

How to design a successful industrial strategy



About this report

As the UK finally leaves the structures of the European Union, the government is expected to unveil an industrial strategy to address the country's long-standing economic ills. This report argues that the case for an ambitious industrial strategy is strong, and aligns well with other government agendas like net zero and levelling up. However, the government is yet to set out a process for delivering on these ambitions. As it does so, it needs to remain vigilant towards the risk of government failure, and carefully restrict its interventions to where they make the most impact.

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Summary

"It is if anything too easy to make the case for industrial policy."

– Professor Dani Rodrik¹

The UK has a patchy record in industrial strategy.

Perhaps it is a downside to being the first to industrialise: having no other country to emulate, the UK gained a habit of fumbling forward, rather than planning. Long after being overtaken by both Germany and the US, with their more consciously developed approaches,* the UK never managed to create and stick to an industrial strategy for more than a few years at a time. During 30 golden years for Europe after the war, Britain's attempts to match its rivals on industrial strategy appeared to make no positive difference.

Economic theory has always found reasons to doubt governments' attempts to shape the economy for the better; by the 1980s, UK experience appeared to back this up. From the premiership of Margaret Thatcher (1979–90) for most of the next 20 years the settled UK policy was that it is better not to try than to keep on failing.

In this report, we argue against such pessimism. The UK can and should have an industrial strategy. But it needs to go into it with its eyes open.

Crises have a way of accelerating shifts in economic approach – from the Keynesian response to the Great Depression and the monetarist counter-revolution after the inflationary 1970s, to the turn against financial deregulation after the 2007/08 banking crisis. They expose the failings of and dissatisfaction with the previous way of doing things, and force governments to take decisions that may have been evaded when times were easier.

Coronavirus and an impending hard Brexit create another such crisis. The pandemic pushed the UK into its deepest slump since the war, leaving the exchequer nursing the largest ever peacetime fiscal deficit. It has also shaken expectations of how the economy and government interact. During the peak of the crisis more than nine million people were being kept in work by furlough payments; more than one million businesses have received government-backed loans. The government has with enthusiasm set about working closely with business on the challenges thrown up by Covid-19, such as the provision of sufficient ventilator capacity, personal protective equipment and a vaccine.

This enthusiasm built upon an appetite for intervention already apparent in the Johnson administration, with its stated ambitions for "levelling up", a huge boost in science spending, and a determination to see the UK's commitment to [reaching 'net zero' greenhouse gas emissions](#) as an economic opportunity.

* The best citation for this in the case of the United States might be DeLong JB and Cohen SS, *Concrete Economics*, Harvard Business Review Press, 2016.

As this report argues, this boisterous 'can-do-ism' reflects a growing urge to address the UK's economic flaws going back at least to the financial crisis of 2008/09. Weak productivity performance and regional imbalances have worried politicians for a long time, as has a sense that the UK does not make enough of its abundant strengths in science. These alone are important justifications for an industrial strategy.

Brexit provides the other essential context. A total exit from the EU's political structures at 11pm on 31 December weakens UK ties with one habitual source of growth, while also creating possible new freedoms in economic policy. The repeated rationale for Brexit – to "take back control" – is in one sense an argument for state intervention. Britain's emergence from the EU is also a reminder that it is one medium-sized country in a vastly larger global economy. Such countries cannot attempt to cover every base, economically, but must choose where to focus their resources. Much of this can be entrusted to market forces – but for some sectors of the economy, the case for the government both making the choices and helping to concentrate resources is strong.

Such is the case for the UK to embark on an industrial strategy.

But while we argue against the scepticism that took root in Thatcher's time, we also urge readers not to forget the failings that led to it. As much as the sceptic, the other great saboteur of industrial strategy is the unconstrained enthusiast. The risks of policy failure are greatest when it is left in the hands of people keenest to pick technological winners, anoint favoured companies, pull up maps of the country and direct resources around. Political motivations often contradict commercial imperatives; most of the ideas for interfering in the economy that arise in the political brain will be bad. There is nothing as quick or decisive as a market to weed out the worst ideas. Optimism and political capture hobble efforts to see a problem clearly. Any policy maker that embarks on an industrial strategy without a clear awareness of these disadvantages will run the risk of a clumsy failure.

The "how" of industrial strategy is therefore a greater challenge than either the "why" or the "what". The UK's historic failures were not because its past governments were all incompetent or poorly resourced, but because industrial strategy is difficult. The best way to improve the odds is to retain the sceptical, restraining mechanisms that work to winnow out the bad ideas. Superficially, they make industrial strategy more laborious. But mechanisms that force decision makers to pause for thought are a good idea when government decisions can severely impede competitive markets, and often have impacts that last years.² Constraints that challenge ad hoc intervention, such as [state aid rules](#) and Treasury challenge, will generally improve policy.

Such restraining mechanisms are all part of a selective approach. Clear limits around where the government intervenes and where it holds back are essential. It is not a strategy just to assert that you are going to improve all of the economy, everywhere. The conditions under which government intervention is both warranted and likely to succeed are rare. Better to focus ruthlessly on where they may apply and enjoy some success somewhere, than optimistically sally forth vowing to transform the whole

economy and fail everywhere. What is left can then be committed to properly; the failure to do this is another enduring problem for UK policy making.

Beset by the Covid crisis, the Johnson government has put off the publication of its industrial strategy, probably to the spring of 2021. Not all the signs of the approach it would like to take are good. It has made itself the enemy of many of the institutional constraints mentioned above, seen most evidently – and in the context of the Brexit negotiations to date, damagingly – in its stance on state aid. The Institute for Government, like the original Conservative champions of the single market, argues that rules constraining state aid benefit everyone, including the economy of the government constrained.

Similarly, the prime minister’s “levelling up” agenda appears fuelled by a belief that sheer weight of infrastructure spending can raise regional performance, for which there is little evidence. The science-obsession of the recently departed chief adviser to the prime minister, Dominic Cummings, points to another dubious mental model, of industrial strategy as a centralised brain making inspired technological choices, like the recent decision to take over the failed satellite operator OneWeb. If that is the model for how the UK will grow in the decades ahead, it is not one with any great precedent.

It is early days, however. The pandemic and impending hard exit from the EU’s economic structures provide a challenging backdrop for creating an enduring industrial strategy but will certainly concentrate minds. It has been an exceptionally difficult year for the government, but if this report is right, an overconfident administration is more likely to make a mess of industrial strategy than one chastened by the recent experience of its fallibility.

Meanwhile, the strengths and opportunities of the UK economy are still impressive. It has a world-class science base and the fiscal room to boost it more. It has made an impressive start to the daunting task of decarbonising its energy system, and hosts valuable sectors from financial services, education and advanced manufacturing to life sciences and creative industries. This report emphasises above all that a government that wants to succeed in industrial strategy must face up to the difficult choices – where it should act, and where it should not – but these may be easier to make when times are tough. Add to this its impressive record for building great economic institutions and recent strong cross-party support for industrial strategy, and the prospects for success are as good as they have ever been.

Key points and recommendations

This is a report about how a government ought to think and plan if it is to embark upon an industrial strategy. It is not, however, a proposal for an industrial strategy in itself. This is not where the reader should find arguments for which specific regions, sectors or technologies it should be pursuing or how. What we intend to lay before the reader are principles, examples and rules of thumb to help the government identify its priorities and put in place a strategy for achieving them.

The case for industrial strategy

The case for the government having an industrial strategy is strong. If defined as a programme to change the economy in some conscious way, there are good reasons why it is a good time to pursue such a programme:

- **The pandemic provides impetus to change.** Crisis eras are often the time to attempt a structural change to the UK's economic model, as they provide the motivation for a sustained change to how the economy operates. Covid itself will change the economy and may leave enduring problems with insufficient aggregate demand and low business confidence.
- **Several long-term challenges, in particular the shift to a net-zero economy, are inherently suited to an industrial strategy approach.** Times characterised by broad, predictable changes present more industrial strategy opportunities. As well as net zero, the shift towards more digital working and an ageing society are the sort of change that an industrial strategy may be oriented around.
- **The immediate response of the government to the pandemic was, correctly, not to attempt radical surgery on the economy, but to preserve it against chaotic loss of assets.** The work of industrial strategy therefore lies entirely ahead of it.

Rules for making it work

- **Do not try to own all of economic strategy.** Both the Treasury and the business department have key economic responsibilities. Economic strategy, primarily owned by the Treasury, covers high-level objectives such as growth, employment and inflation. Industrial strategy needs to reflect this, but in its operation be supplemented by more specific objectives.
- **Industrial strategy is a matter of degree, not all-or-nothing.** Purists are too quick to see industrial strategy in black and white terms; either you favour intervention or you do not, as if the only choices are between Stalinist five-year plans and outright libertarianism. But there are areas of the economy where it works, and others where it does not. It is essential to delineate the two from one another. It does not require the government to abandon free market principles, no longer care about competition, nor shun arm's length institutions for the delivery of policy.
- **Have 'edges' around the industrial strategy – do not fall into the trap of trying to be all-encompassing.** The sort of strategy that the government can feasibly implement cannot cover every economic interest or agenda it wishes to pursue, and

too broad a sweep will threaten its ability to learn from the interventions it makes. It is better to start with cases where there is a clear rationale for intervention and build from there, rather than promise to try to make everything better by every possible means.

- **Do not fall for the 'investment board game' model of how the strategy works.** A misleading model of industrial strategy depicts a decision maker at the centre, allocating resources and 'driving' the economy through the government's investments. This model fails as a way of understanding the 21st-century economy. Government investment is not big enough, relevant enough or sufficiently skilfully deployed on its own to wrestle the economy in the 'right' direction. Business incentives are much more significant.
- **This model is popular with theorists of 'levelling up' – but the evidence for this working is weak.** Regional development policy is a well-explored area, internationally and through the UK's history. Vows to drag regions up through the power of an infrastructure budget have not enjoyed widespread success internationally.
- **Answers to how to 'level up' are difficult and vary with the region but are likely to involve many other softer factors.** These will include skill levels, health care, openness to overseas markets and sectoral inheritance.³
- **Overconfidence and a blithe attitude to 'how' are serious risks to successful industrial strategy.** Most political ideas about the economy are bad. Politicians are influenced by who can access them, as much as by what is tested to work in a competitive market. They are often prone to optimism bias, and unable to access all the information needed to judge whether an economic intervention has staying power. Paradoxically, the risks most likely to undermine a good industrial strategy arise when it is developed by those with the greatest confidence, and least awareness of these flaws.
- **Adopt a systematic approach that focuses on institutions, rather than inspired ad hoc political decisions.** The economy is not something directly controlled by the government but works through the actions of the private sector. These actions are influenced by the economy's institutions – the rules of the game, the constraints that guide behaviour – as much as direct government behaviour.
- **The important choices government needs to make are about the overall objectives of the strategy, including which sectors and challenges are to be targeted.** The system put in place should insulate the strategy from the whim and bias of political actors. Objectives should be sufficiently high-level as to retain room for competitive mechanisms.

Choosing the objectives

- **Industrial strategy objectives that are too high-level provide little practical help.** Setting the right objectives for the industrial strategy is one of the most crucial tasks. Although it helps to have a strong overall analysis of the problems in the economy, national variables that define the government's overall economic approach – such as employment, GDP growth or productivity – are not on their own enough to shape the industrial strategy.
- **But there are risks to being too 'micro' as well.** A strategy that sets its targets in too granular a fashion is at greater risk of selecting the wrong objectives and can distort the economy unhelpfully. Governments attempting to pick the right technology or company are likely to distort competition or run up against the limits of what they need to know to achieve effective action.
- **Instead, objectives defined at the level of a sector or a specific societal challenge are more appropriate.** A good example is the pursuit of green growth, albeit that would need to be broken into lower-level objectives. When a government is already committed to intervention towards some policy objective, such as national security or green growth, it gains an informational advantage that improves the prospects of success.
- **Sectors should be actively chosen – not determined by whichever sector body comes forth with a plan.** It is quite right for the government to discriminate over which sectors of the economy it prioritises, rather than let this be determined by how well they lobby. Some sectors will be more relevant to the government's objectives, more affected by circumstances only the government can control, or more promising in terms of growth.
- **Judgements about sectors should be on the basis of their being weighty in economic terms, allied with government objectives, and tractable for industrial strategy.** Different sectors have different characteristics rendering them more or less amenable to industrial strategy direction.
- **Do not allow industrial strategy to become an anti-competitive force.** The operation of competitive market forces remains the key driver of improved economic outcomes over time. Government intervention is often required to ensure competitive conditions exist, which when effective can exert a pressure on companies that is a powerful force for good across the economy. A badly formulated industrial strategy poses a risk to this. There already exist key institutional protections against the government intervening in ways that damage competition – they need to be protected.

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- **A pro-competition stance means not blindly helping whatever sector is high value-add.** The relationship between profitability, competition and economic wellbeing is a complex one. Sometimes a sector can record high value-add because it is less subject to competitive forces, rather than more innovative. It is unwise to assume that helping any sector producing increasing value-add is necessarily helping the economy in proportion, nor that one shrinking in those terms is a failure.
 - **Avoid being besotted with technological success and tech superstars.** The long-term role of technology in advancing economic growth is undeniable, and it is a sign of a successful company that it generates the innovations that are used worldwide. But industrial strategy should be concerned with the diffusion of new innovations, not only their production.
 - **State aid constraints are valuable to the country imposing them, not just to other countries damaged by unfair competition.** The rules help governments block actions that damage their own economies, not just their international competitors’.
 - **Within the limits and constraints, commit.** A lack of consistent commitment from the government makes it hard for a strategy to succeed, in large part because it makes it less likely that a non-credible strategy can inspire the right actions from the private sector. The point of the government being highly selective at the outset is so that it can then with confidence commit resources where they can make the greatest difference. Creating objectives that can endure through the political cycle greatly improve the chance of success. In the debate between “lumpiness” and “jam-spreading” – industrial strategy needs to be lumpy, but with carefully chosen lumps.

Introduction: defining industrial strategy

To be an advocate of industrial strategy is not as simple as just accepting that the state's actions can improve the economy. All but the most laissez-faire-minded economists agree with that. States everywhere help to fund basic infrastructure, regulate activity, and provide public goods like education and science. But simply doing all these things better does not constitute an industrial strategy.

Instead, the concept captures the idea that a government should plan these interventions to some extent, consciously, towards a desired end-goal relevant to the economy. The Institute for Public Policy Research has a neat formulation for this, calling industrial strategy "purpose-driven coordination by the state of its 'supply side' economic policies".⁴ Vince Cable, as business secretary in 2012, set out similar thinking when laying the groundwork for the restoration of industrial strategy to the government's agenda:

The government shapes the British economy with its decisions every day. It makes many decisions about skills and universities, on research, on technologies, and on infrastructure. Through what it buys, and how it goes about buying it, the regulations that exist, the markets it oversees, and tax policy. All of these send messages to the economy. We can have an industrial strategy by default or design. Ignoring this reality is not a policy – it is just negligence.⁵

Here you can see the essence of what it means to believe in industrial strategy. First, there are the objectives that the government is aiming towards and, second, there are the tools that it regards as relevant to the task. The strategy must therefore include a diagnosis of what is wrong with the economy that needs the state's involvement to fix, and a case for the state being able to do this.

Yet adherence to industrial strategy is not a black-and-white choice. All governments set out visions for their economy, but the comprehensiveness and specificity has varied over time. To set out an industrial strategy is not to deny the importance of private sector action. It is true that in its post-war heyday, industrial strategy was associated with a governing philosophy sceptical of free markets; in that period, the public sector owned swathes of industry, used budgets to fine-tune aggregate demand, and orchestrated wage and price agreements in grand bargains struck in Downing Street. But thinking has developed since then.

One of the more melodramatic complaints made against it is that it requires the government to produce a Soviet-style "Gosplan" covering most of the economy. This is not the case. It is perfectly consistent for an industrial-strategy government to eschew targeted intervention in most places, restricting it only to where there is a justified need. Different parts of an economy have very different characteristics: in some, the free play of market forces is all that is needed, while in others there is a rationale for state involvement.

The disappearance and return of industrial strategy

When Boris Johnson became prime minister in July 2019, he inherited an administration with a clear determination to pursue industrial strategy. His predecessor, Theresa May, had made it a cornerstone of her economic approach, expressed in her 2016 retitling of the business department as the Department for Business, Energy and Industrial Strategy (BEIS).

This change was more than semantic: it was accompanied by a large increase in R&D spending, itself part of a Treasury-administered national productivity investment fund for housing, transport and digital infrastructure. The investments were given broad direction by various devices set out in a white paper in 2017: "sector deals" between self-organised representatives of a business sector and government, four so-called 'grand challenges' (artificial intelligence/data, the future of mobility, clean growth and ageing) and five foundations of productivity (business, ideas, people, place and infrastructure).

In pushing for industrial strategy, both May and Johnson were atypical of Conservatives of recent times. From the mid-1970s, their party's economic thinking had been premised on scepticism towards the good that conscious interference in the economy can do, after battles that raged across macro-economic management, labour market policy and state ownership of industry. The position they reached was established by 1984 when the chancellor, Nigel Lawson, delivered a well-known Mais lecture. In his words, the 'British experiment' was about providing

"increasing freedom for markets to work within a framework of firm monetary and fiscal discipline [and should be contrasted with] the post-war trend towards ever more ad hoc interference with free markets within a context of increasing financial indiscipline".⁶

Lawson characterised his approach to economic management less by what he thought the state should do than what it shouldn't:

"The abolition of pay controls, price controls, dividend controls, foreign exchange controls, bank lending controls, hire purchase controls, industrial building controls – all these have been beneficial in themselves, but will bring even greater benefit to the nation as part of the process of rediscovering the enterprise culture."

All in all, under the Conservative governments from 1979 to 1997 there was a transformation in the state's direct control over the economy, accentuated by widespread privatisations of hitherto state-owned industries, including steel, telecoms, energy, rail and more. And this step away from political intervention was not just a feature of Conservative policy. The Labour governments that followed (1997–2010) accepted much of this critique. Gordon Brown (chancellor 1997–2007) matched Lawson in his denunciation of what the former had called "ad hoc interference":

"I have tried to take decisions that should be made on the basis of economics out of politics ... we have removed where it is right to do so essential elements of monetary policy, competition policy and industrial policy and now statistics from the pressures of day to day politics, taking government out of areas where it need not be."⁷

This reiterated the view expressed earlier in a key 2003 speech, where Brown said: "The best industrial policy for success in a global economy is to help markets work better."⁸

Only after the financial crisis of 2008 and the deep recession in its wake did politicians at first gingerly but then with increasing confidence begin to reintroduce elements of industrial strategy to their rhetoric and policies. Lord Mandelson (business secretary 2008–10) launched a paper titled *New Industry, New Jobs*, aiming at "less financial engineering, more real engineering". In his words, the UK needed "a transformative wave of private investment in Britain's infrastructure and strategies for ensuring that this work is a big industrial opportunity for UK-based firms and workers [... which would require] government encouragement and incentives". Vince Cable, his successor under the coalition government, continued to make the case for industrial intervention, and instigated strategies for chosen, long-term sectors such as aerospace, automotive, offshore wind and more. His approach ultimately laid the groundwork for the better-funded successor under May and now promised by Johnson.

What can be concluded from this cyclical movement away from and back towards industrial strategy? First, as is set out in our earlier report, *All Change*, churn in policy making does not necessarily stem from sweeping shifts in ideology but can simply reflect a system of government with weaknesses, such as a centre unable to manage long-term planning, and a tendency to create and destroy organisations as proof of progress.⁹ In the case of industrial strategy, the presence or not of a strong secretary of state for business can be a decisive factor (although without support from the prime minister the policies can fail to gain traction).

Second, as discussed above, crises generate change. As the strike-ridden, inflationary 1970s set the scene for the Thatcher revolution, so the global financial crisis of the late 2000s hailed a return to intervention. Brown's words were written in 2005, when the UK was into its 12th year of record-breaking economic expansion: it is understandable that he felt confident about the success of his largely hands-off industrial policy – and that any minister looking to intervene more would have a hard time arguing against the Treasury.

Third, it is misleading to declare what the 'right' suite of economic policies is and judge history in that light. Policies need to be appropriate for their era. The issues that governments had to grapple with in the 1980s were different to today's – a far less flexible labour market, inefficient and un-innovative state enterprises, a need to subject British industry to greater international competition. For a long while, the medicine appeared to be appropriate – the UK outpaced its peers like Germany for many years. There is a case to be made for the non-intervention of Thatcher and her successors, and for their emphasis instead on broader, 'horizontal' reforms to improve market functioning over the whole economy. Circumstances change, and it is natural that politicians try to detect when this happens and that policies need to change too.

Reasons to return to industrial strategy

Ultimately, to pursue any course of economic intervention is a political choice. Success is not guaranteed. There will be winners and losers, and the kind of outcomes pursued invariably reflect the political preferences of the government in charge. But in our view, circumstances today provide good grounds for a shift back towards industrial strategy.

Most of the evidence offered is negative, about the failures that have resulted from the seeming abandonment of industrial strategy. Since the financial crisis, politicians' criticisms of the failings of the economy have grown more frequent. At a high level, their evidence has included stagnating wages, low business investment, failing exports, flagging productivity and steep regional imbalances in GDP per head.

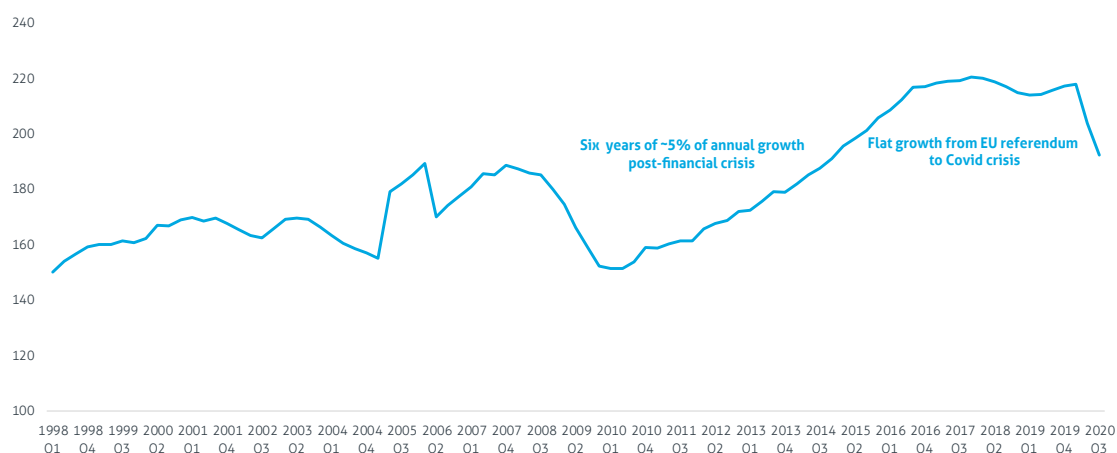
This has been noticed by political leaders, laying the groundwork for a more interventionist approach. Ed Miliband, Labour leader from 2010 to 2015, had a well-rehearsed critique that the modern economy failed to deliver stronger living standards and rewarded "predators" over "producers".¹⁰ Coalition politicians decried the regionally unbalanced nature of economic growth and the decline of manufacturing, and as chancellor, George Osborne promised "a march of the makers". In 2010 David Cameron used his first prime ministerial speech at the business department to make a point that might as easily have been made today, a decade later, by Johnson:

"Today our economy is heavily reliant on just a few industries and a few regions – particularly London and the South East. This really matters. An economy with such a narrow foundation for growth is fundamentally unstable and wasteful – because we are not making use of the talent out there in all parts of our United Kingdom. We are determined that should change."

Following Cameron, May in her brief leadership campaign spoke stingingly of an economy that "does not work for everyone". Her business secretary, Greg Clark, presented his industrial strategy as an attempt to address weaknesses that keep the UK from achieving its full potential: "business, people and places whose level of productivity is well below what can be achieved". Andy Haldane, a member of the Bank of England's Monetary Policy Committee – and the first chair of the Industrial Strategy Council – has in a series of speeches since set out a compelling diagnosis of the multiple aspects of Britain's productivity crisis: the interregional gaps, the failures

relative to the pre-financial crisis trend, problems with a 'long tail' of underperforming companies, and the gap between the UK and international peers.¹¹

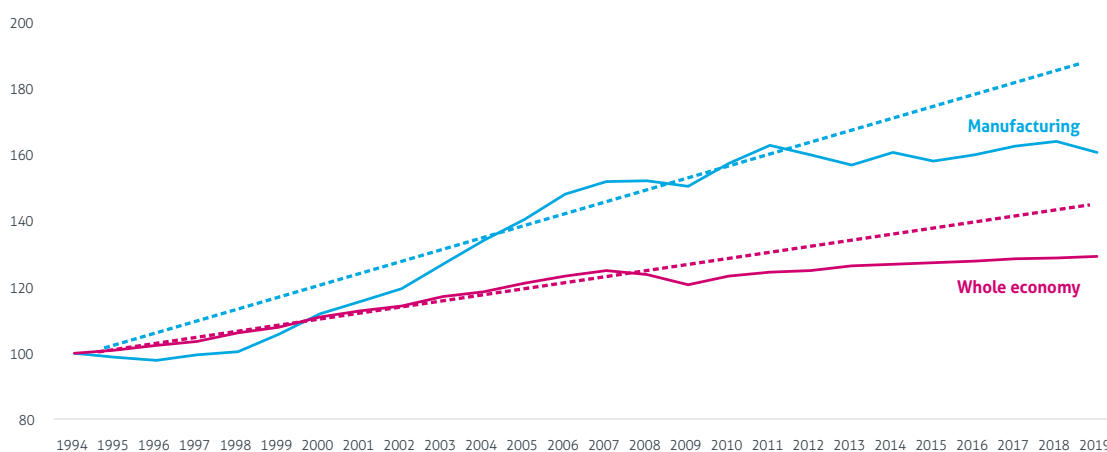
Figure 1 **The UK's unimpressive recent business investment, £bn real terms**



Source: Office for National Statistics, 'Business investment in the UK: January to March 2020 revised results', 30 June 2020, www.ons.gov.uk/economy/grossdomesticproductgdp/bulletins/businessinvestment/januarytomarch2020revisedresults

These failings have become apparent even as the UK remained a relatively strong performer in terms of pro-market reforms, evidenced by its consistently strong showing in the World Bank's ease of doing business rankings.¹² If low taxes, a lack of burdensome red tape and easy access to international markets have not led to strong growth, there are grounds for a search for a new, more directive approach. There is no shortage of theoretical justification for government intervention helping to achieve such a better performance. Economic theory recognises numerous exceptions to the rule that the pure free market is always best. These include: the existence of negative and positive spill-overs, imperfect markets, concentrations of economic power, essential public goods, information asymmetries and more. There can be missing institutions, systemic failures, and the political imperative to intervene to address outcomes that are too unequal.

Figure 2 **The UK's flagging labour productivity growth since 2008 (1994 = 100)**



Source: Office for National Statistics. Dotted lines show author's analysis of previous 1994–2007 trend.

There are more positive ways to present the case for industrial strategy, too. Through the 'grand challenges' (created by Clark during May's premiership), the government identified economy-wide changes sufficiently large and transformative that they should inform how government and industry plan for the future. They were: clean growth, the future of mobility, the artificial intelligence and big data revolutions, and the ageing society. We discuss later in the report how such changes enable the government to create goals and missions that are suited to industrial strategy.

Figure 3 **Ten years of zero real wage growth, £ per week**



Source: Office for National Statistics, 'Earnings and working hours', www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours

Finally, the coronavirus pandemic has reinforced a view that the UK economy cannot simply be restored to its position *ex ante*, even if that were possible. As of late 2020, this is still a matter of considerable controversy and uncertainty. With promising news of several effective vaccines, hopes are high that by mid-2021 the pandemic will no longer be the dominant factor for the behaviour of the economy that it has been in 2020. Nevertheless, unless the economy greatly outperforms the central scenario published by the Office for Budget Responsibility at the November spending review, unemployment will remain elevated above its pre-pandemic level for two years or more. This will add pressure on the government to do more to create jobs.

There is more than enough material to justify the government's push for a more active industrial strategy: clear failings in past performance, some positive economic objectives to choose from, and broad, even cross-party support fostered in part by a long series of political speeches vowing to improve the economy.

How governments are programmed to fail at industrial strategy

A desire to push parts of the economy towards some chosen objectives is clearly necessary for an industrial strategy. It is not sufficient. Some of the scepticism towards industrial strategy that became embedded in UK government thinking was premised not on the undesirability of such objectives, but the doubtful ability of governments to achieve them consistently. These doubts deserve to be taken seriously.

Some of this scepticism may have been based on an exaggerated belief in the ability of free markets to channel resources efficiently. What is described as the 'market-efficiency' school of thought is accused by one critic of dispensing with the factors that actually cause economic growth – knowledge, innovation, firm capabilities and so on – and merely being concerned with efficient allocation of what is already there.¹³ The more dynamic 'production capability school', best associated with Austrian economist Joseph Schumpeter, focuses more on innovation, doubts the pervasiveness of perfectly competitive markets, and allows for much more of a role for governments in furthering progress.

But even thinkers willing to accept this critique of pure market-efficiency can be sceptical towards industrial strategy, because of other failures that bedevil governments' attempts to help. Such attempts might easily make things worse because, as intimated by leading chancellors of the new orthodoxy, Nigel Lawson and Gordon Brown, political meddling can do harm rather than good.

It is important to keep in mind why this is the case.

An industrial strategy proposal is usually a suggestion that the government does something that the private sector has collectively decided not to do. Often there is a clear reason for the government to get involved – for example, the state provides some basic goods that private markets will not. But when it comes to embarking on new interventions, a sensible policy maker should always be asking: "If this is such a good idea, why is it not already happening?" It is unlikely that the government of the day is the first to spot a problem, the first to care or the first to have the funds to address it. In the economic cliché, you should not expect to find twenty-dollar bills on the sidewalk – and the more developed the country, the fewer such bills will be lying around.

Nor is it just a matter of technical skill. There is no harm in the government gaining better commercial skills – indeed, as has been set out in Institute for Government work on [outsourcing](#), the government has much to do to improve how it interacts with the private sector.¹⁴ But it is a mistake to think of the government as like a giant company or investor, looking for commercial opportunities. It operates with very different constraints and incentives, and some of these make it inherently hard to make good industrial strategy decisions.

These include:

- **Favouring the visible over the invisible.** When confronted with an idea, political motives are skewed towards the highly visible opportunity over its costs, which are generally dispersed and difficult to allocate to a particular cause. A classic case is the targeted tax-break, which the recipients will loudly praise, while the opportunities foregone because of the lost revenues have no such champion. For example, Entrepreneur's Relief, originally expected to cost £427 million when launched in 2008, now has a £2.7 *billion* impact on tax revenues, but news of its possible demise attracted a storm of criticism from lobbyists for entrepreneurs.¹⁵
- **Producer capture.** A version of favouring the visible over the invisible is when government becomes biased in favour of protecting a producer interest over, for example, the consumers that need to pay for that protection. A tariff is a classic example of this; another, when a regulator is persuaded to give a regulated monopoly a lenient price settlement to protect investment and jobs. At its worst, this can lead to an automatic attraction to "losers" over prospective "winners". A failing industry in a local area, where every private sector signal might be bleeping red for 'don't go near', often has considerable political weight in arguments about intervention.
- **Lack of the right error-correction mechanisms – or their converse.** In a free-market economy bad investments or business ventures have their own error-correction mechanism – they fail, investors lose money, managers with a profit motive shift resources away and change course. Good ideas enjoy the opposite treatment, including emulation by rivals. Government-chosen schemes do not have either of these forces at work.
- Instead, they have **inertia**: organisations, spending streams, tax breaks – once produced, a political system can be biased in favour of their continued existence, long after whatever rationale that may have justified them has lapsed. As the Institute for Government observed on the subject of tax breaks, people suffer from "loss aversion", so "government will always attract more criticism for taking tax advantages away than they will receive praise for introducing them".¹⁶ It takes especial political effort to scrap something that exists and to which special interests have become attached.
- **Bias towards the well-connected.** There has been research demonstrating how political connections can enable outside interests to influence the course of policy.¹⁷ This is a problem most associated with the US. However, in every political system, the sheer shortage of time allows the most significant decision makers in government a small amount of time to evaluate key choices.¹⁸ Merely having preferential access to the time of one of them can be enough to sway policy.
- **Survivorship bias.** When seeking out good policy approaches, it is natural to look for successes to emulate. This can bias the analyst towards optimism. For example, it is an industrial strategy cliché to try to copy the success of Silicon Valley in California, or the various tech building blocks that went towards the US's

pre-eminence in the digital revolution, like Xerox Palo Alto Research Center and Bell Labs. These make for inspiring stories, but a proper evaluation would require an examination of all the places to have been labelled becoming “the Silicon Valley of” their own region without matching the success of the original (Wikipedia lists 75 examples, including 15 in the UK, from Silicon Alley in Newcastle to Silicon Walk in Edinburgh).

- **Co-ordination challenges in the face of competing political concerns.** To quote Professor Diane Coyle: “The improvements needed to raise an entire economy’s productivity require coordinated, collective action”.¹⁹ For example, a new technological cluster will require the right infrastructure, skilled workforce and expert finance as well as the technology itself. This can be extremely difficult in a political system where the various moving parts (departmental incentives, for example) respond to very different incentives.
- **A bias to novelty.** Politics is inherently skewed towards creating new institutions rather than bolstering the performance of what it inherited. Most politicians are in a position of power for a small fraction of their careers. They will naturally want to favour doing something over holding back in the face of doubts.
- **Imperfect knowledge.** Even in this era of explosively growing data, the ability of the political system to gather what it needs to know to make a commercial decision is usually much worse than what exists in the commercial world, which is constantly searching out signals from the market. Moreover, as argued by economist Friedrich Hayek, some of the information needed to make economic decisions, such as people’s future preferences for different goods and services, is intrinsically unknowable.²⁰

All this is evidence that industrial strategy is difficult, not that it is impossible. When designing it, the challenge is to find ways to neutralise such problems, while still allowing progress. But a constant awareness of them is valuable as the strategy is created. One of the paradoxes of industrial strategy is that it is most desirable to politicians with an attraction towards novel ideas and intervention – but those same tendencies are what generate the greatest risk to the good execution of a strategy. As a critic of industrial strategy expressed it: “If businesspeople and investors do not generally exhibit a great deal of patience with new ideas, that is no doubt largely attributable to the fact that most new ideas do not, after all, turn out to be good ideas.”²¹

Businesspeople and investors operate in a constrained environment that normally stops them taking uncontrolled risks. Few private sector entities, for example, would be capable of persisting with an investment mistake as large as Concorde, or the Magnox nuclear reactors. It takes a government to mess up that badly – which is why in designing an industrial strategy, the most thought needs to go into how to constrain it.

How is hard

"The specific practical objections to industrial policy are twofold. First there is the informational objection, which states that it is impossible for governments to identify with any degree of precision and certainty the relevant firms, sectors, or markets that are subject to market imperfections... The second objection is that industrial policy is an invitation to corruption and rent-seeking."

– Dani Rodrik, 'Industrial Policy: Don't Ask Why, Ask How', 2008

The bigger problem with industrial strategy is not the why, but the how – an understanding of the tools needed to address these ills and the ability to wield them.

It is not just about investment

From the way many politicians discuss industrial strategy, the answer seems obvious: investment. The objects of industrial strategy can be achieved if only the government can invest its money in the right places, sectors, technologies and skills. In other words, industrial strategy is just a subset of the government's overall *investment* strategy, a matter of placing all the right financial bets, as if the government is playing a board game and laying its pieces down. The state spends some £60 billion a year on roads, prisons, R&D, hospitals and more; some portion of that is 'the industrial strategy bit', chosen for being more pertinent to whatever ends the strategy has in mind. Improve how that part works, and the economy eventually improves too.

This kind of portrayal works only up to a point. Government investment obviously influences the economy, and in the more distant past may have to a considerable extent. But for modern purposes, this provides a misleading impression of how government-driven the economy is. First, there is no conceivable level of government investment large enough to shift the UK's overall economic performance, without assuming implausibly large returns. Second, most of the progress that matters in a modern economy is decided upon in the private sector, not because of consciously chosen government investments. Finally, any proposal that government-driven investments should transform an economy must explain how it can do so competently, in the face of the serious biases in how it operates already discussed.

No conceivable level of government investment is large enough to shift overall economic performance

To take the quantitative point first, note that businesses invest far more than the government does – in a recent three-month period in the UK, for example, capital spending by business was £46bn against just £14bn by central government.

The success of an industrial strategy is ultimately much more about how government influences business to invest its money, not the government's direct contribution. Moreover, this £14bn figure exaggerates what the government consciously directs in pursuit of specific economic aims. Most of the roads, prisons, hospitals and schools that constitute its capital spend are not moulded by industrial strategy, but the basic needs they service. For better context, the first major industrial strategy move of the May government was to create a national productivity investment fund, which

set aside £23bn in the five years to 2022 specifically for the purpose of boosting productivity. This sum is both a large amount for industrial strategy by recent standards – and also a relatively small amount on the scale of the economy. Even if the government possessed the secret to finding 10% returns (a level skilled investment managers struggle to come near), this might have raised potential GDP by just 0.1% or £2bn.

In its stated “levelling up” agenda, the Johnson administration implicitly endorses the government investment-led theme.²² Although a vague term, it is often implied that this agenda is about pushing more investment into the places that have been deprived too long. The most frequently heard figure is of a promised extra £100bn to be spent over five years on infrastructure. But the historical record on investment money alone being able to perform the task of regional development is not good. As the OECD has summarised:

“In the past, regional development policy tended to try to achieve these objectives by means of large-scale infrastructure development and by attracting inward investment. Past policies have failed to reduce regional disparities significantly.”²³

The challenge is starkly illustrated by some of the studies that take the approach to its logical conclusion. The 2070 Commission (a levelling-up focused think tank) calculates, somehow, that £1 *trillion* over 20 years would be needed to “level up” the UK, taking East Germany post reunification as its example.²⁴ This would be about seven times as much per year as Philip Hammond found for May, repeated into the distant future. Centre for Cities has more modestly determined that a £100bn fund over a decade could add £16bn a year to the output of eight major cities, eliminating a third of the output gap targeted by the levelling-up agenda.²⁵ This is merely twice as much as Hammond found, albeit assuming a very generous 16% rate of return to the economy.

In the current fiscal climate, with the government facing a deficit approaching £400bn, any proposal to fix the economy simply by investing hundreds of billions of pounds of taxpayer money will be challenged on grounds of affordability – and still might not even solve the problem.*

In a modern economy, most progress is decided in the private sector, not by government investments

The mental model of an economy shaped by government investment provides a misleading depiction of how growth and progress really occur in modern times. The changes we see around us seldom stem directly from a government investment decision, but are more likely to result from countless businesses looking out for market signals and constant experimentation. Fortunately for the chancellor, the bulk of the capital is provided by the private sector too. At the most, businesses respond to signals that the government may play a part in creating.

* Deficit figure as of Spending Review 2020.

This is best illustrated by some current examples. A recent major economic trend has been for companies to outsource their IT functions to 'the cloud' – a trend likely to have accelerated during the pandemic with the shift towards more remote working. Global revenues for cloud computing services now stand at well over \$200bn and have been doubling every three to four years,²⁶ and the major providers are currently investing around \$40bn a year in the basic infrastructure to serve this market.²⁷

Another trend – increased home shopping – is being powered by companies investing in automation facilities; Ocado, for example, was reportedly planning £600m of investment in robotic warehouses shortly before the pandemic struck.²⁸ The capital investment budget of Amazon, the leading e-retailer, is over \$15bn a year.

A third trend is the rise in electric vehicles, and the effective conversion of a global capital stock from the manufacture of internal combustion engines to electric models, which is being supported by hundreds of billions of dollars of investment by carmakers worldwide.²⁹ The market signals that lead investment in these directions may reflect government policies, but the investment and how it ultimately occurs is fundamentally about private sector incentives.

The point of these examples is not to downplay the significance of government investment, but to put it in proper context. It is so easy to focus so much on what the government does that one ignores how much the private sector is doing on its own. Understanding this is helpful to identify those areas where the state's involvement *is* significant. It also serves as a reminder that whatever the government wants to achieve, most of the heavy lifting will not score to its own balance sheet. Influencing the actions of the private sector is the game to play, not supplanting it with the government's own ideas.

Proposals for government investment to transform an economy too often lack clarity or competency. Finally, any plan to change the economy through the sheer brute force of the government's investment needs to confront the problem of the state not necessarily being very good at it. As Chris Giles, economics editor of the *Financial Times*, put it:

"The lesson from British public-sector investment disasters, including the Humber Bridge, advanced gas-cooled nuclear reactors and the NHS electronic patient record system, is that the growth-enhancing promises of investment projects are often overstated and multipliers might be very small."³⁰

Even if the funds were available for a massive, investment-led push to solve the UK's economic ills, critics of industrial strategy will object not just because of affordability, nor even from a stubborn ideological attachment to the free market, but as our earlier section set out, from concerns that governments can easily fail too and make things worse.

Dos and don'ts of a good industrial strategy

Have a system

The first protection against a failed industrial strategy is to have a conscious, systematic approach at the outset. Inspired ad-hoc-ery is no route to a higher level of growth in the UK, no matter how bright the people responsible for the decisions. This approach needs to contain a clear understanding of the objectives of the strategy, the methods used to achieve it, the limits around it, and a clear communication strategy for the private sector. It cannot simply be a promise to make everything better.

This may sound too obvious to state. But an option often alluring to busy governments is to eschew policy principles and dress up ad hoc policy making as praiseworthy versatility. After all, the world is messy, and coronavirus reminds us that the conditions under which the government will act often cannot be known in advance. But versatility is one thing, reactive and unstrategic behaviour quite another. One of the most telling jibes aimed at the 1970s approach was that it was not so much the government picking winners, as the losers picking the government,³¹ which poured time and money into just keeping the existing, failing industrial structure going.

A solid structure around the strategy is itself a tool for making it more effective and keeping all its moving parts working well together, both business and government. People running companies do not want to have to refer to the government's constantly changing whim in making their plans. Moreover, just as a clear, strongly enforced law can achieve as much through deterrence as actual use, a clear and widely understood policy towards an economic aim can do much just through communication. A strategy that communicates a direction is itself a tool, helping to align private sector behaviour with it – for example, with government goals to replace the production and sale of carbon-emitting cars with electric vehicles. These create a framework that influences countless industry plans as to how to prepare.

Focus on institutions

Industrial strategy must involve choices. Politics is an inescapable part of it. But it is crucially important that the choice-making is set at the right level. If the model policy makers have in mind is of a political machine making a series of commercial decisions, about which companies and technologies to back, fuelled by the firepower of the state, then the policy is unlikely to succeed. The choices must be higher level, as we discuss below, and in their implementation the real work of economic progress is managed by institutions, not the political actors at the centre.

In normal parlance, an institution is an organisation tasked with some function. For economists, it means something slightly different. In the definition put forward by the economic historian Douglass North, institutions are "the rules of the game of a society, the humanly devised constraints that structure human interaction".³² They include property rights, the rule of law and the way competitive markets work, and may come from conscious government policy but also from the accepted rules of society.

Differences in institutions have been found by academics like North to explain much in economic history. They *may* be manifested in organisations in the conventional sense (like our court system or the Bank of England), but they can also be intangible. In economic terms, institutions enable activity to happen that might not otherwise. For example, a strong rule of law helps transactions to take place without cheating, or expensive alternative ways of establishing trust. An institution can be understood as something that rewards some kinds of behaviour and punishes others.³³

A focus on institutions goes with a realisation of how the real work of the economy happens in a decentralised way, not driven and chosen at the centre. The creation of an independent Bank of England by the Banking Act of 1998 is the archetype of a successful institutional innovation. The politicians retained broad control of the purpose – in this case, low and stable inflation, defined in a letter from the chancellor. But the Bank of England operated the monetary policy levers, and the actors in the economy, understanding the system of rules they operate under, aligned their expectations with the system put in place.³⁴ The politicians responsible for the innovation achieved low and stable inflation; but in a sense, they didn't 'do' anything – they merely set up a framework within which countless actors in the economy would do the work to achieve the goal.

Monetary policy presents an ideal case. Industrial strategy is more difficult and fiddlier. Many of the institutions needed are not so much enabling entities that 'do' something or other, as ways of providing a constraint around policy makers: state aid rules, audit and the ever-present challenge of other departments are all constraints that structure the behaviour of government actors in a certain way. A good example might be the Haldane principle, which determines that scientific projects should be funded according to decisions made by academics subject to peer review.

Creating the right institutions in both the conventional and economic sense is going to be crucial to any ambitions of "levelling up". If we take it to mean 'raising the productivity of lagging regions', the real task will be carried out by thousands of actors, acting under their own steam and the institutional structures put about them. Decisions taken in Westminster to place funds here or there may make a difference. But – as already noted – crude fiscal reallocation cannot take this agenda very far. To make enduring progress, the right institutional reforms will need to be chosen too, setting up processes that reward the good ideas and sift out the bad. For example, a reform that allowed local authorities to retain more of the revenue uplift from extra economic activity would shift decision making towards more growth-enhancing decisions. Others might pick planning reforms, or competitive bidding into growth funds.

Institutional thinking might appear inimical to industrial strategy; it constrains decisions and emphasises the role of dispersed economic actors. This is not the heroic model some may harbour, of the political actor seizing control to make bold choices that boost the economy. But if a government's plan for growth is that it will make a continuous series of brilliant technological and sectoral decisions, it needs some explanation for how it is imbued with this remarkable power.

Instead, the choices the government needs to make are elsewhere: about sectoral emphasis, the resources to be set aside for industrial strategy, and political trade-offs such as between consumer costs and investment returns. There are choices in institutional design, too, such as in the parameters of the state aid regime, or the freedom to give regional political actors in competing to draw economic activity to their area.

Have edges: do not try to make industrial strategy about everything

Labour prime minister James Callaghan (1976–79) talked of plans covering 'the' key 39 sectors of the economy. A modern industrial strategy should, in contrast, be built upon the idea that it is only certain key features that create the case for government involvement. Another way of putting this: a good industrial strategy should have 'edges' around it, delineating where the free play of markets is good enough from where strategic intervention is needed.

The January 2017 green paper that launched the previous government's industrial strategy failed to create meaningful edges. This was most clearly shown in its sector deals policy, which was explicitly open to all comers (see Box 1 below). What applies to sectoral interests applies to its economic objectives more broadly. The 2017 green paper also included 28 distinct commitments to review areas of government policy for future action (see Appendix). Despite some worthwhile initiatives, such as Professor Juergen Maier's review of industrial digitisation, their sheer number indicated a strategy launched without a clear idea of what it meant to achieve or how.

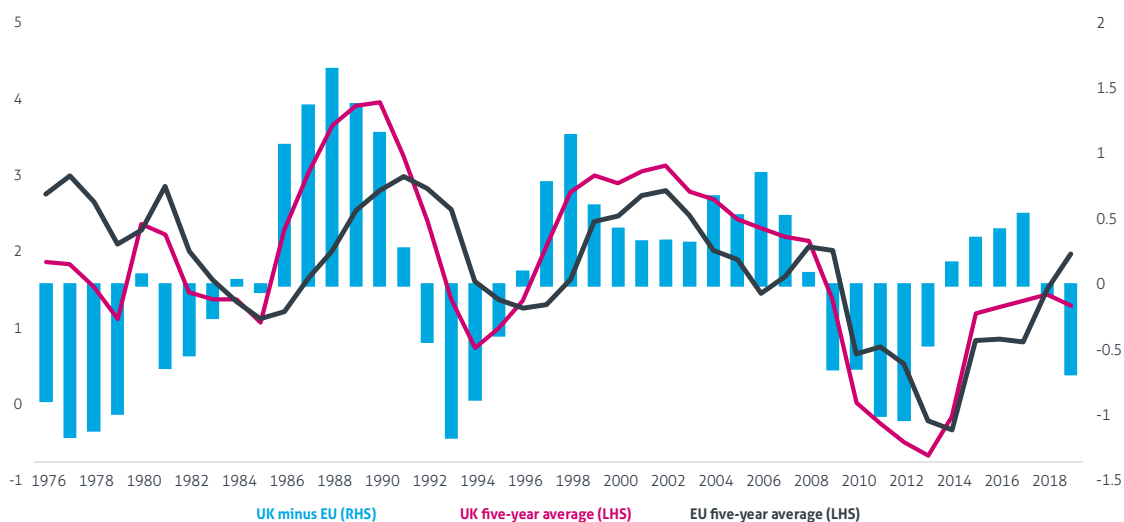
There are two major economic ministries in Whitehall: the Treasury and BEIS. Their zones of responsibility are distinct, though overlap. An industrial strategy that attempts to be too all-encompassing – in effect, which tries to subsume the whole of economic strategy into industrial strategy – provides no guide to where its operations begin and end. This generates goals or objectives that are too broad to be a practical guide to those operating the strategy.

Whatever the rights and wrongs of the debate about where economic policy making should sit,³⁵ it is important to establish a distinction between economic and industrial strategy. The former includes every high-level macro-economic concern – that is, 'horizontal' policies that potentially touch on every worker, consumer, business or region. Tax and other fiscal policy, trade policy, employment laws, and macro-economics are all tools of economic policy. Industrial strategy is for more specific objectives at a regional, technological or sectoral level, chosen for more specific strategic ends. They need to go with the grain of the economic strategy, but reflect other interests as well, such as growing the aerospace sector, improving the quality of life of older people, or maintaining a technological lead in cybersecurity.

Pursue lower level, traceable objectives over national variables

It is impractical for industrial strategy to be designed around the improvement of national-level variables, given how long it takes for these to change. A glance at per capita GDP growth rates of the UK compared to the EU over 40 years gives a sense of this.

Figure 4 **10-year average per capita GDP growth rates, UK and EU**



Source: The World Bank DataBank.

The 1980s represented a period of serious economic reform. The catch-up the UK achieved up to the mid-2000s amounted to 0.5-1.0ppts of GDP. If this is credited to Thatcher's reforms, the impacts appeared to have taken at least five years, and up to 15 years, to feed through. These constituted some of the most significant reforms ever seen in the UK, touching nearly every part of the economy: privatisations, widespread deregulation, entrance to the EU single market, a fall in marginal tax rates from over 80% to 40% and more.

This is why an industrial strategy aiming at improving the economy needs to be supplemented with objectives that are more tractable and lower level than the performance of the whole economy. So while the chancellor may set out a plan for boosting productivity or raising wages across the whole economy, it falls to the business secretary to set out plans for growing the UK's presence in, say, quantum computing, increasing investment in offshore wind or developing a specific technological cluster in partnership with a mayoral authority.

Box 1 **Sector deals for all**

The 2017 green paper unveiled the government's new policy of sector deals, described as an "open call to business to organise behind strong leadership... to address shared challenges and opportunities".³⁶ Crucially, it was made clear – in bold font – that the process would be open to all. None of the consultation questions even hinted at criteria for which sectors would enjoy this innovation. This openness was later reiterated to the BEIS Select Committee, the department saying "sector deals are open to every sector and we are committed to building long-term strategic partnerships with businesses through Sector Deals between the government and industry".³⁷

There is an obvious political temptation to be comprehensive. Every sector has its lobby group, its statistics showing an impressive contribution to GDP and job creation, its pitch about how important it is to various parts of the country. This makes it hard for a minister to rule out intervention in a particular area without risking the appearance of indifference to that sector.

As the BEIS committee argued at length, the government provided little useful guidance to how a sector deal would be judged, and the result was a stampede of ill-formed proposals. The Engineering Employers Federation (now Make UK) put it forcefully, telling the committee:

"There is now a wave of expectation from sectors that has been built up, which will soon come crashing against the wall of reality being built by government during closed-door negotiations" and, similar to previous devolution deals, the outcome is likely to be "disgruntled sectors walking away from negotiations feeling their time has been wasted".³⁸

The promise to every sector of a possible "long-term partnership" with the government was problematic. First, fiscal resources are not sufficient for whatever tasks this multiplicity of sectors might generate. The Treasury insisted that no resources could be promised, but few sectors took this at face value; after all, why ask a sector to convene and brainstorm ideas if there is nothing financial in it for them?

Second, there also were not sufficient resources of administrative time: even without financial demands on the Treasury, the policy ideas thrown up by sector bodies needed evaluation and their reciprocal promises needed monitoring – perhaps for ever, if the phrase "long-term partnership" is to be taken at face value. Perhaps this is efficient when the sector in question is large, intrinsically tied up with government policy and there exists a competent body in government to deliver it, such as with the Office for Life Sciences. But it is impossible when those clamouring for attention range from the Professional

Business Sector (over 10% of GDP) down to the ceramics and ironmongery sectors (somewhat less).

The net result of the open to all comers approach was too many attempts to create sector deals, too much led by the objectives of industry rather than government, and those that made it through were underpowered when compared to their equivalents in the EU, for example.³⁹

That the overall approach was far from strategic does not mean that nothing good came of any sector deals. Individual programmes produced some good policy interventions (notably life sciences, offshore wind and the rail sector). But these could easily, and indeed should have, emerged from a conscious, strategic approach that evaluated where the government's actions might make a key difference towards important goals, based on solid analysis – not on whoever organised themselves to lobby best. Co-operation with a sector is a good idea but, in the words of a recent Industrial Strategy Council study of the area, “the industry involvement should be matched by a very clear steer from the government about what the Deals are trying to achieve”.⁴⁰

Sectoral objectives need to be based on clear criteria

When it comes to drawing edges, the government should be in control, rather than allow its field of operation to emerge from its engagement with business. This would mark a break from the 2017 modus operandi (see Box 1) and a return to an early method.

That method came in 2012, when the coalition government created an analysis to provide “evidence on which sectors could make the greater contribution to future economic growth and employment in the UK, and then considers in which Government action could add most value”.⁴¹ Eight years later, the government should engage in a similar process. Any forecasts of future potential are subject to error, but they establish a basis upon which to justify where they aim to place emphasis. This analysis can choose different variables depending on its overall economic goals. Nor is it necessary to cleave to the standard industrial classification (SIC) definitions provided by the Office for National Statistics (ONS), which can be poor at reflecting the changing shape of the economy.

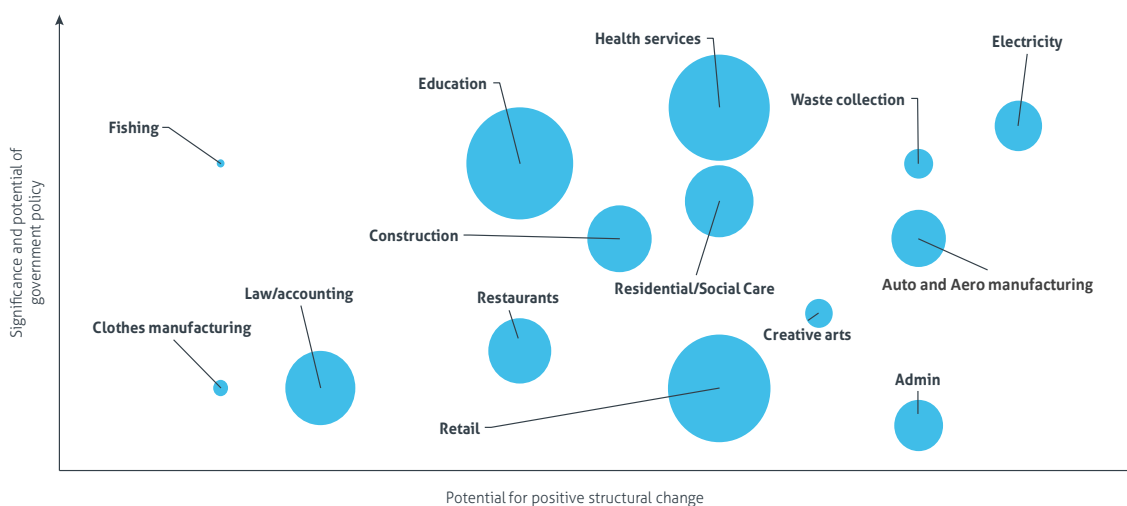
The Industrial Strategy Council suggested choosing growing sectors on their growth expectations, the prospects for technological transformation and export potential, but also defensive interventions on the basis of the damage they might do if allowed to decline in a disorderly manner.⁴²

Note, too, the words from 2012, asking where government action “could add the most value”. An assessment of how government policy matters to a sector is crucial. There are some sectors due to change significantly over the years ahead, but the relevance of directive government action may be slight. It is the combination of potential and opportunity for the government to make a difference that renders a sector worthy of

attention. With retail, for example, the market may be doing the job of restructuring largely on its own.

In Figure 5 the size of the bubbles represents the weight of the sector in GDP, the X axis the potential for the sector in question to change, and the Y axis the relevance of government strategy in determining that change. These represent the author's judgement – the government will reach different conclusions. But in this schema, the sectors to gain the most intention will be those that are large, to the right and up.

Figure 5 **Figurative representation of industrial strategy sector opportunities**



Source: Institute for Government analysis.

To many critics of industrial strategy, the task of choosing which sectors to prioritise has the smack of “picking winners”; how is this any better than trying to second-guess the market and picking what consumer preference or technological pathway will prove the winner?

There are several answers to this. First, such scepticism should never be dismissed; policy makers should always acknowledge the risk of making failures of judgement. It is easily possible to make the wrong call, despite strong grounds for backing a sector. For example, 30 years ago it would have appeared obvious that computer manufacturing was a vast growth market, but enduring competitive advantage in this sector lay elsewhere, such as the Far East.*

Second, the real damage is done when a government ‘picks’ at a much lower level – for example, by choosing which company or technology to back. It is possible with greater certainty to make forecasts such as “there is going to be an increased demand for renewable power” or “Britain has strengths in artificial intelligence” than to declare which particular wind technology or AI firm to back. The more granular the target, the greater the risk of the kind of clumsy, distortionary behaviour that politics falls prey to,

* This is much clearer in hindsight than it may have appeared in the 1980s – the UK had several early computer makers like Acorn and Sinclair, and in Bletchley Park a claim to the home of their invention.

such as developing favourites. The higher level it is, the more that actual competitive dynamics can be used to determine the actual allocation of resources.

Choose objectives that go with the grain of other non-economic goals

To some degree, industrial policy goals are a part of the broader economic strategy – for example, if the latter aims to lift UK productivity, the former might identify sectors where a rise in productivity can contribute to the whole. But not everything in industrial strategy is a subset of a Treasury-set agenda, and other objectives should be chosen on the basis of other important goals of the government.

The ‘grand challenges’ are again instructive here. Perhaps the best example is clean growth: this was chosen not because the UK’s strengths are well aligned with low carbon industries (though they might be) but because governments everywhere are already committed to action on clean growth, which provides a valuable clue to the future direction of economic activity. The UK also already has firm targets – for example, net zero carbon emissions by 2050, an end to the use of coal by 2025 – which come with industrial implications. Whereas one of the most intractable problems of industrial strategy is how to forecast the course of economic demand, with green growth the government has already made a commitment to that demand. Not all of the uncertainties have been taken away, but a great many have.

Another is on ageing. The UK is ageing in the century ahead. It makes sense to encourage an optimistic, strategic approach to the shifts in demand that will result. The same applies to the future of mobility, given that governments everywhere are mandating a near-term end to the sale of carbon-emitting vehicles and the future growth of electric alternatives.

There is a growing body of work about the art of setting the right level of tractable, government-policy-oriented mission objectives. Some examples can be found in the work produced by the UCL Institute for Innovation and Public Purpose under Professor Mariana Mazzucato.⁴³ Its work sets out how missions must be a combination of bold; measurable and targeted; ambitious but realistic; able to encourage multiple interactions across sectors; involving multiple bottom-up solutions.

Keep a bias in favour of competition

“The fight for the cause of competition, like the fight for free trade, is always a struggle. There is a constant tension between the interests of millions of consumers, highly dispersed and generally passive and disengaged, against the interests of well-resourced incumbent vested interests.”⁴⁴

– Sir John Kingman, former second permanent secretary to the Treasury, 2016

Competition is good for growth.* To quote from a summary written by the Competition and Markets Authority (CMA) in 2015, it acts as a discipline on managers to improve, drives custom and capital from the less to more efficient companies, and acts as a spur to innovation. It is a regulator of corporate behaviour more relentless than anything an actual regulator can match.

The benefit of greater competition was one of the major motivations for the UK entering what was then the European Common Market in the early 1970s. In the words of one enthusiast at the time, Nigel Lawson, the UK was advised to choose “the cold douche of competition [because] free movement of labour and capital would open up the closed nature... of British industrial life; the increased competition from Europe would force businesses to wake up or go under”.⁴⁵ Now the UK is leaving the single market, some studies suggest much of the forecast loss of GDP stems from the loss of ‘dynamic gains’ of trade – how being in a bigger, more vigorous market forces companies to innovate more and improve with time.⁴⁶

The emphasis on competition is why the concept of a bargain with business (like a sector deal) needs to be approached with care. Governments and businesses want different things; the latter straightforwardly seek higher profits, which may or may not result from actions beneficial to the economy and can be a sign of competitive failure. The economist Thomas Philippon, in *The Great Reversal*, argues that the profit share in the US rose steadily after the year 2000 as markets became more concentrated. Over this period, however, productivity growth has disappointed. This is suggestive of companies gaining in profitability by successfully fighting off competition, perhaps at a cost to consumers and other businesses they serve. He calculates that the loss of competition over 20 years may have cost the economy 5 percentage points of production, or \$1.5trn of annual income for US workers, through higher prices and lower effective wages.

It follows that gross value-add is a variable that needs to be treated with caution. High mark-ups or value-add may be a sign of innovation, but they can also mean a lack of competition – and low value-add does not mean a sector is somehow failing to play its part. For example, the UK telecommunications sector has seen declining revenue since 2007 (from £42bn to £33bn in 2018), despite offering a far greater range of services over that time. There has been plenty of innovation – coverage has expanded, 3G has been replaced by widely available 4G, and much more. This is a success story – but the

* The best recent book on this is Philippon T, *The Great Reversal: How America gave up on free markets*, Belknap Press, 2019.

spoils have largely ended up with consumers – which is a good thing. And despite the UK lacking giant tech firms like the US – there is no British Apple – Philippon notes that the US has suffered much poorer performance in this sector, and its consumers pay more as a result.

Competition is a complex policy area that cannot be summarised with one or two variables like concentration or profit margin. But research from the Resolution Foundation points towards potential concerns around flagging competitive pressures in the UK.⁴⁷

In short, it is far too easy for competition to be set aside by politicians eager to announce a win of some kind; it provides an archetypal example of an invisible benefit that struggles against the more visible rewards. As set out in a [recent Institute for Government paper](#), “poor economic decisions – like propping up a failing business – can be attractive politically because the short-term ‘winners’ are concentrated and the ‘losers’ are diffuse”. Moreover, the mechanisms to ensure a continuing respect for competitive forces can too easily appear like pointless, bureaucratic obstacles to an impatient decision maker. These mechanisms include state aid rules, due process in the dispersal of government funds, procurement rules, controls on mergers and takeovers, and much more. In many cases, they can seem to be impediments on the freedom of action of the political class to “take control” of the economy in some way. This may appear like a downside. It isn’t.

Avoid becoming besotted with science and technology

Science, technology, research and development: these comprise just a few of the broad tools of industrial strategy and are insufficient as an objective in themselves.

It is easy to see how the technological aspect of the business environment is disproportionately enticing to policy makers. Economic theory decomposes growth into key factor inputs – capital, labour, human capital – leaving a residual, “total factor productivity” (TFP), the effectiveness with which all the other elements of growth are combined. Many studies put the contribution of TFP to long-term growth at well over half.⁴⁸ To put it in plain language: economies achieve growth not by throwing more resources at the problem but by combining them more smartly, which is another way of seeing technological advance.

So it is alluring to imagine that the smarter management of a relatively small budget (publicly funded R&D makes up less than 1% of GDP) can on its own catapult an economy on to a higher path. Economic historians find good evidence for an increasing role of massive state spending in the recent breakthroughs, notably the efflorescence of new technologies that came during and after the Second World War, such as jet engines, computers and atomic energy.*

* The best treatment of this topic is Mazzucato M, *The Entrepreneurial State: Debunking public vs. private sector myths*, Anthem Press, 2013.

The key characteristic of scientific innovation is that its benefits “spill over”, helping far more than the direct innovator. According to one estimate from William Nordhaus, a historian of science and economics, “innovators are able to capture about 2.2 percent of the total social surplus from innovation”.⁴⁹ To provide an example, survey research has found that US consumers, apparently, value the use of internet search at over \$17,000 per year – a high multiple of the revenues made from the technology by the leading company, Alphabet/Google.^{50*} An even more pertinent recent example can be gleaned from the reaction to a favourable test result for the Covid-19 vaccine developed by Pfizer. On 9 November, when this was revealed, Pfizer’s market capitalisation rose by \$20–30bn – that of the S&P 500 index of stocks rose by \$500bn alone (and global markets by far more), albeit with some notable losers such as the video conferencing company Zoom.

These spillovers provide another reason for a natural bias in favour of R&D – the argument for its support is generally easier to win, particularly when the activities being funded are basic science a long way from commercialisation. With so much of the benefits going to the broader economy, arguments that it will be under-provided in the free market are convincing.

But spillovers are also why R&D is not an easy tool for acquiring *domestic* industrial advantage. What really matters is the diffusion and adoption of technologies, and there is no reason that the earliest and broadest adoption will necessarily happen wherever the first inventive spark was found. The US has benefited considerably from being where Google was born, in terms of local economic effects, higher wages, and phenomenal stock market returns. But the bulk of the advantage has accrued to users of search worldwide, and the business possibilities that it has opened up. Compared to these, a few tens of thousands of jobs and a stock market killing are insignificant.**

The popular idea that R&D policy can or should be directed towards helping the UK to emulate the US’s success in creating technology superstars – what has been called a ‘national champion’ – stems from several misapprehensions. One, discussed above, is mis-identifying gross-value-add as the sole metric for the success of an industry. Another is what experts call the ‘linear model’ of thinking about innovation.*** This, crudely, sees innovation produced from a flow of sequential moments starting with R&D in universities and ending with a commercialised product, perhaps instantiated by a big tech firm. When captured by the linear model, the policy maker imagines their job to be simply picking the right technology to back, maybe finding interventions along the chain to boost it.

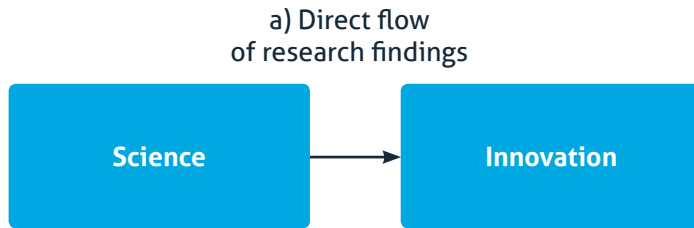
* Google’s annual revenues from advertising – which it achieves thanks to internet search – come to \$162bn per year, around \$40bn from US consumers, or around \$130 per citizen.

** In fact, it is notable that while the USA has specialised since the 1990s in the creation of companies generating huge equity market returns, this has not put it on a growth pathway markedly better than other countries like Germany or the UK that have failed to match it in this regard.

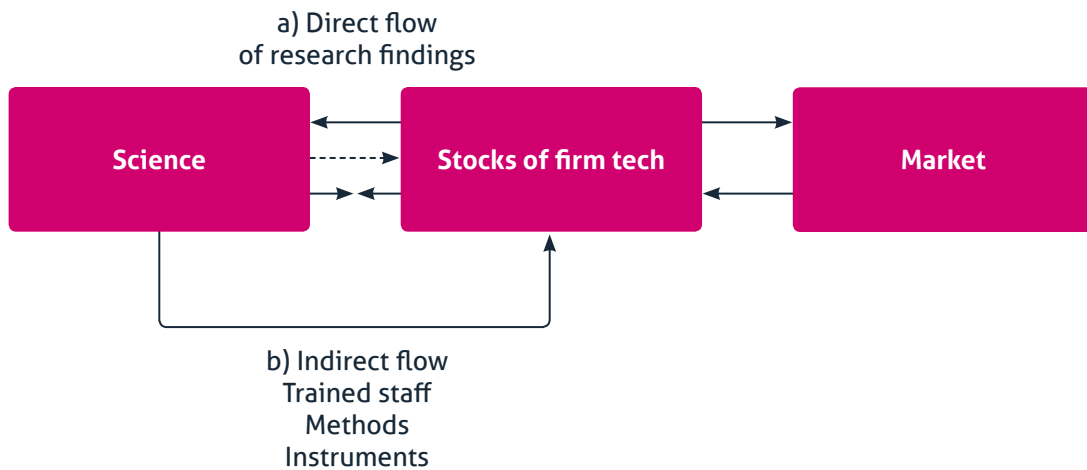
*** The best short discussion of these models can be found in evidence from Nightingale P, Evidence to House of Lords Science and Technology Committee, 2009, <https://publications.parliament.uk/pa/ld200910/ldselect/ldsctech/104/10011207.htm>

Figure 6 **Contrasting models of innovation**

Linear model



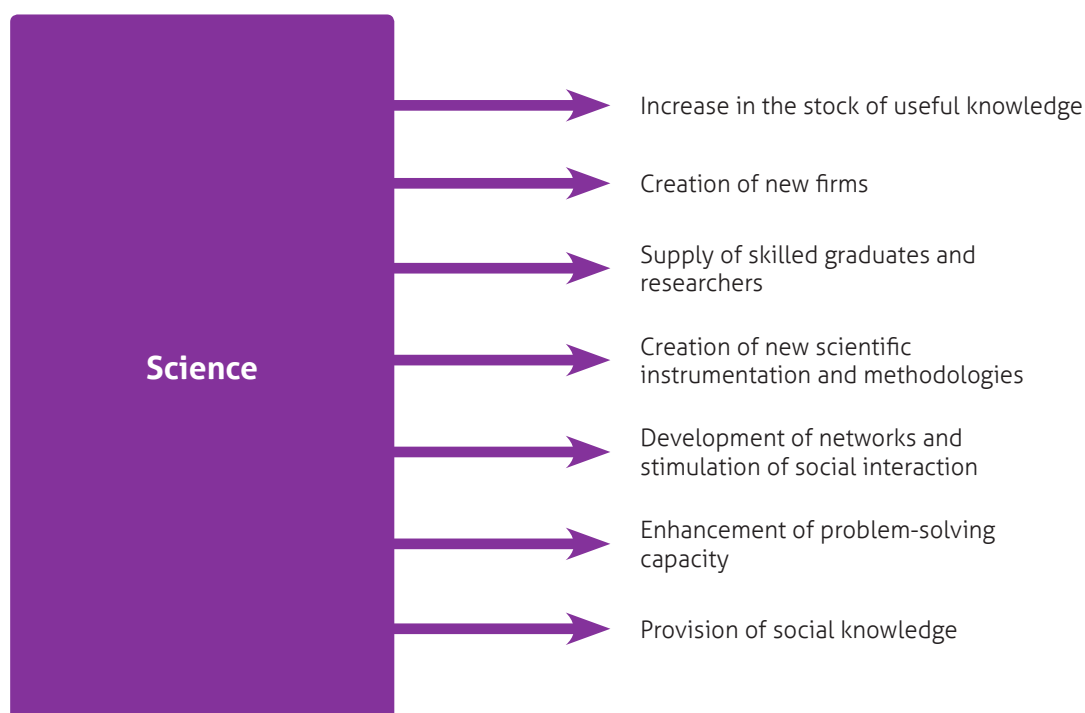
More realistic view



Source: House of Lords Science and Technology Committee, 'Memorandum by Dr Paul Nightingale', 2010, <https://publications.parliament.uk/pa/ld200910/ldselect/ldsctech/104/10011207.htm>

The alternative, more realistic view is that the relationship between R&D and growth is more indirect. R&D supports the technological capability of the economy through the provision of trained staff, stronger links to international networks and solutions to technical challenges. Spinouts – companies directly generated from the research – are a relatively small part of the picture.

Figure 7 **How science has an impact on the economy and society**



Source: Institute for Government analysis of The Royal Society, *The Scientific Century: Securing our future prosperity*, March 2010, https://royalsociety.org/~media/Royal_Society_Content/policy/publications/2010/4294970126.pdf

Total factor productivity is about more than just the creation of new inventions, but the whole range of ways in which economies might be managed more effectively, only a small amount of which is to do with R&D. A host of other factors are just as significant: managerial competence; adoption of existing technology – including from overseas, where most of it is made; the availability of a large market; good incentives through the tax system; skills; infrastructure and more.*

The best strategies are likely to achieve a co-ordination of these. Much of what might be called innovation involves nothing resembling university-based research; it can include anything a firm does to improve how its internal processes work, for example, or new applications for existing products. In a survey in the late 2000s, businesses asked to identify various sources of information for innovation ranked universities 15th in the UK and 14th in the US, out of 18 possible sources. What they said mattered far more was “internal knowledge within the business, customers, suppliers and other businesses”.⁵¹

In fact, R&D is highly concentrated in particular sectors of the economy and types of activity – auto makers, pharmaceuticals and certain technology companies.⁵² Focusing entirely on the companies performing 60% of the R&D would help just 8% of the business set in terms of jobs.

* Bloom N et al, 'What drives differences in management practices?', *American Economic Review*, 2019, vol. 109, no. 5, pp. 1648–83, found that R&D explained just 17% of the difference in productivity between the top and bottom quartile manufacturing plants in the US, for example.

Table 1 **High R&D sectors**

| Product groups | % of business spend on R&D | % of employment |
|---|----------------------------|-----------------|
| Pharmaceuticals | 18 | 0.52 |
| Motor vehicles and parts | 15 | 0.56 |
| Computer programming and information service activities | 8 | 2.42 |
| Aerospace | 7 | 0.43 |
| Miscellaneous business activities | 7 | 1.67 |
| Software development | 6 | 2.42 |
| All others | 40 | 91.99 |

Source: Office for National Statistics, 'Business enterprise research and development, UK statistical bulletins', 20 November 2020, www.ons.gov.uk/economy/governmentpublicsectorandtaxes/researchanddevelopmentexpenditure/bulletins/businessenterpriseresearchanddevelopment/2019 and 'EMP13: Employment by industry', 10 November 2020, www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/datasets/employmentbyindustryemp13

It is notable that London, the region with the highest GDP per head, is not particularly dependent on these activities for its prosperity. Financial services, creative industries, government, media and general business services – from which London generates most of its output – are all sectors that have demonstrated considerable innovation over the years, but little of it the sort that matches straightforwardly the linear model.

None of this is to settle the case for a large R&D budget one way or another. There is strong evidence for how investment in R&D can boost national growth and afford a country many spillover effects that are stronger locally.⁵³ Both of these point towards R&D being a useful strategic tool – if used sensibly. But any intervention to create more technology-based growth has to think much more about how companies across the country can do a better job of absorbing technological ideas – both those created in the UK, and worldwide. The moment of invention is just one part of it; in the words of one academic, Jason Potts:

"For any new idea or technology, before entrepreneurial action can occur, answers to questions are needed about: what knowledge needs to come together to make this technology work? What will it be best used for? Who will use this and how, and in combination with what? What costs are involved in producing or delivering this, and how do they vary? What business models will work best?"⁵⁴

Introduce as much challenge as possible

Failure in industrial strategy is very hard to avoid. It cannot be done simply by choosing the right brilliant advisers or officials. Data is essential for evaluation and accountability but, as Friedrich Hayek has argued, much of what needs to be known to operate an economy is inherently impossible to know. Government lacks key mechanisms that work in the private sector to weed out the poor ideas and boost the good – the decisions of customers, the pressure of competitors, the demands of financiers. Furthermore, the lens through which a government policy maker sees the world can be heavily influenced by political considerations and optimism bias. They are often the most difficult people to challenge.

To give an industrial strategy a fair chance of success, it needs to nurture those processes that act to challenge ideas as they pass through. Paradoxically, the harder the government makes the operation of industrial strategy for itself, the better the result it is likely to produce.

The good news is that many of these processes are hard-coded into the way Whitehall already operates. The system of cabinet government gives other departments a right to challenge big decisions, for example, and forces anyone proposing an idea to justify it more than if each ministry was an unconstrained barony. The role of the Treasury is also crucial, as are those independent bodies that hold the government to task for its use of money, such as the National Audit Office and the Public Accounts Committee. The ultimate constraint is a finite budget, which forces good ideas to compete against each other and introduces challenge naturally.

As Sir John Kingman again explained:

“In my experience the Treasury’s biggest contributions to good supply-side policy are negative, and very often completely invisible to the outside world. What do I mean by this? It is generally understood that the Treasury’s main contribution to public spending control is to stop things happening. It is less well understood that exactly the same is true of growth policy.”⁵⁵

State aid rules provide another challenge essential to the task of keeping an economy competitive. The way state aid is often discussed, it is easy to think that its constraints matter only in the context of competition between nations within the same international market. For example, a 2010 European Commission report discussing the single market argued: “If Member States would engage in a race to subsidies for their own companies, the single market would be disrupted as wealthier Member States would win the contest against smaller Member States.”⁵⁶ To the unwary, the impression given by “win the contest” is that offering state aid necessarily gains a country some advantage, and that the only problem is for others.

This is misleading. Yes, a state free to support a domestic company might see some advantage from business flowing to that company. But this would be at the expense of its own taxpayers or consumers, and ultimately its competitive environment. State aid rules help governments resist the temptation to take actions that have short-term

political benefits but damage their own economies as well as those of nation state competitors. As argued in the Institute for Government's report *Beyond State Aid*, poorly designed subsidies can be harmful, impede the workings of the market, and prevent capital being put to its best use.⁵⁷

A well-designed UK state aid, or subsidy control, regime, as set out in our report, is not just about stopping damaging subsidy races between the devolved UK nations, or a concession to the EU in return for single market access. It helps to formulate good policy in the UK too. A good regime forces those designing interventions to confront the question of how precisely the advantage being gained by those promoting the intervention is brought about. If it is merely to gain a competitive lead on another domestic rival – in effect, to reallocate some benefit to one company or region at the expense of another – then the process of challenge inherent in the regime ought to expose the problem.

“Hull? HULL? Do I sound like I give a ** about Hull?”**

– MP for a northern constituency near Manchester, on being told by the author that his bid for a subsidy for a local company merely reallocates activity from Hull

Distortion of competition, a classic ‘invisible’ disbenefit, struggles to be detected when policy makers, businesspeople and lobbyists meet to discuss great ideas. The (often irritating) need to pass through a check on unlawful state aid helps to give the question more weight.

The Johnson government is apparently keen on ‘red teams’ set up to challenge policy ideas, an idea called for by the centre-right think tank Policy Exchange last year.⁵⁸ The idea is a good one, and was in fact mentioned in 2010 by the Labour government in the context of defence planning. Whether it will work depends upon how it is designed. A single team permanently tasked with questioning every proposal might start to be discounted not as a critical friend but as an outsider whose voice does not matter; this was a concern that led to the idea of ‘collaborative red teaming’ in a pamphlet co-authored with the Institute for Government by the Behavioural Insights Team on *Behavioural Government* in 2018.⁵⁹ People *within* the group proposing an idea need to be expected to think critically about it, not just plot ways of getting their idea through the Treasury, say.

This is hard. The ability to be justifiably sceptical often arises only with experience of failures. One way to make it easier is to make it common practice for policy makers to seek case studies of similar ideas being tried before and failing in their process of evaluation. Someone should always be there to ask: “If this is such a good idea, why has it not happened already?”

For example, there is a renewed enthusiasm in the UK for new forms of nuclear energy, either smaller fission or breakthrough fusion reactors. It is possible that this might work; the UK has an endowment of good technical skills and the overwhelming imperative of the net zero target driving commitment to the overall goal. But policy makers should have a thorough understanding of the expensive failures before

embarking on projects, including in particular the decision in 1965 to pursue the British model of an advanced gas-cooled reactor, delivered 13 years late and – according to Professor John Kay – generating the biggest write-off in capitalism (he wrote in 2002).⁶⁰

Kay concluded: “In the face of this dismal story, some humility from government would be appropriate. The notion that government can turn British scientific expertise into business success is a continuing, and costly, illusion.” It is not necessary to be this gloomy, but his overall message – that the government should be acutely aware of its past errors, more than its dreamed-for successes – is surely a strong one.

Within the limits, commit

The major theme of this report is how industrial strategy should be limited and constrained: in where it should operate, in the tools that are used to pursue its ends, the caution and challenge that are applied when they are wielded. In a fast-moving, modern and open economy there should be a high bar for any policy maker launching a determined effort to change economic outcomes.

But once that determination is made, the policies need to be pursued with commitment and consistency. Indeed, one of the very reasons for the high degree of selectivity and sceptical analysis at the planning stage is that this allows resources to be focused where they are better able to make a difference, rather than spread thinly around the economy. Within Whitehall, this is characterised as the debate between ‘lumpiness’ and ‘jam-spreading’ – between adopting a strategy with a few big commitments and one that tries to be everywhere at once. Industrial strategy needs to be lumpy, but with carefully chosen lumps. A spread-it-thin strategy not only risks doing too little everywhere, but also acting on too small a scale for useful lessons to emerge.

Commitment is not just a matter of financial resources. What businesses value most is certainty and longevity, which have been historically lacking in industrial strategy. Business investment cycles are long, and involve investors tying up capital over a period that spans several ministerial spells in a department. This is why solid institutional arrangements are so important, as these outlast a political life cycle and can confer a degree of immunity to subsequent meddling.

A good example is in the contract for difference (CFD) system, originally designed when Chris Huhne was secretary of state for the Department of Energy and Climate Change in 2011, to provide guaranteed prices for nascent electricity generating technologies like offshore wind. His successor, Ed Davey (2012–15), oversaw the launch of the scheme, and the two holders of the energy portfolio afterwards, Amber Rudd (2015–16) and then Greg Clark (at BEIS, 2016–19), its evolution from an administrative to an auction-based system. Through this period, the certainty provided by CFDs enabled developers to invest with confidence and helped drive the price of offshore wind electricity from above £110/MWh in 2012–13 to below £40/MWh in 2019. It also underpinned the investment case for supply chain companies such as Siemens to invest in facilities like the blade manufacturing operations in Hull.

Another good example is provided by the aerospace sector, where the UK government agreed in 2013 to create the Aerospace Technology Institute, matching £1bn of state money with £1bn from the private sector to fund the innovation needed to keep the UK at the forefront of the industry. The 2013 budget in which it was unveiled allocated funding that easily outlasted the coalition.

Momentary political commitment, even with a hefty slug of public money, will still fail if the project is ill-chosen and unable to pass subsequent due diligence. In fact, although political commitment is an important ingredient in policy making, it cannot be the only one; a political champion can depart the scene, and if he or she was all that made a policy possible, the result is often limbo. Industrial strategy has to be built to outlast its architects.

Appendix

Reviews suggested in the Industrial Strategy Green Paper 2017

1. The **Patient Capital Review**, recently announced by the Prime Minister, will identify the most effective ways to improve the availability of patient capital for growing businesses.
2. The Government has launched an **independent review of the UK's Small Business Research Initiative** to examine how we can use strategic procurement to support businesses developing innovative new products and services.
3. We are also **reviewing what we can learn from inward investment strategies** of key competitors and will report in 2017.
4. This will be informed by **a review, commissioned by the Government, of the opportunities to reduce the cost of achieving our decarbonisation goals** in the power and industrial sectors.
5. We will also **review the opportunities for growth from the energy sector and the opportunities for the UK**.
6. The Government is **reviewing the current careers offer for people of all ages**, and will build on the best international evidence to publish a comprehensive strategy later this year for careers information, advice and guidance.
7. The Infrastructure and Projects Authority will lead **a new review to identify ways the Government, working with industry, can improve the quality, cost and performance of our infrastructure**.
8. Department for International Trade will **review the potential role it can play in attracting businesses**, including with reference to the impact they can make on areas where productivity needs to catch up.
9. The Cabinet Office **is reviewing the location of Government agencies** and cultural institutions and will consider relocating them where they could help reinforce local clusters and support private sector growth.
10. We will also **review whether there is more that can be done to leverage government and research council laboratories to drive local growth**.
11. We will work **with local government to review how to bring more business expertise into local government**, for example through the creation of a modern "Alderman" type of role within local government.

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12. We will work with **Local Enterprise Partnership (LEPs) to review their role in delivering local growth**, examining how we can spread best practice and strengthen LEPs, including extending the support they receive from the What Works centre for Local Economic Growth.
 13. As an early example of a new institution to support a key technology, **the government has asked Sir Mark Walport to review the case for a new research institution to act as a focal point for work on battery technology**, energy storage and grid technology, reporting in early 2017.
 14. We have **launched a review of the tax environment for R&D** to examine whether there is more we should do to stimulate private sector investment and make the UK an even more competitive place to do R&D.
 15. We **are reviewing how to maximise the incentives created by the Intellectual Property** system to stimulate collaborative innovation and licensing opportunities – including considering the opening up of registries to facilitate licensing deals and business to-business model agreements to support collaboration.
 16. So the Government **is reviewing the effectiveness of current policy to help as many young people as possible leave compulsory education with a good standard of maths and English**.
 17. The Government **will review how we can best deliver the increased level of ambition we have for the new routes**, including whether there are ways to drive up quality and make the new routes more demanding.
 18. For those people aged 19 or older **we will review the current loan system for technical education and the various restrictions on accessing it**. We have also consulted on and are reviewing the option to create maintenance loans for technical education.
 19. A **review into entrepreneurship will be led by the Chief Entrepreneurial Adviser at the Department for Business, Energy and Industrial Strategy**, tech entrepreneur Professor Tim Dafforn.
 20. The **Financial Conduct Authority has announced in its 2016/17 Business Plan that it will be reviewing the structure of the UK's listed markets**, and it plans to release a discussion and consultation paper in the first quarter of this year.
 21. We **will review how we attract inward investment and how we evaluate the impact of successful inward investments**.
 22. The Department for International Trade is also reviewing what we can learn from the work of inward investment promotion agencies across the globe.

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23. **Juergen Maier will undertake a review of industrial digitalisation** to consider how UK industry can benefit from the accelerated adoption of digital technology across advanced manufacturing.
 24. **Lord Hutton will oversee work to improve UK competitiveness and skills in nuclear.**
 25. **Sir Peter Bazalgette will conduct an independent review into how the UK's creative industries, like our world-leading music and video games industries, can help underpin our future prosperity** by utilising and developing new technology, capitalising on intellectual property rights, and growing talent pipeline.
 26. The Government will work with stakeholders to explore opportunities to reduce raw material demand and waste in our energy and resource systems. Supporting our 25 Year Environment Plan.
 27. **The Department for International Trade will review how it identifies priority investments**, including with reference to the impact they can make in local areas where productivity needs to catch up.
 28. The government will work with the British Business Bank and ScaleUp Institute to understand and address the relative weakness of venture capital funding and entrepreneurship networks outside the South East.

References

- 1 Rodrik D, 'Normalizing Industrial Policy', World Bank Commission on Growth and Development, 2008, <http://documents1.worldbank.org/curated/en/524281468326684286/pdf/577030NWP0Box31UBLIC10gc1wp10031web.pdf>
- 2 'Dominic Cummings and the unchained ministers', *The Economist*, 19 November 2020, www.economist.com/britain/2020/11/19/dominic-cummings-and-the-unchained-ministers
- 3 Sandbu M, 'Gita Gopinath: "Fiscal policy plays an essential role in recovery"', *Financial Times*, 19 November 2020, www.ft.com/content/9dd38ca3-a07b-4905-813d-39261dbc3c91
- 4 Jacobs M et al, *Industrial Strategy: Steering structural change in the UK economy*, IPPR Commission on Economic Justice, 2017, www.ippr.org/files/2017-11/1511445722_industrial-strategy-cej-november17.pdf
- 5 Cable V, 'Industrial Strategy: Cable outlines vision for future of British industry', speech at Imperial College London, 11 September 2012, www.gov.uk/government/speeches/industrial-strategy-cable-outlines-vision-for-future-of-british-industry
- 6 Lawson N, 'The Fifth Mait Lecture: the British Experiment', Margaret Thatcher Foundation, 1984, www.margaretthatcher.org/document/109504
- 7 'Full text of Gordon Brown's speech', *The Guardian*, 28 November 2005, www.theguardian.com/business/2005/nov/28/economicpolicy.budget2006
- 8 Brown G, 'A modern agenda for prosperity and social reform', speech to the Social Market Foundation, 3 February 2003, www.smf.co.uk/wp-content/uploads/2004/05/Publication-A-Modern-Agenda-for-Prosperity-and-Social-Reform-Gordon-Brown.pdf
- 9 Norris E and Adam R, *All Change: Why Britain is so prone to policy reinvention, and what can be done about it*, Institute for Government, 14 March 2017 www.instituteforgovernment.org.uk/publications/all-change
- 10 Wintour P, 'Ed Miliband to blame David Cameron for declining living standards', *The Guardian*, 14 February 2013, www.theguardian.com/politics/2013/feb/14/ed-miliband-speech-economy-tax-policies
- 11 See Haldane A, 'Industrial Strategy and Institutions', speech at Leeds Civic Hall, 6 March 2019 <https://industrialstrategycouncil.org/sites/default/files/2019-09/Andy-Haldane-speech-6-March-2019.pdf>
- 12 Department for International Trade, 'UK rises to 8th on World Bank's 'Ease of doing business' index', press release, 24 October 2019, www.gov.uk/government/news/uk-rises-to-8th-on-world-banks-ease-of-doing-business-index
- 13 Sainsbury D, *Windows of Opportunity: How nations create wealth*, Profile, 2020.
- 14 Sasse T, Britchfield C and Davies N, *Carillion: Two years on*, Institute for Government, 3 March 2020, www.instituteforgovernment.org.uk/publications/carillion-two-years
- 15 Payne S and Walker O, 'Chancellor plans to scrap tax relief for entrepreneurs', *Financial Times*, 1 March 2020, www.ft.com/content/50217c00-5bac-11ea-b0ab-339c2307bcd4
- 16 Tetlow G, Marshall J, Pope T, Rutter J and Sodhi S, *Overcoming the barriers to tax reform*, Institute for Government, 14 April 2020, www.instituteforgovernment.org.uk/publications/overcoming-barriers-tax-reform
- 17 Philippon T, *The Great Reversal: How America gave up on free markets*, Belknap Press, 2019.
- 18 Wilkes G, *The Unelected Lynchpin: Why government needs special advisers*, Institute for Government, 2 December 2014, www.instituteforgovernment.org.uk/publications/unelected-lynchpin-why-government-needs-special-advisers
- 19 Coyle D, 'The key to the productivity puzzle', Project Syndicate, 13 October 2020, www.project-syndicate.org/commentary/coordinated-collective-action-boosts-productivity-by-diane-coyle-2020-10
- 20 Hayek F, 'The use of knowledge in society', *The American Economic Review*, 1945, vol. 35, no. 4, https://german.yale.edu/sites/default/files/hayek_-_the_use_of_knowledge_in_society.pdf
- 21 Miller J, 'The case against "industrial policy"', *Cato Journal*, 1984, vol. 4, no. 2, www.cato.org/sites/cato.org/files/serials/files/cato-journal/1984/11/cj4n2-13.pdf
- 22 Prime Minister's Office, 'PM statement on transport infrastructure: 11 February 2020', oral statement to parliament, GOV.UK, www.gov.uk/government/speeches/pm-statement-on-transport-infrastructure-11-february-2020

-
- 23 'Regional development policy', OECD, www.oecd.org/regional/regionaldevelopment.htm
 - 24 Bounds A, 'Boris Johnson's "levelling-up" plan carries £1tn price tag', *Financial Times*, 27 February 2020, www.ft.com/content/e9203af0-589f-11ea-abe5-8e03987b7b20
 - 25 Breach A and Jeffrey S, *Re-writing the Green Book for levelling up*, Centre for Cities, 28 September 2020, www.centreforcities.org/publication/green-book-levelling-up
 - 26 'Total size of the public cloud computing market from 2008 to 2020', Statista, www.statista.com/statistics/510350/worldwide-public-cloud-computing
 - 27 'Is tech getting more competitive?', *The Economist*, 22 October 2020, www.economist.com/leaders/2020/10/22/is-tech-getting-more-competitive
 - 28 Witherow T, 'Ocado set to invest £600m on robotic warehouses this year as it prepares to launch international partnerships', *Daily Mail*, 11 February 2020, www.thisismoney.co.uk/money/markets/article-7993157/Ocado-set-invest-600m-robotic-warehouses-year.html
 - 29 Peak Resources, 'A Reuters analysis of 29 global automakers found that they are investing at least \$300 billion in electric vehicles, with more than 45 percent of that earmarked for China', www.peakresources.com.au/news/3823
 - 30 Giles C, 'The expensive promise of England's Covid test and trace', *Financial Times*, 15 October 2020, www.ft.com/content/5dc5184e-0f6c-47db-a730-d173539c2d36
 - 31 'Lord Mandelson's speech', speech to Labour Party conference, 28 September 2009, www.theguardian.com/politics/2009/sep/28/lord-mandelson-speech-in-full
 - 32 Boliari N and Topyan K, 'Conceptualizing Institutions And Organizations: A critical approach', *Journal of Business & Economic Research*, 2007, vol. 5, no. 1, <https://core.ac.uk/download/pdf/268111763.pdf>
 - 33 Kling A, 'Why I lean libertarian', blog, www.arnoldkling.com/blog/why-i-lean-libertarian
 - 34 King M, 'Monetary policy: practice ahead of theory', speech as the Mais lecture, Cass Business School, London, 17 May 2005, www.bankofengland.co.uk/-/media/boe/files/speech/2005/monetary-policy-practice-ahead-of-theory
 - 35 Wilkes G and Westlake S, *The End of the Treasury: Breaking up the UK's finance ministry*, Nesta, 3 September 2014, www.nesta.org.uk/report/the-end-of-the-treasury-breaking-up-the-uks-finance-ministry
 - 36 Department for Business, Energy and Industrial Strategy, *Building our Industrial Strategy*, GOV.UK, 23 January 2017, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/611705/building-our-industrial-strategy-green-paper.pdf
 - 37 'Industrial strategy: Sector deals: Government response to the Committee's Seventeenth Report', parliament.uk, 30 May 2019, <https://publications.parliament.uk/pa/cm201719/cmselect/cmbeis/2295/229502.htm>
 - 38 'Industrial strategy: Sector deals contents', parliament.uk, 19 March 2019, <https://publications.parliament.uk/pa/cm201719/cmselect/cmbeis/663/66308.htm>
 - 39 Balawejder F and Monahan E, *Effective policy approaches to sectoral issues*, Industrial Strategy Council, October 2020, <https://industrialstrategycouncil.org/sites/default/files/2020-10/Effective%20Policy%20Approaches%20-%20Research%20Paper.pdf>
 - 40 *Ibid.*
 - 41 Department for Business, Innovation and Skills, *Industrial strategy: UK sector analysis*, September 2012, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/34607/12-1140-industrial-strategy-uk-sector-analysis.pdf
 - 42 Balawejder F and Monahan E, *Effective policy approaches to sectoral issues*, Industrial Strategy Council, October 2020, <https://industrialstrategycouncil.org/sites/default/files/2020-10/Effective%20Policy%20Approaches%20-%20Research%20Paper.pdf>
 - 43 Mazzucato M and Dibb G, *Missions: A beginner's guide*, UCL Institute for Innovation and Public Purpose, December 2019, www.ucl.ac.uk/bartlett/public-purpose/sites/public-purpose/files/iipp_policy_brief_09_missions_a_beginners_guide.pdf
 - 44 Kingman J, 'The Treasury and the supply side', speech to the Strand Group, 20 October 2016, <https://s26304.pcdn.co/wp-content/uploads/328294000-Kingman-Speech.pdf>
 - 45 Williamson A, 'The case for Brexit: lessons from the 1960s and 1970s', *History & Policy*, 5 May 2015, www.historyandpolicy.org/policy-papers/papers/the-case-for-brexit-lessons-from-1960s-and-1970s

-
- 46 Van Reenen J, 'Brexit's long-run effects on the UK economy', *Brookings Papers on Economic Activity*, 2016, vol. 47, no. 2, pp. 367–83, www.brookings.edu/wp-content/uploads/2017/02/brexit-long-run-effects-john-van-reenen.pdf
- 47 Bell T and Tomlinson D, *Is everybody concentrating? Recent trends in product and labour market concentration in the UK*, Resolution Foundation, 26 July 2018, www.resolutionfoundation.org/publications/is-everybody-concentrating-recent-trends-in-product-and-labour-market-concentration-in-the-uk
- 48 Easterly W and Levine R, 'It's not factor accumulation: stylized facts and growth models', *The World Bank Economic Review*, 2001, vol. 15, no. 2, pp. 177–219, <https://openknowledge.worldbank.org/bitstream/handle/10986/17440/773550JRN0200100Factor0Accumulation.pdf>
- 49 Nordhaus WD, *Schumpeterian profits in the American economy: theory and measurement*, National Bureau of Economic Research, working paper 10433, April 2004, www.nber.org/papers/w10433
- 50 Ylan Mui, 'Would you give up Google for \$17,000 a year? The Federal Reserve wants to know', CNBC, 11 October 2019, www.cnn.com/2019/10/11/fed-tries-to-figure-out-value-of-free-internet-services-to-americans.html
- 51 Hughes A, *Open Innovation, the Haldane Principle and the New Production of Knowledge: Science policy and university–industry links in the UK after the financial crisis*, Centre for Business Research, September 2011, www.cbr.cam.ac.uk/fileadmin/user_upload/centre-for-business-research/downloads/working-papers/wp425.pdf
- 52 Rhodes C and Ward M, *Research & Development spending*, House of Commons Library, briefing paper no. SN04223, 17 June 2020, <https://commonslibrary.parliament.uk/research-briefings/sn04223>
- 53 Lychagin S, Pinkse J, Slade ME and Van Reenen J, 'Spillovers in Space: Does geography matter?', *The Journal of Industrial Economics*, 2016, vol. 64, no. 2, pp 295–335, <https://onlinelibrary.wiley.com/doi/10.1111/joie.12103>
- 54 Potts J, 'What is the innovation problem?', SSRN, 24 September 2016, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2842080
- 55 Kingman J, 'The Treasury and the supply side', speech to the Strand Group, 20 October 2016, <https://s26304.pcdn.co/wp-content/uploads/328294000-Kingman-Speech.pdf>
- 56 Monti M, 'A New Strategy for the Single Market: Report to the president of the European Commission', 2010, pp. 86–7, https://images.irpa.eu/wp-content/uploads/2019/04/monti_report_final_10_05_2010_en.pdf
- 57 Pope T and Stojanovic A, *Beyond state aid*, Institute for Government, 13 September 2020, www.instituteforgovernment.org.uk/publications/state-aid
- 58 Owen J, 'Downing Street should take back control of the civil service, says think tank', Civil Service World, 31 December 2019, www.civilserviceworld.com/professions/article/downing-street-should-take-back-control-of-the-civil-service-says-think-tank
- 59 Ministry of Defence, Red Teaming Guide, second edition, 2013, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/142533/20130301_red_teaming_ed2.pdf; Hallsworth M, Egan M, Rutter J and McCrae J, *Behavioural Government: Using behavioural science to improve how governments make decisions*, The Behavioural Insights Team, 2018, www.bi.team/wp-content/uploads/2018/08/BIT-Behavioural-Government-Report-2018.pdf
- 60 Kay J, 'Britain counts the cost of wasted energy', 19 September 2002, www.johnkay.com/2002/09/19/britain-counts-the-cost-of-wasted-energy

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