

UK's Industrial Policy: Learning from the past?

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Abstract

The UK's industrial policy since the 1970s has been characterised by frequent policy reversals and announcements, driven by political cycles, while multiple uncoordinated public bodies, departments and levels of government are responsible for delivery. This paper explores the impacts of these deficiencies of the industrial policymaking landscape in the UK and contrasts them with the experiences of other advanced economies.

A consequence of the policy inconsistency and poor coordination identified here is that UK industrial policy lacks adequate information feedback channels from outcomes to the policy process; there is a failure to learn or to build on successes.

Some potential options for reform, embedding a more systematic mechanism of policy updating, are also explored, considering lessons from other countries that could be feasibly implemented in the UK.

1. Introduction

In March 2020, in the middle of the worst peacetime economic downturn in modern history and to the dismay of policymakers, economists, and business leaders alike, the Conservative Government abolished the 2017 Industrial Strategy and the independent Council monitoring it. In its place, the Government published a new 'Plan for Growth' (HM Treasury, 2021a).

This reversal was not an aberration in British industrial policymaking, but symptomatic of the fundamental features driving it. Yet although characteristic for the UK, the move was particularly puzzling when juxtaposed against the fact that policymakers elsewhere across the OECD countries have been expressing renewed interest and growing willingness to deploy industrial policies (Aiginger and Rodrik, 2020). Accounting for today's poor economic conditions and outlook in the UK, the case for a sustained industrial policy is compelling. The economy has experienced low growth and poor productivity performance since the Great Recession of 2008. There are growing imbalances across dimensions such as region, demography, income, and opportunity. There is an evident lack of preparedness to respond to economic shocks such as pandemics and climate change-related extreme weather. These point to underlying structural weaknesses in the way the economy is presently managed.

Nevertheless the locus of industrial policy debate within British policymaking circles remains largely preoccupied with arguments that either lack a strong evidence base or are politically-motivated (Bailey and Driffield, 2007). The motivation behind the overnight replacement of 2017 Industrial Strategy with the new Plan for Growth, for instance, was not predicated on a firm objective evaluation (BEIS Committee, 2021).

This policy brief argues that the UK must improve the efficacy of its policy generation process and the institutional arrangements to deliver government interventions. Based on our analysis of the key industrial policy documents produced by the British government since the 1960s, and in light of recent academic literature on industrial policy, we map the top-down institutional arrangements and relationships that make up the current industrial policy environment. From this conceptual mapping of the process of generating and implementing policies, we describe the key deficiencies. These are: a lack of information feedback from economic evaluations to policy-setting, such that immediate political considerations outweigh economic criteria in setting direction of policies; and as a result of the inability to learn, policy inconsistency and coordination failures. We compare the UK's situation with policy frameworks in other advanced economies and consider ways the UK could draw lessons from these, rectifying its institutional failings. The key needs are first to embed a mechanism for learning from the previous implementation of policies and their outcomes, which would lead to a more consistent and long-termist environment for private sector investment decisions; and second to enable far better coordination of policies in a complex domain of structural economic change. We propose two institutional reforms, building on existing models in the UK and elsewhere, that could achieve these aims.

2. Industrial Policy Redux

Industrial policy has a long been contested within economics, with views polarised around the respective roles of market and state.¹ For our purposes, the definition provided by Rodrik (2009) provides a helpful framing:

“[Industrial policies] are policies that stimulate specific economic activities and promote structural change... Policies targeted at non-traditional agriculture or services qualify as much as incentives on manufactures.”

In the context of developed economies, industrial policies are often used with the intention to induce structural or industrial upgrading—that is, to enable and assist the creation of new value-generating activities and product spaces in the economy, as well as better and more efficient production techniques (by utilising relevant scientific and technological advancements). Viewed this way, industrial policy is ultimately a policy aimed at shaping the structure of production in the economy (Andreoni et al, 2019).

The track record of industrial policy differs greatly between one economy and another. The most notable success stories documented are those of the East Asian ‘miracle’ economies; Japan being the textbook example, but also South Korea, Taiwan, and Singapore. Their whole-of-government industrial policy frameworks were explicit attempts to create a domestic production structure that was globally competitive. This structure was attained by aggressive export-promotion measures and accompanying policies ensuring that local firms reached (and eventually would lead) the technological frontier. Many of today’s well-known Asian-based multinational giants, the likes of Toyota, Mitsubishi, Samsung, Hyundai, and Taiwan Semiconductor Manufacturing Company (TSMC), can trace their growth to industrial policy measures put in place in their respective home economies.²

Another often overlooked example is the American experience, although rarely discussed in industrial policy terms. There is renewed recognition of the role industrial policies—since first championed by Alexander Hamilton, the first US Treasury Secretary³—have played in driving long-term development and structurally transforming the American economy. Measures have included subsidies for strategic industries, tariff rebates on imported inputs used for export production, and imposition of technical standards to reduce uncertainties for business investments (Wade, 2014; Cohen and DeLong, 2016; Chang and Andreoni, 2020). The importance of US government driving development continues to this day, supporting crucial industries with extensive linkages to other segments of the economy, such as military and energy, through numerous channels ranging from basic research funding to dedicated procurement programmes.

¹ See Chang (2011) and Stiglitz (2015) for review of the debate in the late 20th century. Ideologically charged debates saw industrial policy as fundamentally incompatible with the dominant market-fundamentalist paradigm of the day.

² For instance, Shih and Wang (2010) documented Taiwan’s industrial policy journey to create a sophisticated, technologically-advanced, and capital-intensive industry despite not having an existing technological and skill base to begin with.

³ Chang (2011) noted that Hamilton’s strong advocacy for an active industrial policy to develop the US economy was partly influenced by the British industrial policy experience under first British Prime Minister Robert Walpole.

In contrast, Britain's historical experience with industrial policy is widely seen as a failure in comparison to these success stories. Accounts identify industrial policy mishaps in the 1960s and 1970s (for example, see Crafts and Hughes, 2013 and Crafts, 2018). Nationalisation and subsidies were the primary tools of choice from the postwar years up to then, and were used to resist deindustrialisation by supporting declining industries such as steel producer British Steel Corporation, auto maker British Leyland, and machine tool manufacturer Alfred Herbert. Attempts to create new economic engines, such as commercial nuclear power, did not lead to sustained success.⁴ These episodes left a generation of British policymakers a lasting distaste for 'picking winners', given how much they had ended up 'backing losers' instead. Experiences such as these were reinforced from 1979 on by an explicit ideological push to retrench the role of the state. Since Mrs Thatcher's election, paving the way for the large scale privatisation, spending cutbacks, and deregulation programmes in the 1980s, the received wisdom in the Treasury and elsewhere has been that the best industrial policy is no industrial policy.

Today, the balance of industrial policy opinion in policy debates is shifting back in favour of more active state direction of the economy.⁵ This reflects the state of the world post-Great Recession, combined with seismic transformations including digitalisation, demographic change, the climate crisis, and the pandemic. There has been a 'lost decade' of stagnant productivity and wage growth, combined with technological disruptions, and entrenched inequality. These trends have eroded economic security for large sections of the population and for future generations. Additionally, renewed interest in industrial policy comes from two further developments. The first is China's impressive economic development trajectory into a global economic superpower, built on the back of a diverse array of industrial policies (Rodrik, 2019b). The second is disillusionment with pure market fundamentalist-type policies—from those applied in Latin America in the 1980s to austerity measures in the UK after the financial crisis—which resulted in a weaker economic footing for many economies (Collier and Kay, 2020). There is therefore growing policy interest in ideas such as 'mission-oriented' policies (Mazzucato, 2018) or 'defensive' industrial policy (Haldane, 2021).⁶

The sheer magnitude of the stress and scarring caused by the current public health crisis has also induced a reappraisal of how individuals and societies perform even the most basic of functions: how we eat, how we work, how we educate young people, and so on. Crises such as pandemics or extreme weather events may become recurring shocks. More of what were once considered tail risks are morphing into non-negligible risks posing serious threats to society. They come in many forms; climate change, irreparable damage to biodiversity and natural capital, risks to food security, public health crises, and geopolitical tensions. The realisation has prompted interest in economic 'resilience'. Responses such as reengineering

⁴ Britain's strategy to commercialise nuclear power in 1970s had several critical missteps (Coyle, 2020): The first was choosing a reactor type (Advanced Gas-cooled Reactor, or AGRs) that no other country used, which meant that Britain could not take advantage of exporting supplies or know-how to other markets. The second was inconsistent signals of public sector support to the market—the commissioning of two more AGRs in 1978, before backtracking and switching to light water reactors (widely used in the US and elsewhere) created immense technological uncertainty in the industry.

⁵ There is widespread acknowledgement on the renewed interest and willingness to deploy industrial policies, as highlighted in Stiglitz (2015), Noman and Stiglitz (2016), CFM (2017), Crafts (2018), UNCTAD (2018), Aiginger and Rodrik (2020), Chang and Andreoni (2020), to name a few.

⁶ Not to be mistaken with traditional 'defensive' policies, which aims to shield domestic players from foreign competition.

value chains and production systems is precisely the type of structural change that well-designed industrial policies could potentially catalyse.

As a result, a number of developed economies are embarking on ambitious industrial policies. The European Green Deal, the flagship green industrial policy initiative of the European Commission under Ursula von der Leyen, is a substantial effort aimed at making Europe the first climate-neutral continent by 2050 (European Commission, n.d.). This includes the recently updated EU Industrial Strategy, championed by France's and Germany's economic ministers, Bruno Le Maire and Peter Altmeier, to use available tools permitted under EU's State Aid rules—most notably, the Important Projects of Common European Interest (IPCEI)⁷—to support emerging green and digital transition industries, such as hydrogen energy, cloud computing, and microelectronics for electric vehicles (BMW, 2021; European Commission, 2021a). EU's efforts also extend beyond the confines of green growth: the EU is also aggressively investing in boosting European semiconductor value chains—a key issue given the ongoing global shortages in electronic components—with the European Commission launching the Alliance on Processors and Semiconductor Technologies in July 2021 focussing on addressing the widening gap between European electronics design ecosystem and advanced manufacturing capabilities with those in Asia (European Commission, 2021b). Similar efforts are taking shape across the Atlantic: the US Innovation and Competition Act (USICA) of 2021, a colossal US\$250 billion bill passed with bipartisan support in Congress, is another example. The USICA was designed to boost US capabilities along many dimensions, ranging from rebuilding key industries vital for the future economy such as semiconductor and electronics production, to strengthening core US comparative advantages such as scientific research, artificial intelligence development, and space exploration (Congress.gov, 2021). The UK therefore stands out in the absence of an explicit industrial policy aspect to its current economic policy discourse.

Modern industrial policy literature

At the same time, newer approaches to industrial policy are emerging in the academic literature, synthesising classic market failure arguments with new approaches to learning over time and the accumulation of ideas in the context of endogenous growth (Stiglitz and Greenwald, 2014) with, coordination, and system-failure arguments developed in studies of innovation and manufacturing systems (Andreoni et al, 2019). This recent literature is bringing insights and evidence expanding understanding of policy designs, their efficacy, and rationales for deployment.

In this recent literature, the term industrial policy itself is often extended with broader labels such as 'learning, industrial, and technology policy', or 'technology and innovation policy', encompassing a more extensive range of instruments than older industrial policies (Noman and Stiglitz, 2016; Cherif and Hasanov, 2019; Rodrik, 2019b). Based on these new ideas (for a review, see Andreoni, 2016; Aiginger and Rodrik, 2020; Chang and Andreoni, 2020), the rationales for industrial policy can be broadly summarised as follows:

⁷ IPCEI, which derives its state aid compatibility basis under Article 107(3)(b) of Treaty on the Functioning of the European Union (TFEU), provides an avenue for EU Member States to jointly design large cross-border projects to achieve EU strategic goals in areas where the market alone cannot deliver breakthrough innovations (European Commission, 2021a).

- **Information failures:** Informational problems and lack of effective price signals could lead to underinvestment—limited by capital market failures, lack of effective equity markets, or insufficient internal financing resources, among others. This problem is rife, particularly in frontier industries. In the nascent stages of industrial development, the price mechanism may not provide a clear enough signal on the likely long-term profitability of investment (for instance in new technology, skills, or production methods) that have yet to materialise. Government investment or procurement can reduce perceived investment risk. Additionally, private sector the will underinvest in basic knowledge discovery via research, a vital public good and a fundamental building block for knowledge-led economic growth.
- **Coordination problems:** Provision of essential skills and know-how, the establishing of technical standards enabling market growth, and complementary investments in interconnected activities (structurally connected via backward and forward industrial linkages) need co-ordinating. Governments can use their convening power to facilitate coordination.
- **Technological innovation dynamics:** Failures to invest in the development of new technologies can occur due to “infrastructural and institutional problems; technological lock-in, path dependency, and transition failures; quality of linkages and networks configuration failures; and issues related to learning dynamics at the firm, local network, and system levels” (Andreoni, 2016). Economic growth based on a set of existing comparative advantages may not be sufficient to enhance long-term growth as innovations emerge, so exploration of new economic activities with the potential for unlocking productivity growth is essential (Redding, 1999). These dynamics feature extensively in market-creating objectives of industrial strategies (Industrial Strategy Commission, 2017) or promotion of ‘learning societies’ (Stiglitz, 2015).

The new focus in this literature is on issues relating to the application of industrial policies, such as policy design and efficacy, state capability, institutional frameworks, and political economy issues, given these rationales for intervention. Dani Rodrik summarised these trends by remarking that modern academic thinking on industrial policy has largely evolved away from the question of ‘why’ and progressed to the question of ‘how’ (Rodrik, 2009 & 2019a). These include research into policy designs within a country’s industrial structure, institutional frameworks, and political settlements, as well as their efficacy in delivering desired outcomes within the context of their surrounding environment. This new line of research looking directly into the ‘nuts and bolts’ of industrial policymaking would greatly illuminate our understanding of what truly works in promoting economic development and structural transformation.

In the UK context, these aspects of British industrial policymaking are relatively under-researched areas.⁸ Here we focus on the information feedback mechanism within policymaking, looking into what types of information are gathered and used during the policy generation and implementation process. These information sets range from relevant market or technological ‘signals’ to extraneous ‘noise’ such as biases and heuristics, political interference, and lobbying from vested special interests (Jordan, 2009; Steenbergen and Colombo, 2018; Rodrik, 2019b; Fernández-Arias et al, 2020). The ability of policymakers to discern signals from noise and act on them is an important aspect of well-designed policies.

⁸ Although a rich source of insights into the UK’s industrial policy designs, mechanisms, and efficacy can be found in the policy papers published by the Industrial Strategy Council.

3. The Industrial Policymaking Context in the UK

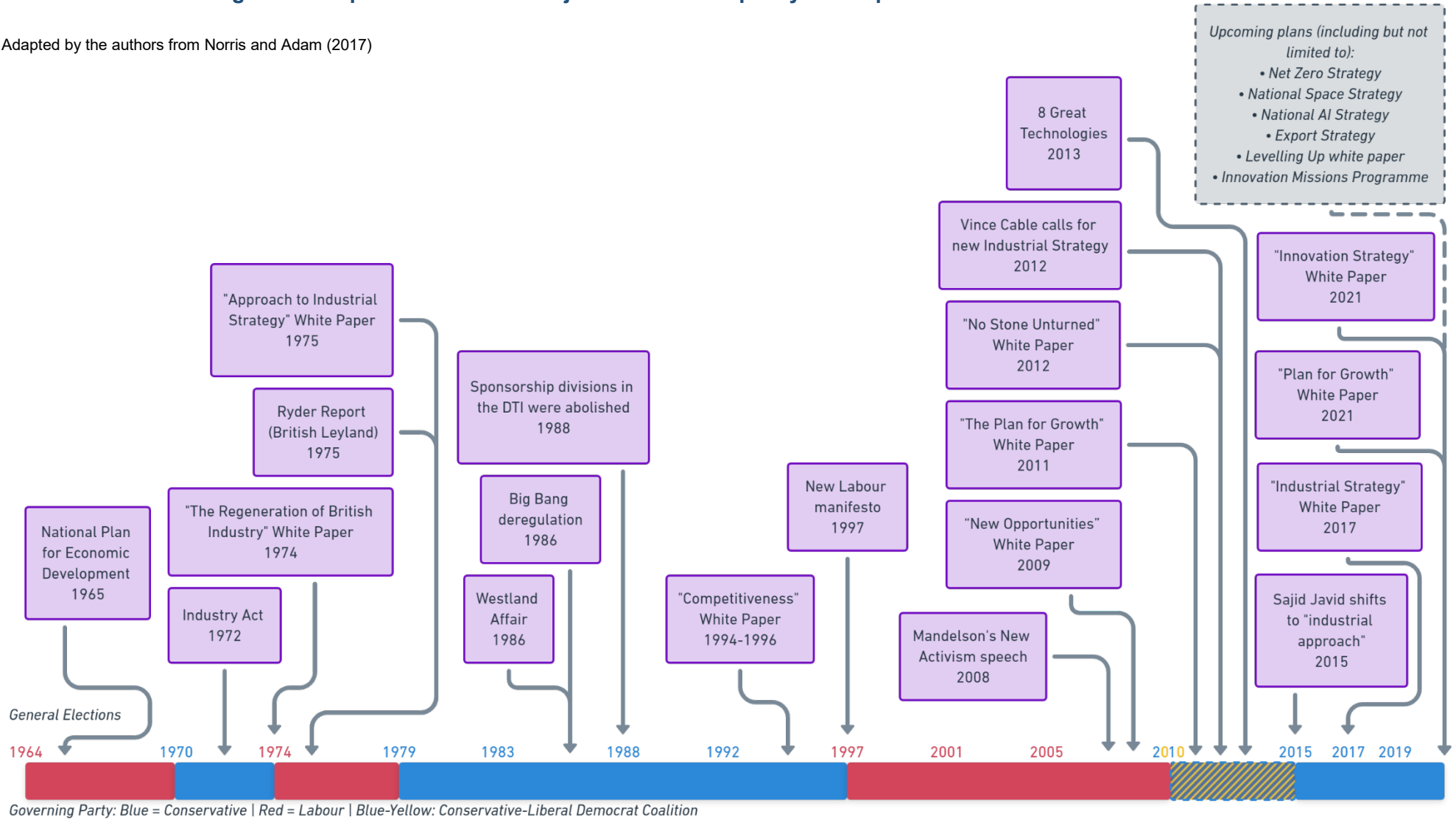
Broadly speaking, policymaking practice is generally described as the net result of two competing styles of policy-crafting processes. The first is an 'impositional' (top-down) style, where policy proposals originate at the political level, i.e. ministers and their personal advisory staff, while the second reflects a 'consensual' (bottom-up) style of policymaking, emphasising collaborative and deliberative policy process via networks of affected interests and relevant civil servants (Richardson, 2018). Richardson notes that in most aspects of government, the UK has steadily gravitated towards the impositional end of the policymaking style spectrum. This style of policymaking, at its best, limits the scope for robust policy analysis and learning, while at its worst is striking for its dearth of incorporation of insights from consultation into the policymaking process (ibid.). This style gives rise to what he calls 'pop-up' policymaking; Richardson (2018) cites David Halpern, the founder of the UK's Behavioural Insights Team who compared policymaking in the Prime Minister's Office to a hospital Accident & Emergency Department where "there is often neither the time nor the patience, for the answer to be 'more research needed'" (Halpern, 2015).

Given the dominant style of policymaking in the UK, it is not surprising to see that the British approach to industrial policy has generally been ad hoc and haphazard, characterised by regular cycles of new policy announcements that are often prematurely changed or rolled back (Bailey and Driffield, 2007; Norris and Adam, 2017). The British approach to industrial policy in general has been linked to political cycles (see timeline in Figure 1). Episodes of policy change generally follow ideological lines reflecting the prevailing paradigm of the day: from the subsidies and nationalisations of the post-war years up through the 1950s, the power-sharing arrangements of government, business, and workers in the 1960s and 1970s, to the privatisations and spending cutbacks of the 1980s and 1990s (Norris and Adam, 2017). Policy change has also occurred when the transitions happened within one party, such as the rollback and replacement of the 2017 Industrial Strategy of Theresa May's administration by Boris Johnson's administration in 2021. These episodes are indicative of the politically-driven nature of British industrial policy, indicating an ever-present risk that policies could be scrapped whenever administrations change. Projects that are not firmly institutionalised or are seen as pet projects of former administrations might not survive the transition. Those that do survive have new announcements overlaid on top.

Understanding what makes industrial policies effective or hollow, fleeting or lasting, is vital if the UK is to make meaningful improvements in its policy generation and implementation process. As a starting point in this exercise, we map out here the current institutional arrangements of the industrial policymaking landscape in order to identify which parts of the government machinery develops and decide the policies, which parts execute them, and the types of transitional turbulence that occur.

Figure 1: Simplified timeline of major UK industrial policy developments.

Adapted by the authors from Norris and Adam (2017)



The current state of play in UK industrial policy

In March 2021, the Secretary of State for Business, Energy and Industrial Strategy (BEIS), Rt Hon Kwasi Kwarteng MP, announced to the House of Commons that the 2017 Industrial Strategy would be scrapped and replaced with the 'Plan for Growth'. He asserted that the conditions on the ground had radically changed since 2017 and that the former plan lacked focus; the 2017 Industrial Strategy was dubbed “a pudding without a theme”.⁹ The Plan for Growth has some similarities in substance to the Industrial Strategy it replaced, but with a greater macroeconomic focus along three growth pillars: infrastructure, skills, and innovation. The switch defied widely held expectations that the Government would continue with the Industrial Strategy.¹⁰ Crucially, the Government also disbanded the Industrial Strategy Council, the only body in the UK explicitly dedicated to assessing the effectiveness of UK's industrial policies. This surprise change did not involve any consultation and the Plan for Growth incorporates little feedback from the wider industrial policy community. For instance, the annual report from the Industrial Strategy Council a year earlier called for greater emphasis on Industrial Strategy's policy longevity, scale, and coordination (Industrial Strategy Council, 2020); it is difficult to see improvements along these dimensions in the Plan for Growth.

Following on the heels of the Plan for Growth came an accompanying Innovation Strategy in July 2021. It filled some gaps from the Plan for Growth by setting out the Government's vision to boost productivity, jobs, and growth by introducing a wide variety of measures, ranging from new visa schemes to attract high-skilled people to embedding innovation chapters in future trade agreements. In contrast to the Plan for Growth, over 400 stakeholders were consulted during the Innovation Strategy's policy formation process; its scope is significantly broader than the Plan for Growth.¹¹ Nevertheless, many aspects of the Innovation Strategy remain nebulous in its current (September 2021) white paper form. There is little substantive information beyond announcements of additional policies in the pipeline such as a Net Zero Strategy, an Export Strategy, and a Levelling Up white paper. The exact manner in which these sprawling policies are to be delivered and the terms of reference for the new bodies that will spearhead these policy formation processes or policy delivery remains to be seen. Both the Plan for Growth and the Innovation Strategy lack any mechanisms to independently track, evaluate, and—if necessary—recommend changes to existing strategies and policies over time.

Supplementing these new plans are proposals to create several new government bodies, two of which stand out as the flagship institutions relevant to these policies. The first is a new Advanced Research & Invention Agency (ARIA). Modelled after the US's Defense Advanced Research Projects Agency (DARPA), £800 million of public funds is to be funnelled into ARIA to spearhead transformative science and technological R&D programmes (BEIS, 2021a). The other is a new UK Infrastructure Bank, to finance green and regional infrastructure projects, with a projected financial capacity of £22 billion (HM Treasury, 2021b).

⁹ While the House of Commons BEIS Committee acknowledged new developments since 2017 (e.g. Brexit and the COVID-19 pandemic), evidence gathered by the Committee suggested an updated Industrial Strategy to be a more appropriate course of action (House of Commons BEIS Committee, 2021).

¹⁰ For example, see Wilkes (2020) on the general expectations that the Industrial Strategy would be kept and continued.

¹¹ The UK Innovation Strategy contains four pillars of focus, comprising of 44 high-level actions listed under the strategy's plan for action (BEIS, 2021b, pp. 103–107).

In some ways, the new Plan for Growth-Innovation Strategy duo does not stray far from the 2017 Industrial Strategy. Some of the differences have more to do with semantics and presentation, rather than substance; a number of the specific policies announced fundamentally represent a continuation of existing ones, revamped with refreshed targets and updated focus areas (for instance, the previous AI Sector Deal will loosely morph into the National AI Strategy, currently still under development). In other ways, the new Plan has materially reduced the scale and scope of British industrial policy, leaving some aspects of the previous Industrial Strategy in limbo (such as local industrial policies) while others were scrapped altogether (particularly the independent oversight). Elsewhere, policies remain unclear and many key parts of the strategy are under development.

Given that senior ministers, their teams, and ministerial departments are afforded significant degree of freedom in dictating the overall shape and form of industrial policy,¹² it is unclear how they weigh the relative importance of objective evidence and analysis as opposed to political calculus and lobbying from special interests. The omission of ‘mission-led’ policies from the Plan for Growth, for instance, indicated the low weight placed on this approach by senior ministers, although arguably the creation of the Oxford-AstraZeneca COVID-19 vaccine can be cited as a successful ‘mission’ (Balawejder et al, 2021). The strong objections to the abolition of the Industrial Strategy raised by various parties—businesses, industry associations, and Industrial Strategy Council, among others—suggested there are contrasting views about the merits of the approach.¹³ UK industrial policymaking structure is therefore once again in a state of flux.

While policies remain uncertain, there are several key organisations within the Government structure that have either a continuing influential role in shaping future policies, or specialised roles in delivering those policies. Figure 2 presents a simplified landscape of the institutions for industrial policy analysis and implementation. These include:

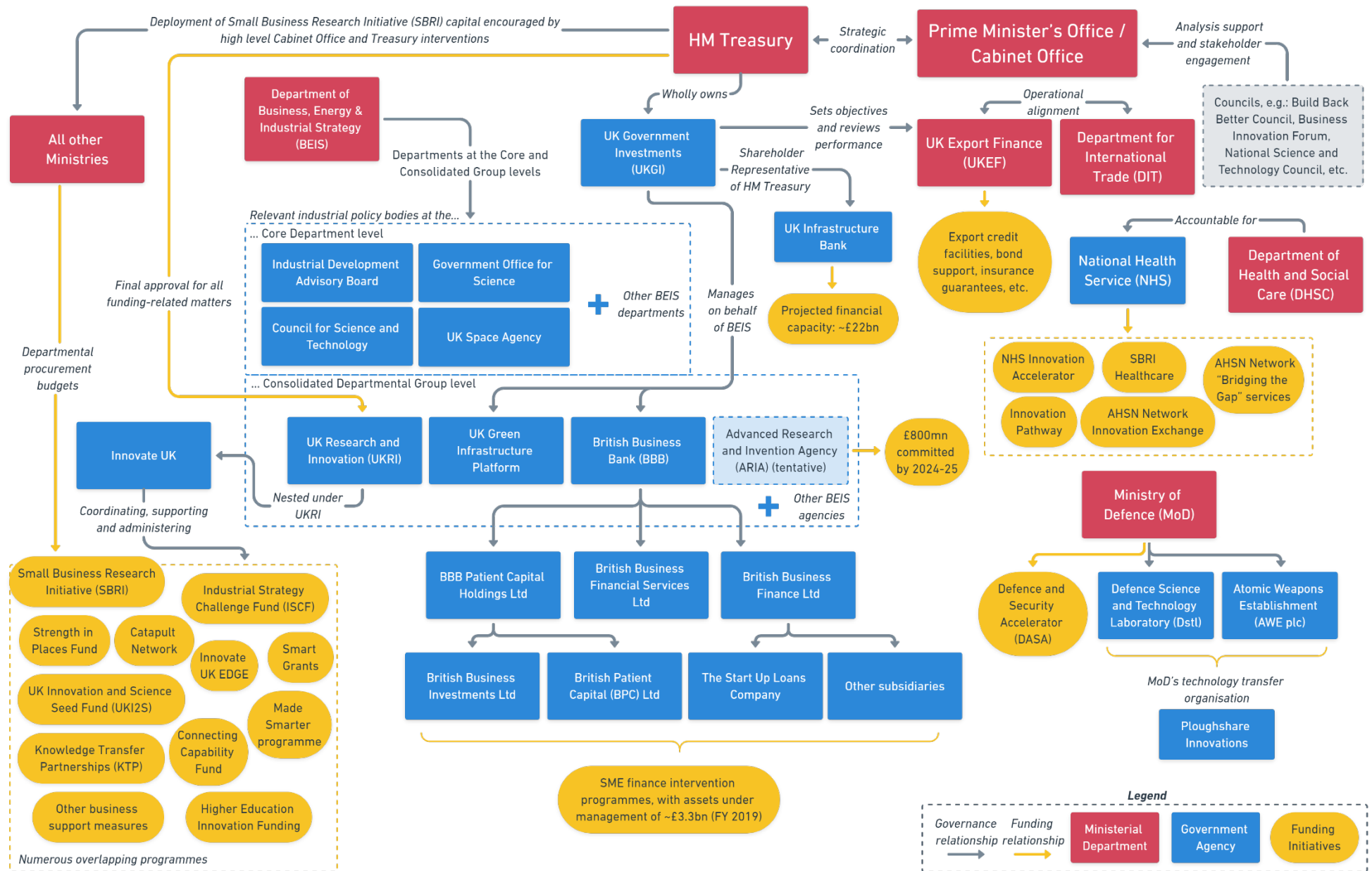
- **HM Treasury:** In addition to being the key ministerial department designing the overarching economic strategy, the Treasury also houses the UK Government Investments (UKGI), the primary holding body for many key state-owned enterprises. HM Treasury, via UKGI, also manages other important institutions that it does not have direct shareholdings in. Economic development institutions such as the British Business Bank (BBB), which is the parent company for agencies like the British Patient Capital (BPC) and the Start-Up Loans Company, is managed by UKGI despite being nominally owned by BEIS (NAO, 2020). These bodies, coupled with the fact that the Treasury is the final approval body for many industrial policy-related expenditures, gives it unparalleled influence over all aspects of industrial policy.
- **BEIS:** BEIS continues to play pivotal role, albeit a reduced one given the current policy arrangements, housing the teams and government agencies that execute industrial policies. Crucially, BEIS houses UK Research and Innovation (UKRI), the primary administrator for all grant-related funding of research (NAO, 2021).

¹² It is well-established that the UK’s Westminster model of majoritarian democracy confers a significant degree of latitude for the ruling party to make nearly unilateral executive decisions (Lijphart, 2012).

¹³ For example, see Haldane (2021), Mazzucato et al (2021), May (2021), Pickard and Thomas (2021), and House of Commons BEIS Committee (2021) for criticisms of the Government’s decision to discontinue the 2017 Industrial Strategy. An open letter from Sunak and Kwarteng (2021), published at the end of March 2021, clarified the Government’s commitment to honour existing Sector Deals and pledged a review of the mission-oriented elements of the previous Industrial Strategy.

- **Other ministries:** Other ministries such as Department for International Trade, Ministry of Housing, Communities and Local Government, Department for Health and Social Care, UK Export Finance (UKEF), and Ministry of Defence help support specific aspects of industrial policy such as export promotion, business procurement programmes (such as the Small Business Research Initiative or SBRI), and regional or local industrial strategies.
- **Government agencies:** Organisations such as UKGI, BBB, UKRI, the National Health Service (NHS), ARIA, and the UK Infrastructure Bank play specific roles in implementing the policies set by the government. These agencies often house other sub-agencies, such as Innovate UK as part of UKRI, or BPC as part of the BBB.
- **Expert councils:** Expert councils function as consultation and stakeholder engagement bodies, advising the Government in various areas of policymaking according to their remit and subject matter expertise. Prior to the current Government, these included groups such as the Build Back Better Business Council and Innovation Expert Group. Additional new councils are to be established, such as a National Science and Technology Council (supported by the new Office for Science and Technology Strategy), and a Business Innovation Forum.

Figure 2: Simplified map of key British industrial policy institutions, initiatives, and their relationships, as of September 2021.



Source: Authors' analysis

4. Weaknesses of the Current Policy Framework

The policymaking and implementation framework is institutionally complex and frequently changes with the political cycle. Furthermore, rigorous evaluation of evidence and a subsequent mechanism for learning from outcomes are not institutionally embedded into the process. The practice of engaging stakeholders and incorporating consultations from expert groups and relevant interests is done haphazardly, with little understanding as to how the information derived from these discussions are actually incorporated into the policymaking process. There is no channel for independent and objective evaluation of present policies with the intention of informing future decisions. This vacuum created by an absence of consensual evidence-based statecraft leaves space for 'ideational' policy proposals to take root, ones driven by political actors and stemming from political motivations (Richardson, 2018). Ministers and their respective teams control the process of policy generation, while the nature of UK's Westminster model of majoritarian democracy means that these will generally become the prevailing policy of the day.

While the political process in a developed Western democracy such as the UK does, to a certain extent, act as the medium through which dispersed sources of information around the country are discovered and incorporated into policy, relying on this process alone is likely to be suboptimal. In complex domains such as industrial policies—where the time horizons of structural transformations are long and uncertain, while gains are diffuse and difficult to quantify (and costs highly visible)—heuristics and biases in decision-making by political elites militate against objective judgements (Wade, 2014; Steenbergen and Colombo, 2018; Vis, 2018). This missing element of learning locks the UK into short-lived, politically-driven industrial policies. Its absence leads to two particular deformations of policy in the UK: lack of consistency and lack of coordination.

Lack of Consistency

The prevailing impositional style of policymaking leads to numerous policy changes with no improvement in the Government's capacity to solve problems effectively (Richardson, 2018). The short-termist nature of policymaking leads to several problems. The first casualty tends to be the interruption of the structural transformation process that industrial innovation policies are designed to catalyse. There is frequent upheaval including in contexts where the private sector has to make long-term investment decisions:

“The Institute for Government documented 29 major skills policy reforms since the 1980s. That is about one a year. We have had half a dozen energy market reorganisations in the same span, and this is an industry where investment horizons can be up to 50 years.” (Coyle, Evidence to BEIS Committee, 2020)

Structural reforms can only occur over longer than political time horizons and therefore suffer setbacks from lack of policy continuity. Take the need to build new green infrastructure to decarbonise the UK economy as an example. Prior to the present proposals to create the UK Infrastructure Bank, the UK already had a similar vehicle to mobilise public and private capital in the form of the UK Green Investment Bank (GIB). However, in 2016, the GIB was no longer deemed central to government strategy and subsequently privatised, even though the

Government had not established whether the GIB had fully delivered its policy objectives in the first place (NAO, 2017). Compounding to this strategic blunder is the fact that five years later, in 2021, the Climate Change Committee (CCC) assigns low scores in numerous areas of the UK’s climate change risk management efforts, many of which require significant infrastructural investments to make meaningful progress (CCC, 2021). The creation more recently of another national infrastructure bank to address important gaps in green infrastructure highlights the dearth of forward-looking planning capacity and strategic continuity in the Government’s own decisions.

By contrast, sustained policy interventions to support the life sciences and healthcare sectors—made possible by having the appropriate industrial policy structures including research funding and tax credits to nurture innovation and remove barriers to scientific and technological progress over long periods of time—meant that the cumulative foundational and practical knowledge acquired from continued government support could quickly be used to tackle immediate present challenges, such as the COVID-19 pandemic (Sharpe et al, 2020; NAO, 2021). The Industrial Strategy Council traces the successive policy linkages that directly laid the foundations for the swift development of the Oxford-AstraZeneca vaccine (Table 1). However, the developers of the vaccine have noted that scaling up their research, testing, and the manufacturing process in early 2020 required them to patch together funding from outside UK official sources, given the relatively small scale of prior investment in their work (Gilbert & Green, 2021). Their success reflects in large part the creation of a Vaccines Task Force outside the usual machinery of government.

Table 1: Successive support measures provided to the life sciences industry over time.

Life Sciences Industry Support Measures	Contributions towards the COVID-19 vaccine development
Cell and Gene Therapy Catapult	Launched in 2012, the Catapult fostered expertise in vaccine delivery methods by bridging early-stage research into commercially viable and investable therapies, including work on viral vector and mRNA vaccine technologies.
UK Vaccine Network (UKVN)	Established in 2015 with £120 million in funding from DHSC and Medical Research Council, brought together government, industry, academia, and relevant grant providing agencies to make targeted investments in specific vaccines and vaccine technology for a selected list of priority pathogens. This included the Middle East Respiratory Syndrome (MERS), a member of the coronavirus family.
Vaccine Manufacturing and Innovation Centre UK (VMIC)	A £66 million investment in VMIC—a commitment under the 2017 Industrial Strategy—developed capabilities to speed up the vaccine manufacturing process. VMIC was rapidly scaled up by the Vaccines Taskforce during the COVID-19 pandemic.
Industrial Strategy Life Sciences Sector Deals	Out of the £475 million pledged, £16 million was committed to develop manufacturing capacity for the viral vector method of vaccine delivery.

Source: Balawejder et al, 2021

The lack of consistency in policies over time also makes it difficult to evaluate the impacts of past policies and cultivate long-term institutional capability in industrial innovation policy. In short, there is no capacity in the system to learn. The disbanding of the Industrial Strategy Council removed one dedicated body that could have developed and embedded the capacity to learn. This stands in sharp contrast with international and indeed domestic policy best practices, whereby rigorous oversight and evaluation by independent and arms-length bodies are vital in determining the efficacy of policy delivery and gaining insights into better policymaking practice for the future (refer to Table 2 for international examples). With regard to public servants, deploying complex policies requires resources and talent as well as institutional memory, a good network, and the know-how to be able to discover what policies are needed and how best to deliver them. The frequent policy discontinuity severs this 'nervous system' and leads to a haemorrhage of talent out of the public sector. Indeed, the Industrial Strategy Council (2021) noted that the knowledge capacity of the 2017 Industrial Strategy policies is dispersed across the public sector, consisting of a handful of individuals within each of the 20 ministries and arm's-length bodies tasked with its implementation.

A consequence of the failure to embed rigorous and comprehensive evaluation is that policy discussions become strongly skewed towards tangible short-term costs with less emphasis on potential gains, which are typically diffuse and hard to quantify.¹⁴ This makes for a lopsided case for dismantling policy support measures, shutting down agencies, or privatising policy delivery institutions. This has occurred many times; examples include:

- The GIB, as discussed earlier, which was sold to a private sector investment group¹⁵. Today, green infrastructure initiatives have been revived (for now) under the UK Infrastructure Bank.
- QinetiQ, comprising a greater part of what was formerly the Defence Evaluation and Research Agency (DERA), was privatised in the early 2000s as a means of addressing the declining UK defence research budget.¹⁶ While the existing operational remnant of DERA—the Defence Science and Technology Laboratory (Dstl) today—continues to handle certain areas of defence research, the need for greater foundational and radical technological breakthroughs eventually created the impetus for the policy reversal in the form of the ARIA's creation. In contrast, the US DARPA has largely retained its functional and institutional form since its formation in 1968.
- 3i Group, formerly Industrial and Commercial Finance Corporation (ICFC) and the Finance Corporation for Industry, was divested from the Bank of England's holdings in 1987 and publicly listed in 1994. This transition transformed 3i from being a key UK funder of SMEs and venture capital into a private equity firm, leading to a long-term decline in SME financing (Collier and Mayer, 2020). Consequently, the resulting underserved area in SME and start-up finance led to the creation of a different policy vehicle to address this market failure, in the form of the BBB in 2014, and the BPC in 2018.¹⁷ In contrast, the

¹⁴ Wade (2014) makes a similar case for the debate in the US.

¹⁵ GIB was sold to Australian-based investment bank Macquarie Group, with a small portion remaining in public holdings as UK Green Infrastructure Platform—housed under BEIS but managed by UKGI.

¹⁶ QinetiQ became a public private partnership in 2002 with the purchase of a stake by US-based private equity company Carlyle Group. In February 2006, QinetiQ was floated on the London Stock Exchange and the Carlyle Group sold its stake in the company.

¹⁷ The BPC, which has already played a significant role in deepening the venture capital pool in the UK, is already set to be privatised in the foreseeable future. This stands in contrast with many other similar patient capital investment vehicles in other nations, such as Israel's Yozma or New Zealand Growth Capital Partners

German state-owned investment and development bank, KfW, has been in continuous operation since 1948 (Haldane, 2018).¹⁸ Similarly, the Japan Development Bank (JDB, or Development Bank of Japan today) largely retains its central public policy role of industrial development since 1951 (Shimada, 2016).

Lack of Coordination

Industrial policies often have lofty ambitions and objectives. While there is nothing inherently wrong with such goals, an important pre-requisite for bringing about such a large-scale change is that it generally requires a whole-of-government effort. For any industrial policy to change an economy structurally, its deployment cannot simply be an isolated effort by a single department but must be a co-ordinated effort across various ministries and agencies and levels of government using insights and information from multiple different vantage points, and with policy levers covering different aspects of industrial support measures. Unfortunately, while the ambitions of British industrial policies may match its German, Japanese, French, and Chinese counterparts, the UK does not compare well when it comes to the coordination of policies (see Balawejder and Monahan (2020) for cross-country comparisons of recent industrial policies).

At the policymaking level, analysis and decisions in the UK are disjointed across ministries and agencies. Since policy is largely generated largely from a ‘top-down’ approach—directives from senior ministers—the institutional structure for collaboration and coordination is inherently absent, and depends on buy-ins across senior politicians. Lack of cross-government coordination is frequently cited as an impediment to effective policy rollout; inter-ministerial issues of jurisdiction and autonomy often leads to departmental siloes within the Government (BEIS Committee, 2021). The ministerial demarcation problem is significant, as many aspects of effective industrial policy coordination (such as export support, financing, R&D initiatives, public procurement, capability development, etc.) and the emergence of new industries of the future (artificial intelligence, biotechnology, climate change adaptation, etc.) require policy measures cutting across ministerial jurisdictions. This cross-ministerial function of industrial policy development remains wholly underdeveloped in the UK, only occasionally being assumed at various times by key powerbrokers in the Treasury, the Cabinet Office, or the Prime Minister’s Office.

In addition to the departmental silo problem, the position taken by the Treasury, widely regarded as the most powerful institution in British policymaking sphere, usually dictates the outcome of policy deliberations. The Treasury’s focus on other equally important policies such as fiscal management and public finances often means that issues of industrial policy often get a lower priority, and also fall foul of the Treasury’s institutional aversion to intervention by government. The House of Commons BEIS Committee received many assertions of a lack of cross-government buy-in for the 2017 Industrial Strategy, particularly from the Treasury (ibid.):

(NZGCP), which continues to be retained as a key policy delivery vehicles to assist in deepening venture capital pools as new technologies and industries continues to emerge in the future.

¹⁸ For the purposes of this paper, the BBB will be considered as the primary state-owned development bank for Britain. The CDC Group, a wholly owned entity by the Foreign, Commonwealth & Development Office founded in 1948, serves as the UK’s bilateral development finance institution (DFI) to fund overseas development initiatives, particularly in Africa and South Asia. British industrial development is not a remit of the CDC Group; the CDC Group’s investments are not required to be linked back to supporting British businesses and industries. Comparable institutions to the CDC Group would be Germany’s DEG, a subsidiary of KfW.

- Heriot-Watt University's assessment of the Industrial Strategy was that there was "limited evidence of impact" whenever "engagement from other Government Departments" was required.
- The Confederation of British Industry (CBI) noted that the Life Sciences Sector Deal could be improved as the "Life Sciences Council is well attended by the DHSC and BEIS but not the Treasury or Department for Education."
- The Productivity Insight Network argued that the Treasury had not taken the Industrial Strategy seriously, while other ministerial departments such as Department for Work and Pensions, Department for International Trade, Department for Education, and the Ministry for Housing, Communities, and Local Government were unsure how the strategy would exactly fit in within their remit.
- Former Secretary of State for BEIS, Rt Hon Greg Clark MP, remarked that it was difficult getting the Department for Education on board in a "full-hearted way with the agenda that the industrial strategy set out, rather than preserving its autonomy".

The fragmentation of policy delivery extends all the way to the agencies housed in various departments, including BEIS and HM Treasury. Many of them played little to no role in either the 2017 Industrial Strategy or the Plan for Growth, despite having designated policy vehicles to contribute. This includes institutions that engage frequently with local businesses such as UKEF, BBB, BPC, or the Start-Up Loans Company, none of which have any explicit Industrial Strategy or Plan for Growth-related programmes in their past or future business plans (BBB, 2020; BPC, 2020; UKEF, 2020). While the bulk of the current policies to mobilise R&D are mostly in the hands of UKRI (NAO, 2021), other business-facing agencies have recently started their own R&D support programmes. For instance, the BBB has just begun to roll out R&D-boosting initiatives such as the Future Fund: Breakthrough co-investment scheme (albeit a very modest amount). An online finance-innovation hub partnership with Innovate UK, announced under the new Innovation Strategy (BEIS, 2021b), represents a modest and welcome integration of policy but there is substantial room for improvement especially compared to policy integration in other advanced nations (Balawejder and Monahan, 2020).¹⁹ Moreover, the support measures from the BBB and other agencies are themselves formulated and enacted by top-down decree rather than generated bottom-up based on conditions and opportunities discovered by the programme managers in the field. This patchwork is far from an effective, co-ordinated strategy among public sector agencies with different specialist capabilities.

In comparison, notable industrial policy success stories feature a prominent role for 'bottom up' processes. The post-war Japanese story is often cited as a powerful example of a generally well-oiled whole-of-government effort to develop a wide array of industries across different dimensions (providing financing support, management consultation, SME development, technological upgrading, internationalisation, intellectual property development and protection, and more). Their approach features strong collaboration between ministerial departments, notably the Ministry of International Trade and Industry (today the Ministry of Economy, Trade and Industry) and the Ministry of Finance, as well as Japan's highly competent and independent economic development agencies, such as Japan Development

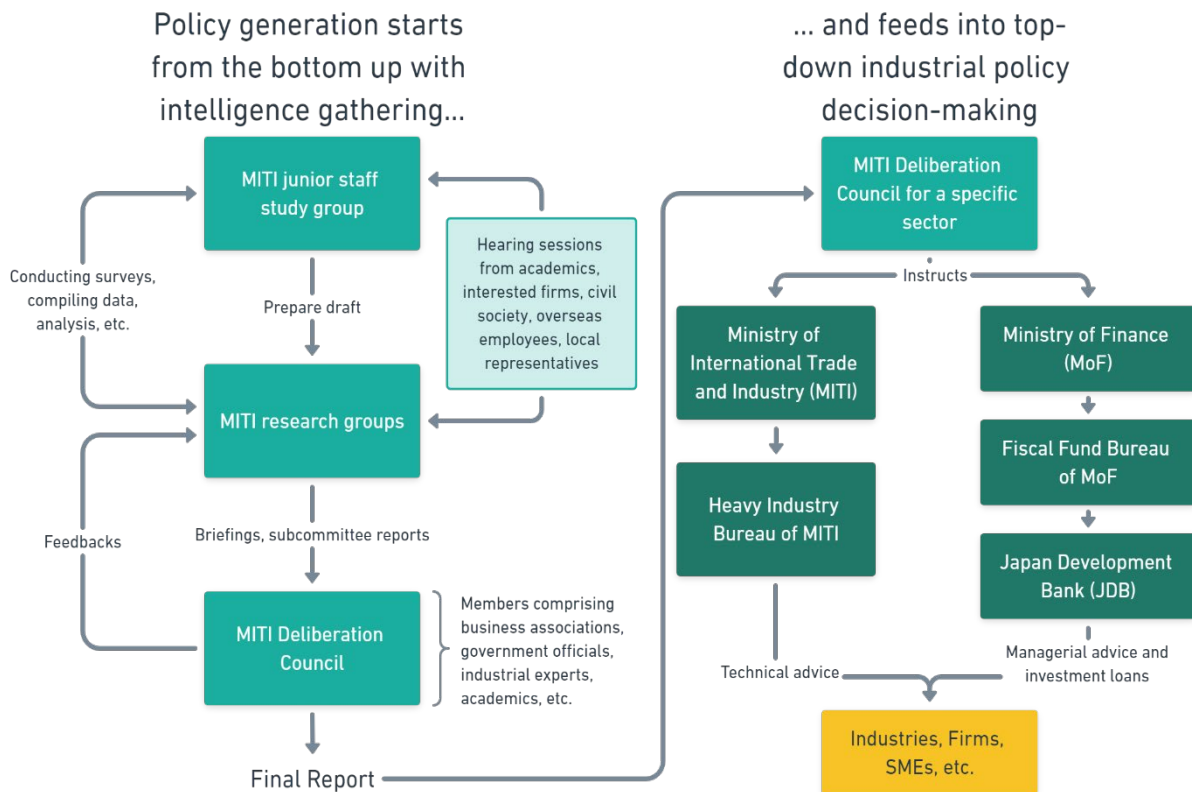
¹⁹ It remains to be seen what other agencies (e.g. UKEF, the NHS's innovation accelerators, Dstl, etc.) will contribute towards the overall delivery of industrial policy. Another way to view that lack of cross-government coordination is the lack of integration across funding initiatives in Figure 2.

Bank (JDB, or what is today the Development Bank of Japan), the Export-Import Bank of Japan (today, Japan Bank for International Cooperation), and SME Agency. Anchoring this collaborative process was an institutionalised bottom-up process for generating policies, exemplified by the following mechanisms:

- Proposals often originate from MITI's junior officials. Their roles in gathering and analysing data, as well as regular extensive stakeholder engagements provides the government with near real-time visibility of industry needs (Ohno, 2018). Information gathered serves as input to subsequent discussions at the subcommittee and the deliberation council levels, which further refine and finalise policy recommendations (see Figure 3).
- The efficacy of industrial policy is further amplified by coordination across government. MITI's policies to support industries along dimensions such as technological upgrading, internationalisation, or industrial cluster creation are combined with, among others:
 - Financial firepower enabled by the Fiscal Investment Loan Program (FILP),²⁰ administered by JDB (an independent developmental agency under the purview of the Ministry of Finance) (ibid.; Shimada, 2016).
 - State-wide network of *Shindanshi* (state-certified SME management consultants), which promoted productivity enhancing techniques for SMEs.
 - Co-ordinating and fostering regional integration with foreign governments to create new Japanese-centric global value chains via state-business relation forums such as ASEAN Economic Ministers-MITI Economic and Industrial Cooperation Committee (AMEICC) (Natsuda, 2008; Lemma and te Velde, 2017).

²⁰ FILP is a mechanism in which funds from postal savings and pension contributions from the private sector are mobilised to fund investments and loans of public nature (typically infrastructure construction and business support) through state institutions and credit mechanisms. Its financial resource was at times as large as half of the central government's general budget (Shimada, 2016).

Figure 3: Illustration of Japanese industrial policy generation process.



Adapted by the authors from Ohno (2018)

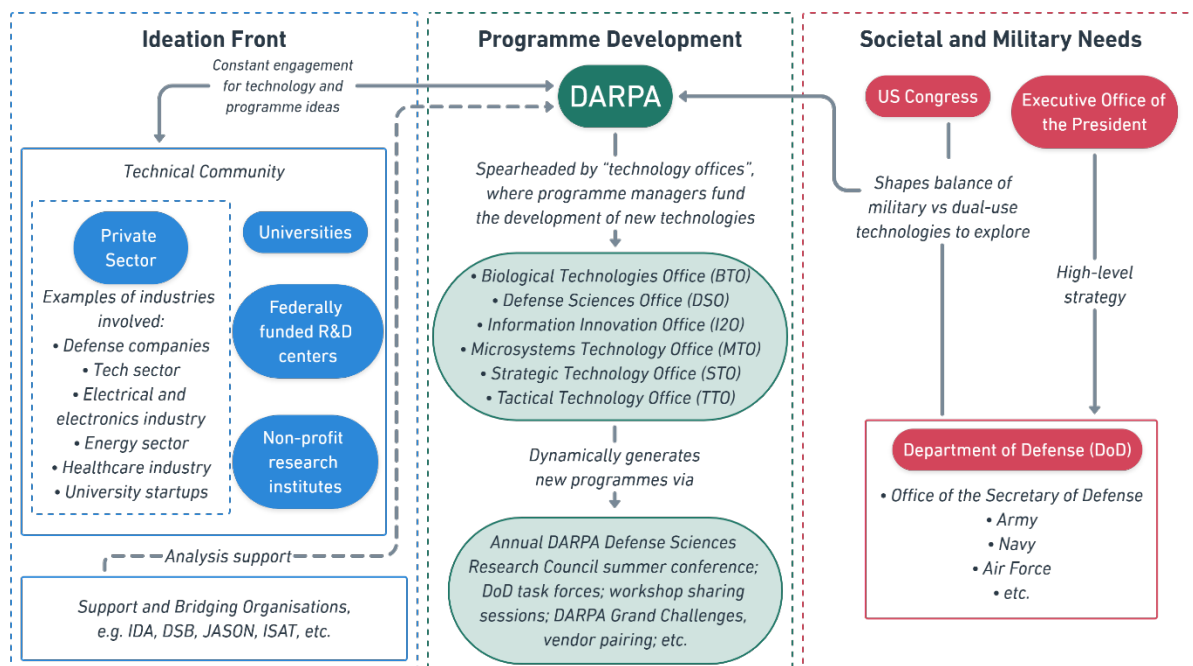
In the US, industrial policy success in creating one of the dynamic, innovative, and knowledge-intensive economies in the world is attributed to a similar model of ‘bottom-up’ decentralised approach, spearheaded by institutions such as the ARPA agencies,²¹ the National Science Foundation (NSF), the National Institutes of Health (NIH), and their extensive networks across industries, academic institutions, and other government agencies. These institutions collectively form the backbone of the ‘hidden’ US developmental state, largely focusing on investing in long-term capabilities based on market and technological signals and avoiding political gridlock despite being the US being deeply divided on partisan lines (Wade, 2014). On an operational level, the framing of US industrial policy is not one of ‘choosing technology winners’ or ‘leaving everything up to the market’, but one of connecting separate actors across the innovation ecosystem to develop technical solutions to national problems (Fuchs, 2019). This coordination function is extremely important at the frontier of technological development, where DARPA’s longer-term vision in supporting technology trajectories across vertically disintegrated innovation ecosystems provides a strong validating signal in an otherwise uncertain technological environment, fostering knowledge cross-fertilisation among industries and agents that might not have traditionally partnered with each other (ibid.).

Viewed through this lens, the key success factor of DARPA arguably lies less in funding fundamental research and more in its role as the connector in the innovation community (see Figure 4). Formal and informal coordination processes embedded in DARPA’s programme

²¹ Includes Defense ARPA (or DARPA), as well as other ARPAs, such as Intelligence ARPA (IARPA), ARPA-Energy (ARPA-E), and Homeland Security ARPA (HSARPA).

development operations—which places its programme managers in constant close proximity to the technical community and US military liaisons—allows for a dynamic, fast, and organisationally agile way to advance technology frontiers. This contrast with the UK’s directive-driven research agendas is striking, these being less responsive to emerging lines of research and more distant from the innovators spearheading them (leading to a poorer understanding of which areas to provide support and how to support them).

Figure 4: Overview of DARPA’s programme development processes



Adapted by the authors from Fuchs (2019) and Cheney and van Atta (2019)

Note: IDA is Institute for Defense Analyses; DSB is Defense Science Board; JASON is a group of high-level government science and technology advisors; ISAT is Information Sciences and Technology Study Groups.

5. Options for Reform

Inconsistent and poorly co-ordinated policies by no means exhaust the list of issues stemming from institutional flaws in UK industrial policymaking practice. Nonetheless, these problems highlight common themes: a top-down policymaking approach that is highly susceptible to political pressures; and an institutional structure that makes policymakers remote from policy delivery vehicles and recipients of support. In an often politically-charged environment with scant institutional learning, political calculus takes precedent over deliberative, evidence-based evaluation and analysis.

In the absence of effective ‘bottom-up’ policymaking channels, the UK’s general industrial policymaking practice implicitly assumes that the executive branch of government—shaped by forces in the political arena—has near perfect information and visibility of conditions on the ground. This mode of policymaking presumes that the political process alone can identify market failures, knows which to prioritise, and what types of policy interventions are required (Fernández-Arias et al, 2020). In reality, relevant information on where market or government failures, obstacles to structural changes, and barriers to investment exist may not be immediately obvious (Romer and Griliches, 1993; Rodrik, 2019a, 2019b; Fernández-Arias et

al, 2020). This necessary intelligence is often diffused widely within society and requires a consistent effort to discover it. While the politically-driven process does get input from technocratic working groups within government departments and agencies, its informational value is placed on a lower footing compared to political lobbying such that private interests are often prioritised over potential social benefits (Bailey and Driffield, 2007; Jordan, 2009)—or compared to political calculus and ideology (Norris and Adam, 2017).

The UK needs to develop better policy processes, requiring an institutional framework that would enable the following:

- An effective capability for information gathering and analysis that could independently identify short- and long-term challenges in a timely manner;
- An institutional means of bringing together these dispersed clusters of information; and, A learning mechanism to ensure that information gathered and evaluation of outcomes is the primary force shaping industrial policymaking and channelling its outcomes to the relevant public sector apparatus.

Independent scrutiny

At a minimum, the UK needs an independent oversight body to evaluate the efficacy of its industrial policies. Although this solution would not craft policies per se, the provision of independent scrutiny would deliver credible and actionable information to Parliament and guidance for future policies. Conferring statutory status (in contrast to the Industrial Strategy Council) would be crucial to provide sufficient institutional longevity.

Such mechanisms are not unique and indeed are well-established in some other policy domains, e.g. fiscal policy or climate policy (see Table 2). Experiences from these institutional setups suggest considerable improvements in the quality of subsequent policy decisions.²² While independent bodies cannot compel decisions by Parliament or the Executive, this does not mean that such an institution is not influential in the process of policymaking. In the fiscal policy domain for example, the indirect influence of independent fiscal institutions (IFIs) like the UK's Office for Budget Responsibility (OBR) or the US' Congressional Budget Office (CBO) on the policymaking process—via pre-emptive effects on budget preparations, informing public debate, and fuelling political will for action—highlights their capacity to shape the policy debate. The late Alice Rivlin, founding chair of the US CBO, stated that:

“IFIs can play an important role in ensuring realistic and well-informed debate based on honest numbers, focusing attention on the consequences of action (or inaction), and identifying more or less sustainable solutions to budget dilemmas.” (Rivlin, 2013)

Importantly, a body of this kind can provide a coordination function across ministries and other public bodies, even though reporting to a single ministry.

²² For example, see Averchenkova et al (2018) for an overview of how the CCC has changed and improved the climate policymaking practice in the UK.

Table 2: Examples of Statutory Bodies.

Examples of statutory bodies in the UK²³	
Institution	Description
Office for Budget Responsibility (OBR)	<ul style="list-style-type: none"> Established in 2010, the OBR gained its status as an independent non-departmental public body (NDPB) from the Budget Responsibilities and National Audit Act 2011. The OBR has five main roles: economic and fiscal forecasting; evaluating performance against target; sustainability and balance sheet analysis; evaluation of fiscal risks; and scrutinising tax and welfare policy costing.
Committee on Climate Change (CCC)	<ul style="list-style-type: none"> Established under the Climate Change Act 2008 as an independent NDPB. Its purpose is to advise the Government on emissions targets and to report to Parliament on progress made in greenhouse gas emissions reductions as well as preparation and adaptation to adverse climate change effects.
Examples of industrial policy-related statutory bodies in other advanced economies	
Institution	Description
Bureau for Economic Policy Analysis (Centraal Planbureau, CPB), the Netherlands	<ul style="list-style-type: none"> Established in 1945, the CPB obtained its legal basis from the ‘Law Concerning the Preparation of a Central Economic Plan’, dated 21 April 1947. The core functions of the CPB are: <ul style="list-style-type: none"> Preparing economic projections to be used as the official basis for the government’s budget). Pursuing policy-relevant analyses based on the CPB’s annual Work Plan, which maps out research themes chosen based on key economic policy issues.
Korea Development Institute (KDI), South Korea	<ul style="list-style-type: none"> Established in 1971, KDI was created based on the Korea Development Institute Act 1970 and its charter re-ratified under the Act on the Establishment, Operation and Fostering of Government-funded Research Institutions 1999. The United States Agency for International Development (USAID) provided crucial seed funding (KRW 1.31 billion) to KDI during its creation, ensuring “autonomy in its operations and commitment to high quality and objectivity in its research.” During the 1970s, KDI proactively focused on policy issues related to Korea’s Five-year Economic Development Plans. Today, KDI provides comprehensive research analyses and policy recommendations to the Korean government on various aspects of the Korean economy, e.g. macroeconomic outlook; public finance and social welfare; industry, trade and labour; law and economics; and North Korean economy.

²³ In the UK, independent statutory bodies typically take the form of a Non-Departmental Public Body (NDPB), “a body which has a role in the processes of national government, but is not a government department, or part of one, and which accordingly operates to a greater or lesser extent at arm’s length from ministers” (Cabinet Office, 2021).

<p>The Productivity Commission, Australia</p>	<ul style="list-style-type: none"> • The Commission is an independent advisory authority established in 1998 following the passage of the Productivity Commission Act No. 14. Its roots, however, go deeper: the establishment of the Industries Assistance Commission in 1974 and, later, the Industry Commission in 1989. • The Commission has four main work streams: <ul style="list-style-type: none"> ○ Public inquiries and research requested by government. ○ Self-initiated research and annual reporting on productivity, industry assistance, and regulation. ○ Performance monitoring and benchmarking and other services to government bodies. ○ Competitive Neutrality Complaints.
<p>New Zealand Productivity Commission</p>	<ul style="list-style-type: none"> • The Commission is an independent Crown Entity with legislative basis from the New Zealand Productivity Commission Act, 2010 and began operating in 2011. • The Act instructs the Commission to “provide advice to the Government on improving productivity in a way that is directed to supporting the overall well-being of New Zealanders, having regard to a wide range of communities of interest and population groups in New Zealand society.”

Source: Respective institutions' webpages

Sovereign development agencies

A type of industrial development initiative that the UK could consider is the delegation of some types of interventions to a special purpose vehicle, such as a sovereign wealth fund (SWF) or a venture fund.²⁴ The Government has taken stakes in an unpublished number of businesses through the recent pandemic. As noted above, the UK has in addition a changeable patchwork of sub-scale investment institutions. An alternative approach would be to adopt a specific ‘developmental’ form of SWF, also called sovereign developmental or venture funds, that are typically exemplified by Singapore’s Temasek Holdings, Australia’s Future Fund, or Malaysia’s Khazanah Nasional (Alsweillem et al, 2015; Dixon and Monk, 2017).²⁵ What distinguishes these institutions from a standard fund is that they contain dual public wealth-management and developmental mandates. Here, the state typically utilises arms-length investment institutions to mobilise industrial policy initiatives that works alongside competitive market forces to ensure financial discipline in its interventions (Bruce-Clark and Monk, 2017).

The developmental mandate forces these institutions to incorporate a long-term horizon into their strategic planning and investment decisions. The terminology often used by these institutions is ‘nation-building’: placing great emphasis on sustainable value creation via future economic development and an investment profile tolerant to investing in intergenerational projects and long-term assets (ibid.). In practice, these typically involve acquire-and-hold

²⁴ SWFs are state agencies whose *raison d’être* is to assist governments with the preservation and augmentation of a nation’s financial wealth for the purpose of enhancing the sponsor community’s welfare via maximising public wealth holdings (Cummine, 2016). This translates to a diverse and varied universe of institutional mandates, organisational setups, and operational practices of SWFs across the world.

²⁵ Other similar institutions in this space include Sixth Swedish National Pension Fund (AP6), Korea Investment Corporation, and United Arab Emirates’ Mubadala Investment Company.

investment strategies that focuses on building new value within their acquisitions; an explicit commitment to wealth creation over wealth appreciation. They could be considered as akin to private equity firms for the public but with a long-term public service remit (ibid.; Santiso, 2017). SWFs like Temasek, Future Fund, and Khazanah play strong catalytic roles in the economic development of their respective countries by leveraging their unique vantage point as the bridge between state actors under their management and the private markets they operate in.

Armed with the information they derive from this unique dual role, these SWFs seed new enterprises and industries, providing advice to boost the competitiveness and productivity of their portfolio companies, investing in infrastructure, and providing platforms to attract private sector players to invest in new ventures (Bruce-Clark and Monk, 2017; Völgyi, 2019). On top of this, both SWFs also spearhead initiatives such as regional and human capital development, initiatives that are often overlooked in traditional industrial policy settings but are vital for equitable growth. At the same time, competitive talent acquisition strategies, professional management of SWFs, and the supplementary mandate to generate sustainable financial returns ensure that the fund and its portfolio remain disciplined by market forces and ensure also that information from the market filters into senior management and policymakers' decision matrix. This supplementary commercial-centric mandate coupled with clear governance processes grants agencies like Temasek and Future Fund the operational freedom to pursue long-term objectives without being side-tracked by short-term political cycles. This is evidenced by their relatively long histories, with continuous operations, without any extreme bouts of policy discontinuity, since 1974 and 2006 respectively.

This type of arrangement is not unique to Asia:²⁶

- France is home to arguably the world's oldest SWF, the *Caisse des Dépôts et Consignations*, which takes on an active industrial policy role via entrepreneurial support, export-promotion, business advisory, infrastructure investments, private equity and venture capital programmes, and more.
- Another notable example is the New Zealand Growth Capital Partners (NZGCP), a state investment vehicle focusing on venture capital funding. Created in 1999, NZGCP had the express purpose of structurally transforming New Zealand's industrial base from the production and exporting of agriculture products to knowledge-based value creation industries (Lerner, 2010); today, New Zealand is actively nurturing a wide array of knowledge-intensive homegrown sectors ranging from medical technology to a nascent but rapidly growing space and robotics industries.
- The US' Central Intelligence Agency (CIA) chartered a government-sponsored venture capital firm, In-Q-Tel, to make strategic investments in start-ups developing commercially focused technologies of interest to the US intelligence community. Their investments have had impacts not only in the defence industry, but also in the wider technology and business community: Palantir Technologies, a software company focusing on big data analytics that recently went public with a market valuation of US\$20 billion, had its origins as a start-up backed by In-Q-Tel.

Documented positive impacts of SWFs are also not solely localised to the Asian experience; Béreau et al (2017) noted that SWF investments had significant positive economic impacts on a number of industrial sectors in Europe, ranging from improved market performance to

²⁶ See Santiso (2017) for an overview of the growth of sovereign venture funds worldwide in recent years.

increased resilience during a crisis. Findings from Brander et al (2015) highlights the positive complementarity that government-sponsored co-investment programmes induce in improving the outcomes of private venture capital investments. This feature points to a powerful fact that, as stewards of public funds operating in open market settings, SWFs must seek out intelligence that enables them to unlock long-term economic value for society, as well as adhering to short-term market disciplining forces.

A natural seed for a British SWF would be UKGI, an arms-length body created in 2016 to consolidate the government's management of its shareholdings and its expertise in corporate finance (NAO, 2016). In some ways, UKGI already serves a 'SWF-like' function as the primary asset manager of the Treasury; the most notable example being the management of emergency bank nationalisations following the 2008 Financial Crisis and their subsequent sales years later (ibid.). UKGI also directly manages key public institutions such as the BBB (and the BPC by extension), the UK Infrastructure Bank as well as sets UKEF's strategic direction (Figure 2), placing many important industrial policy levers in its toolkit. The UK also enjoys a long-established institutional structure and tradition of oversight and evaluation over its arms-length bodies, particularly NAO audits and accountability to Parliament (UKGI, 2020).

The advantage of a SWF-type body, such as UKGI could become, is the insulation of industrial policy decisions from short-term political pressures. The portfolio of enterprises and public institutions under its management would allow the SWF to co-ordinate industrial policy initiatives and identify complementarities. The following measures could transform UKGI into a fully operational developmental institution:

- Recast its mandate within its charter to include developmental objectives in addition to the current objective of acting as the government's corporate finance manager.
- Create a clear and publicly articulated governance structure. This should include established and public process of reviews and evaluations giving it flexibility to adapt and evolve.
- Establish coordination channels with other national bodies including UKRI and ARIA. Potential channels could take the form similar to the UKGI-BBB arrangement, where UKGI manages the agency on behalf of the shareholding ministry, or the case of UKGI-UKEF governance framework, where UKGI holds an ex-officio board member position within the agency. In either case, the management remit covers key responsibilities such as business planning, strategic direction setting, and aligning policy rollout with the broader state apparatus.
- Establish communication channels with Local Economic Partnership (LEP) networks, Combined Authorities, and devolved governments to include local authorities and communities and learn from the information they can provide.
- Acquire talent and build technical capacity beyond its current narrow expertise in corporate finance and governance.

A key SWF management risk regularly highlighted in the literature relates to the possibility of political interference masquerading as 'developmental' initiatives that serves no meaningful commercial or economic purpose. In particular, Bernstein et al (2013) highlighted that SWFs with greater involvement of political leaders in fund management are typically associated with investment strategies that favour short-term gains at the expense of longer-term maximisation value generation and returns. In relation to this risk, the evolved UKGI or a similar body could:

- Endorse the Santiago Principles, a set of internationally accepted principles and practices for SWFs that promote transparency, good governance, accountability, and prudent investment practices (IWG SWFs, 2008).
- Embed a process of talent acquisition for senior management and board member positions independent from political influence. This entails candidate nomination by independent selection committees to prevent political appointments and undue conflicts of interests (Gelb et al, 2014).
- Explicitly define the designated parties institution is accountable to in its charter. This should include the legislature as well as public oversight bodies such as the NAO.

This proposal is similar in spirit to the delegation of monetary policy to an independent authority, i.e. the Bank of England, back in 1997. With clearly defined objectives, set within the political process, operational rules, and a clear governance relationship with both the Treasury and Parliament, the move towards a more modern form of central banking effectively depoliticised monetary policy (Carney, 2017). A similar initiative could potentially depoliticise UK industrial policy, enabling the pursuit of consistent long-term objectives and learning from past successes and failures. UK macroeconomic policy benefits from an independent OBR and an independent central bank. The extent to which politics either can or should be removed from economic policy decisions requiring a long horizon and co-ordinated actions is debatable. Years of unconventional monetary policy have blurred the previously clear line between an independent central bank and political decisions about deficit and debt levels. Moreover, Tucker (2018) argues that the extent of technocratic independence in monetary and competition policy is undemocratic. On the other hand, the UK stands out internationally for its learning and coordination failures in the realm of industrial policy, and there seems little to lose in building on existing UK institutions or models to make the space for a less inconsistent and better co-ordinated approach.

6. Conclusions

The central premise of this paper is that deficiencies of British industrial policy, most notably that of inconsistent and poorly co-ordinated policies, stem from flaws in the way policies are generated (top-down impositional manner) that are enabled by institutional structures that ossify fragmentation and are distant from the stakeholders they are meant to serve. A systematic mechanism of continuous learning—one of deliberative, rigorous, evidence-based evaluation and analysis, followed by mechanisms to incorporate learning outcomes into the policy decision-making structures—is missing in the British industrial policymaking practice. In the absence of dedicated learning channels embedded within the policy generation process, objective evidence and insights are at risk of outweighed in terms of relative importance compared to political pressures. The imbalance of signals from objective analysis versus politics has led to the UK being locked in a constant cycle of premature policy changes with little space to allow for the integration and maturation of policy delivery mechanisms. Recognising the centrality of learning in driving policy improvements over time, the reform options explored here—i.e. independent oversight and development agencies—represent potential ways of embedding this function back into the heart of policy generation process. Ultimately, the aim is to produce a policymaking practice that is forward-looking and long-termist; given the looming societal challenges in the near future, having an open and inclusive

policymaking practice that is honest and objective represents the best way to move forward and overcome those challenges.

Bibliography

- Aiginger, K. and Rodrik, D. (2020) "Rebirth of Industrial Policy and an Agenda for the Twenty-First Century." *Journal of Industry, Competition and Trade*, 20, pp. 189–207. <https://doi.org/10.1007/s10842-019-00322-3>.
- Alsweilem, K., Cummine, A., Rietveld, M., and Tweedie, K. (2015) "Sovereign investor models: Institutions and policies for managing sovereign wealth." *Discussion Paper, Belfer Center for Science and International Affairs and Center for International Development*, Harvard Kennedy School. <https://projects.iq.harvard.edu/sovereignwealth/sovereign-investor-models-institutions-and-policies-managing-sovereign-wealth> [Accessed on 15th September 2021].
- Andreoni, A. (2016) "Varieties of Industrial Policy: Models, Packages, and Transformation Cycles." In Noman, A. and Stiglitz, J. (eds.) *Efficiency, Finance, and Varieties of Industrial Policy: Guiding Resources, Learning, and Technology for Sustained Growth* New York: Columbia University Press, pp. 245–305.. <https://doi.org/10.7312/noma18050>.
- Andreoni, A., Chang, H.J., and Scazzieri, R. (2019) "Industrial policy in context: Building blocks for an integrated and comparative political economy agenda." *Structural Change and Economic Dynamics*, 48, pp. 1–6. <https://doi.org/10.1016/j.strueco.2018.11.003>.
- Bailey, D. and Driffield, N. (2007) "Industrial Policy, FDI and Employment: Still 'Missing a Strategy'." *Journal of Industry, Competition and Trade*, 7, pp. 189–211. <https://doi.org/10.1007/s10842-006-7185-8>.
- Balawejder, F. and Monahan, E. (2020) "Effective Policy Approaches to Sectoral Issues." *Industrial Strategy Council Research Paper*. Available at <https://industrialstrategycouncil.org/effective-policy-approaches-sectoral-issues> [Accessed on 15th September 2021].
- Balawejder, F., Sampson, S., and Stratton, T. (2021) "Lessons for industrial policy from development of the Oxford/AstraZeneca Covid-19 vaccine." *Industrial Strategy Council Research Paper*. Available at <https://industrialstrategycouncil.org/lessons-industrial-policy-development-oxfordastrazeneca-covid-19-vaccine> [Accessed on 15th September 2021].
- BBB (2020) *British Business Bank Annual Report and Accounts 2020*. Available at <https://annualreport2020.british-business-bank.co.uk/> [Accessed on 15th September 2021].
- BEIS Committee (2020) *Oral evidence: Post-pandemic economic growth*. HC 393. <https://committees.parliament.uk/oralevidence/595/html/> [Accessed 15th September 2021].
- BEIS Committee (2021) *Post-pandemic economic growth: Industrial policy in the UK*. HC 385. House of Commons: London. <https://committees.parliament.uk/work/469/postpandemic-economic-growth-industrial-strategy/publications/> [Accessed on 15th September 2021].
- BEIS (2021a) "Advanced Research and Invention Agency (ARIA): statement of policy intent." *BEIS Policy Paper*, available at <https://www.gov.uk/government/publications/advanced-research-and-invention-agency-aria-statement-of-policy-intent> [Accessed on 15th September 2021].
- BEIS (2021a) "UK Innovation Strategy: leading the future by creating it." *BEIS Policy Paper*, available at <https://www.gov.uk/government/publications/uk-innovation-strategy-leading-the-future-by-creating-it> [Accessed on 15th September 2021].

- Bernstein, S., Lerner, J., and Schoar, A. (2013) "The Investment Strategies of Sovereign Wealth Funds." *Journal of Economic Perspectives*, 27(2), pp. 219–238. <https://doi.org/10.1257/jep.27.2.219>.
- Béreau, S., Gnabo, J., Kerkour, M. and Raymond, H. (2017) "Sovereign Wealth Fund Investments and Industry Performance: Evidence from Europe." In Cumming, D., Wood, G., Filatotchev, I., and Reinecke, J. (eds.) *The Oxford Handbook of Sovereign Wealth Funds*. Oxford: Oxford University Press, pp. 475–519. <https://doi.org/10.1093/oxfordhb/9780198754800.013.7>.
- BMWi (*Bundesministerium für Wirtschaft und Energie*) (2021) *French – German Non-paper: The European industrial policy strategy and its Spring-2021 Update*. Available at <https://www.bmwi.de/Redaktion/EN/Pressemitteilungen/2021/02/20210216-germany-and-france-together-for-a-new-and-innovative-european-industrial-strategy.html>.
- BPC (2020) *British Patient Capital Annual Report and Accounts 2020*. Available at <https://annualreport2020.britishpatientcapital.co.uk/> [Accessed on 15th September 2021].
- Brander, J., Du, Q., and Hellman, T. (2015) "The Effects of Government-Sponsored Venture Capital: International Evidence." *Review of Finance*, 19(2), pp. 571–618. <https://doi.org/10.1093/rof/rfu009>.
- Bruce-Clark, P. and Monk, A. (2017) "Sovereign Development Funds: The Governance and Management of Strategic Investment Institutions." In Cumming, D., Wood, G., Filatotchev, I., and Reinecke, J. (eds.) *The Oxford Handbook of Sovereign Wealth Funds*. Oxford: Oxford University Press, pp. 64–87. <https://doi.org/10.1093/oxfordhb/9780198754800.013.30>.
- Cabinet Office (2021) *Non-departmental public bodies: characteristics and governance*. Available at <https://www.gov.uk/government/publications/non-departmental-public-bodies-characteristics-and-governance> [Accessed 15th September 2021].
- CCC (2021) "Progress in adapting to climate change." *2021 Report to Parliament*, available at <https://www.theccc.org.uk/publication/2021-progress-report-to-parliament/> [Accessed 15th September 2021].
- Carney, M. (2017) "Opening remarks to the Bank of England 'Independence – 20 years on' Conference." *Bank of England 'Independence – 20 years on' Conference*, Fishmongers' Hall, London, 28 September, available at <https://www.bankofengland.co.uk/speech/2017/opening-remarks-at-the-boe-independence-20-years-on-conference> [Accessed on 15th September 2021].
- Chang, H.J. and Andreoni, A. (2020) "Industrial Policy in the 21st Century." *Development and Change*, 51(2), pp. 324–351. <https://doi.org/10.1111/dech.12570>.
- Chang, H.J., Andreoni, A. and Kuan, M. (2013) "International industrial policy experiences and the Lessons for the UK." *Future of Manufacturing Project: Evidence Paper 4*, Government Office for Science [Accessed on 15th September 2021].
- Cheney, D. and van Atta, R. (2019) "DARPA's Process for Creating New Programs." In Bonvillian, W.B., Windham, P., and van Atta, R. (eds.) *The DARPA Model for Transformative Technologies: Perspectives on the U.S. Defense Advanced Research Projects Agency*. Cambridge: Open Book Publishers. <https://books.openedition.org/obp/12212>.
- Cherif, R. and Hasanov, F. (2019) "Principles of True Industrial Policy." *Journal of Globalization and Development*, 10(1). <https://doi.org/10.1515/jgd-2019-0034>.
- Collier, P. and Kay, J. (2020) *Greed Is Dead: Politics After Individualism*. Penguin.
- Collier, P. and Mayer (2020) "Reforming the UK financial system to promote regional development in post-COVID Britain." *Oxford Review of Economic Policy*, 36(1), pp. 270–280. <https://doi.org/10.1093/oxrep/graa028>.

- Congress.gov (2021) “S.1260 — 117th Congress (2021-2022): United States Innovation and Competition Act of 2021.” Available at <https://www.congress.gov/bill/117th-congress/senate-bill/1260> [Accessed on 15th September 2021].
- Coyle, D. (2020) *Markets, State, and People: Economics for Public Policy*. Princeton: Princeton University Press.
- Crafts, N. and Hughes, (2013) “Industrial Policy for the medium to long-term.” *Future of Manufacturing Project: Evidence Paper 37*, Foresight, Government Office for Science, available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/283911/ep37-industrial-policy-medium-to-long-term.pdf [Accessed on 15th September 2021].
- Crafts, N. (2018) “Industrial Policy in the Context of Brexit.” *Fiscal Studies*, 39(4), pp. 685–706. <https://doi.org/10.1111/1475-5890.12174>.
- Cummine, A. (2016) *Citizens' Wealth: Why (and How) Sovereign Funds Should be Managed by the People for the People*. New Haven: Yale University Press.
- DeLong, J. B. and Cohen, S. (2016) *Concrete Economics*. Cambridge: Harvard Business Review Press.
- Centre for Macroeconomics (CFM) (2017) “A “new” UK industrial strategy?” *The CFM Surveys*, available at <https://cfmsurvey.org/surveys/%E2%80%9Cnew%E2%80%9D-uk-industrial-strategy> [Accessed on 15th September 2021].
- Dixon, A. and Monk, A. (2017) “A Simple Typology of Sovereign Development Funds.” In Rietveld, M. and Toledano, P. (eds.) *The New Frontiers of Sovereign Investment*, pp. 83–100. New York: Columbia University Press. <https://doi.org/10.7312/riet17750>.
- European Commission (n.d.) *A European Green Deal: Striving to be the first climate-neutral continent*. https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en [Accessed on 15th September 2021].
- European Commission (2021a) “Updating the 2020 New Industrial Strategy: Building a stronger Single Market for Europe’s recovery.” *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions*, COM(2021) 350 final, Brussels. https://ec.europa.eu/info/sites/default/files/communication-industrial-strategy-update-2020_en.pdf [Accessed on 15th September 2021].
- European Commission (2021b) *Alliance on Processors and Semiconductor Technologies*. Available at <https://digital-strategy.ec.europa.eu/en/policies/alliance-processors-and-semiconductor-technologies> [Accessed on 15th September 2021].
- Fernández-Arias, E., Hausmann, R., and Panizza, U. (2020) “Smart Development Banks.” *Journal of Industry, Competition and Trade*, 20, pp. 395–420. <https://doi.org/10.1007/s10842-019-00328-x>.
- Fuchs, E. (2019) “Rethinking the Role of the State in Technology Development: DARPA and the Case for Embedded Network Governance.” In Bonvillian, W.B., Windham, P., and van Atta, R. (eds.) *The DARPA Model for Transformative Technologies: Perspectives on the U.S. Defense Advanced Research Projects Agency*. Cambridge: Open Book Publishers. <https://books.openedition.org/obp/12212>.
- Gelb, A., Tordo, S., Halland, H., Arfaa, N., and Smith, G. (2014) “Sovereign Wealth Funds and Long-Term Development Finance.” *World Bank Policy Research Working Paper*, No. 6776. <https://openknowledge.worldbank.org/handle/10986/17313>.
- Gilbert, S. and Green, C. (2021) *Vaxxers: The Inside Story of the Oxford AstraZeneca Vaccine and the Race Against the Virus*. London: Hodder & Stoughton.

- Halpern, D. (2015) *Inside The Nudge Unit: How Small Changes Can Make a Big Difference*. London: WH Allen.
- Haldane, A. (2018) “The UK’s Productivity Problem: Hub No Spokes.” *Academy of Social Sciences Annual Lecture*, London, 28 June, available at <https://www.bankofengland.co.uk/speech/2018/andy-haldane-academy-of-social-sciences-annual-lecture-2018> [Accessed on 15th September 2021].
- Haldane, A. (2021) “UK industrial strategy is dead, long may it live.” *Financial Times*, 22 March, available at <https://on.ft.com/3dXUGJl> [Accessed on 15th September 2021].
- HM Treasury (2021a) “Build Back Better: our plan for growth.” *HM Treasury Policy Paper*, available at <https://www.gov.uk/government/publications/build-back-better-our-plan-for-growth> [Accessed on 15th September 2021].
- HM Treasury (2021b) *Policy Design of the UK Infrastructure Bank*. Available at <https://www.gov.uk/government/publications/policy-design-of-the-uk-infrastructure-bank> [Accessed on 15th September 2021].
- Industrial Strategy Commission (2017) *The Final Report of the Industrial Strategy Commission*. Available at <http://industrialstrategycommission.org.uk/2017/11/01/the-final-report-of-the-industrial-strategy-commission/> [Accessed on 15th September 2021].
- Industrial Strategy Council (2020) *Industrial Strategy Council Annual Report 2020*. Available at <https://industrialstrategycouncil.org/industrial-strategy-council-annual-report-2020> [Accessed on 15th September 2021].
- International Working Group of SWFs (IWG SWFs) (2008) *Sovereign Wealth Funds Generally Accepted Principles and Practices: Santiago Principles*. Available at <https://www.ifswf.org/santiago-principles-landing/santiago-principles> [Accessed on 15th September 2021].
- Jordan, G. (2009) “Lobbying.” In Flinders, M., Gamble, A., Hay, C., and Kenny, M. (eds.) *The Oxford Handbook of British Politics*, pp. 366–380. Oxford: Oxford University Press. <https://doi.org/10.1093/oxfordhb/9780199230952.003.0020>.
- Lemma, A. and te Velde, D.W. (2017) “State–Business Relations as Drivers of Economic Performance.” In Page, J. and Tarp, F. (eds.) *The Practice of Industrial Policy: Government—Business Coordination in Africa and East Asia*. Oxford: Oxford University Press, pp. 64–80. <https://doi.org/10.1093/acprof:oso/9780198796954.001.0001>.
- Lerner, J. (2010) “The future of public efforts to boost entrepreneurship and venture capital.” *Small Business Economics*, 35, pp. 255–264. <https://doi.org/10.1007/s11187-010-9298-z>.
- Lijphart (2012) *Patterns of Democracy*. New Haven: Yale University Press. <https://www.jstor.org/stable/j.ctt32bg23>.
- May, T. (2021) “Budget Resolutions and Economic Situation.” *UK Parliament Hansard: Volume 690*, 9 March, available at <https://hansard.parliament.uk/commons/2021-03-09/debates/507B79B1-90D6-4F98-9C06-886A53C6C00B/BudgetResolutionsAndEconomicSituation#contribution-BDEA8FB1-3930-433B-85DF-C71A8AC2BB92> [Accessed 15th September 2021].
- Mazzucato, M. (2018) “Mission-oriented innovation policies: challenges and opportunities.” *Industrial and Corporate Change*, 27(5), pp. 803–815. <https://doi.org/10.1093/icc/dty034>.
- Mazzucato, M., MacFarlane, L., and Dibb, G. (2021) “Building Back Worse.” *Project Syndicate*, 22 March, available at <https://www.project-syndicate.org/commentary/boris-johnson-governments-bad-industrial-strategy-by-mariana-mazzucato-et-al-2021-03> [Accessed on 15th September 2021].

- NAO (2016) *Evaluating the government balance sheet: financial assets and investments*. Available at <https://www.nao.org.uk/report/evaluating-the-government-balance-sheet-financial-assets-and-investments/> [Accessed on 15th September 2021].
- NAO (2017) *The Green Investment Bank*. Available at <https://www.nao.org.uk/report/the-green-investment-bank/> [Accessed on 15th September 2021].
- NAO (2020) *British Business Bank*. Available at <https://www.nao.org.uk/report/british-business-bank/> [Accessed on 15th September 2021].
- Natsuda, K. (2008) "Deliberation Councils in Southeast Asia: How Three-Party Institutional Arrangements Benefit MNCs and State Development." *RCAPS Working Paper 08-1*. Beppu: Ritsumeikan Center for Asia Pacific Studies (RCAPS), Ritsumeikan Asia Pacific University.
- Noman, A. and Stiglitz, J. (2016) "Learning, Industrial, and Technology Policies: An Overview." In Noman, A. and Stiglitz, J. (eds.) *Efficiency, Finance, and Varieties of Industrial Policy: Guiding Resources, Learning, and Technology for Sustained Growth*, pp. 1–20. New York: Columbia University Press. <https://doi.org/10.7312/noma18050>.
- Norris, E. and Adam, R. (2017) *All Change: Why Britain is so prone to policy reinvention, and what can be done about it*. Institute for Government Report, available at <https://www.instituteforgovernment.org.uk/publications/all-change> [Accessed on 15th September 2021].
- Ohno, K. (2018) *The History of Japanese Economic Development: Origins of Private Dynamism and Policy Competence*. New York: Routledge.
- Pickard, J. and Thomas, D. (2021) "Business dismay at decision to drop plan for UK industrial strategy." *Financial Times*, 8 March, available at <https://www.ft.com/content/372ae7ec-0ad7-4111-b319-db0a8f4abb7b> [Accessed on 15th September 2021].
- Redding, S. (1999) "Dynamic Comparative Advantage and the Welfare Effects of Trade." *Oxford Economic Papers*, 51(1), pp. 15–39. <https://www.jstor.org/stable/3488590>.
- Richardson, J. (2018) "The Changing British Policy Style: From Governance to Government?" *British Politics*, 13, pp. 215–233. <https://doi.org/10.1057/s41293-017-0051-y>.
- Rivlin (2013) "Politics and Independent Analysis." In Kopits, G. (ed.), *Restoring Public Debt Sustainability: The Role of Independent Fiscal Institutions*, pp. 19–31. Oxford: Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780199644476.001.0001>.
- Rodrik, D. (2009) "Industrial Policy: Don't Ask Why, Ask How." *Middle East Development Journal*, 1(1), pp. 1–29. <https://doi.org/10.1142/S1793812009000024>.
- Rodrik, D. (2019a) "Where are we in the economics of industrial policies?" *VoxDev*, 21 January, available at <https://voxdev.org/topic/public-economics/where-are-we-economics-industrial-policies> [Accessed on 15th September 2021].
- Rodrik, D. (2019b) "Industrial Policy: Old and New." *Industrial Policy in Advanced Economies in the 21st Century Conference Keynote*, London School of Economics and Political Science, 24 May, available at <https://youtu.be/ORXzXQG26sQ>.
- Romer, P. and Griliches, Z. (1993) "Implementing a National Technology Strategy with Self-Organizing Industry Investment Boards." *Brookings Papers on Economic Activity. Microeconomics*, 1993(2), pp. 345–399. <https://www.jstor.org/stable/2534742>.
- Santiso, J. (2017) "An Emerging Frontier in Sovereign Wealth Fund Management." In Rietvald, M. and Toledano, P. (eds.) *The New Frontiers of Sovereign Investment*, pp. 254–267. New York: Columbia University Press. <https://doi.org/10.7312/riet17750>.

- Sharpe, M., Sullivan, M., Hyllner, J., and Thompson, K. (2020) "The Role of Governments in the Commercial Emergence of Radical Innovation: The Case of the United Kingdom." In Vertès, A., Smith, D., Qureshi, N., and Dowden, N. (eds.) *Second Generation Cell and Gene-based Therapies: Biological Advances, Clinical Outcomes and Strategies for Capitalisation*. Academic Press, pp. 659–688. <https://doi.org/10.1016/B978-0-12-812034-7.00025-X>.
- Shih, W. and Wang, J.C. (2010) "Upgrading the Economy: Industrial Policy and Taiwan's Semiconductor Industry." *Harvard Business School Case 609-089*, available at <https://www.hbs.edu/faculty/Pages/item.aspx?num=36951>.
- Shimada, G. (2016) "Inside the Black Box of Japan's Institution for Industrial Policy: An Institutional Analysis of the Development Bank, Private Sector, and Labor." In Noman, A. and Stiglitz, J. (eds.) *Efficiency, Finance, and Varieties of Industrial Policy: Guiding Resources, Learning, and Technology for Sustained Growth*. New York: Columbia University Press, pp. 156–190. <https://doi.org/10.7312/noma18050>.
- Steenbergen, M. and Colombo, C. (2018) "Heuristics in Political Behavior." In Mintz, A. and Lesley, T. (eds.) *The Oxford Handbook of Behavioral Political Science*. New York: Oxford University Press. <https://doi.org/10.1093/oxfordhb/9780190634131.013.9>.
- Stiglitz, J. and Greenwald, B. (2014) *Creating a Learning Society: A New Approach to Growth, Development, and Social Progress*. New York: Columbia University Press. <https://www.jstor.org/stable/10.7312/stig15214>.
- Sunak, R. and Kwarteng, K. (2021) *Letter from Chancellor Rishi Sunak and Business Secretary Kwasi Kwarteng to businesses on the government's Plan for Growth*. Available at <https://www.gov.uk/government/publications/letter-from-chancellor-rishi-sunak-and-business-secretary-kwasi-kwarteng-to-businesses-on-the-governments-plan-for-growth> [Accessed on 15th September 2021].
- Tucker, P. (2018) *Unelected Power: The Quest for Legitimacy in Central Banking and the Regulatory State*. Princeton: Princeton University Press.
- UKEF (2020) *UK Export Finance Business Plan 2020 to 2024*. Available at <https://www.gov.uk/government/publications/uk-export-finance-business-plan-2020-to-2024> [Accessed on 15th September 2021].
- UKGI (2020) "UK government arm's length bodies: the case for them in specialised delivery and how to optimise their use." *UKGI Corporate Reports*, available at <https://www.ukgi.org.uk/2020/01/23/ukgi-issues-paper-on-the-use-of-albs-for-specialised-delivery/> [Accessed on 15th September 2021].
- UNCTAD (2018) *World Investment Report 2018: Investment and New Industrial Policies*. Geneva: United Nations Publications.
- Vis (2018) "Heuristics and Political Elites' Judgment and Decision-Making." *Political Studies Review*, 17(1), pp. 41–52. <https://doi.org/10.1177%2F1478929917750311>.
- Völgyi, K. (2019) "A Successful Model of State Capitalism: Singapore." In Szanyi M. (ed.), *Seeking the Best Master: State Ownership in the Varieties of Capitalism*. New York: Central European University Press, pp. 275–296. <https://www.jstor.org/stable/10.7829/j.ctv138wqt7.13>.
- Wade, R.H. (2014) "The paradox of US industrial policy: The developmental state in disguise." In Salazar-Xirinachs, J.M., Nübler, I., Kozul-Wright, R. (eds.), *Transforming Economies: Making industrial policy work for growth, jobs and development*. Geneva: International Labour Office, pp. 379–400. https://www.ilo.org/global/publications/ilo-bookstore/order-online/books/WCMS_242878/lang--en/index.htm.

Wilkes, G. (2020) *How to design a successful industrial strategy*. Institute for Government Report, available at <https://www.instituteforgovernment.org.uk/publications/industrial-strategy> [Accessed on 15th September 2021].



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