be more relevant to driving productivity growth.[59]

Better evidence on what drives innovation in low-tech sectors will help the government in this. However, a focus on improving management skills and attracting foreign direct investment is likely to be important to raising innovation in these regions and sectors.

Recommendations

This paper has shown that there is a good case for government support for R&D, and that direct government spending can help the government's levelling up agenda so long as it is well-targeted at places best equipped to use it and accompanied by complementary investments. Based on our analysis of the government's current approach we make the following recommendations:

- The government should make the R&D levelling up mission more ambitious so that the share of public funding going to areas outside the South East grows, as well as the level. It should include a specific target for the fraction of total public R&D spending that takes place outside of the Greater South East.
- The government should develop additional policies to ensure that R&D spending in a place translates into economic benefits by developing absorptive capacity. Specifically, if the innovation accelerators prove successful at their current small scale they should be expanded.
- The government should not neglect innovation in lower-tech sectors that are important parts of the economy in some of the lowest productivity places in the UK. It should look to expand government support for management training.

Our review has also highlighted evidence gaps that limit the government's ability to pursue effective policy in this area. It should prioritise filling these gaps. This is especially relevant for the second and third recommendations above, where the evidence base is currently lacking.

The government can and should prioritise developing the evidence base on what constitutes effective absorptive capacity, principally developing better evaluation plans for public R&D spending on different projects. The expansion of public funding should provide many new opportunities to learn what works best. It should also seek to learn from broader efforts about what leads to the development of successful regional clusters.[60]

The government also needs a better understanding of what drives innovation in lower-tech sectors. It should ensure that it is evaluating policies designed to improve management practices (for example, the Help to Grow management scheme). The government can also make use of other tools it has at its disposal to encourage academic researchers to devote more time to this question. This would include adding it to the business department's areas of research interest, which identifies priorities for private researchers, and directly funding economic research on this question.[61]

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